

## Research Article

# Feedback of School Leaders on the Use of a Digital Maturity Model in Supporting School Transformation: A Thematic Analysis

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### Abstract:

Digital transformation in schools requires structured frameworks that guide planning, implementation, and evaluation of digital initiatives. However, many school leaders lack practical tools to assess their digital readiness and to monitor progress in their transformation. This study explored the feedback of three school leaders who implemented a Digital Maturity Model (DMM) to support school transformation planning. A qualitative research design was employed using semi-structured interviews, and the data were analyzed using thematic analysis. The findings revealed four key themes: strategic clarity, data-informed decision-making, leadership empowerment, and systematic school improvement. The results indicate that the Digital Maturity Model is a practical and user-friendly tool that supports structured planning and continuous digital transformation in schools.



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## 1. INTRODUCTION

Digital transformation has become a critical priority for schools seeking to improve teaching, learning, and institutional effectiveness in an increasingly technology-driven environment (Baxter et al., 2022; Yuliandari et al., 2023). School leaders play a central role in guiding this transformation by setting strategic direction, allocating resources, and fostering innovation within their institutions (Asante & Novák, 2023). However, many school leaders face challenges in translating digital initiatives into measurable and sustainable school improvement (Dexter et al., 2021). One key challenge is the absence of structured tools that enable leaders to systematically assess digital readiness and identify development priorities (Razak et al., 2023). Without clear diagnostic frameworks, digital transformation efforts often depend on individual initiatives rather than coordinated institutional planning (Ly & Nguyen, 2024). As a result, schools may invest in digital technologies without achieving meaningful improvements in teaching practices or organizational performance. To address this challenge, the Digital Maturity Model (DMM) was introduced as a structured framework designed to support school leaders in planning and monitoring digital transformation. The model assesses school readiness across six dimensions: (i) Digital Leadership and Governance; (ii) Digital Infrastructure and Cybersecurity;

(iii) Digital Pedagogy and Assessment; (iv) Digital Competence and Culture; (v) Data Practices and Decision Intelligence, and (vi) AI Readiness and Responsible Innovation. This study aimed to explore the feedback of school leaders who applied the Digital Maturity Model in their schools and to understand how the model supports school transformation.

## **2. LITERATURE REVIEW**

### *2.1 Digital Transformation in School Contexts*

Digital transformation in education represents a systemic shift that extends beyond the adoption of digital technologies toward the redesign of pedagogical practices, institutional processes, and organizational culture (Masiello et al., 2023). Contemporary education systems increasingly recognize that digital transformation involves coordinated changes in leadership, curriculum, assessment, and professional development rather than isolated technological interventions (Ly & Nguyen, 2024). Research consistently demonstrates that the mere provision of digital devices or platforms does not guarantee improvements in student learning outcomes or instructional quality unless these technologies are embedded within coherent pedagogical and organizational strategies (Arifani et al., 2026). Consequently, scholars emphasize that successful digital transformation requires alignment among leadership vision, teacher competence, infrastructure readiness, and institutional culture to sustain innovation and continuous improvement (McCarthy et al., 2023). Within school contexts, digital transformation is therefore conceptualized as an ongoing developmental process in which institutions progressively enhance their capacity to integrate technology into teaching, decision-making, and governance practices. This perspective highlights the need for structured frameworks that enable schools to systematically evaluate their readiness and guide strategic transformation initiatives (OECD, 2025; McCarthy et al., 2023).

### *2.2 Digital Maturity Models in Education*

Digital maturity models have emerged as critical diagnostic tools for assessing organizational readiness and guiding technology-driven transformation in educational institutions (Valdivia-Salazar et al., 2025). These models provide structured frameworks that measure the extent to which digital practices are integrated into leadership, teaching, infrastructure, and organizational processes. In recent years, digital maturity models have been widely adopted in education systems to support school improvement planning, monitor progress, and inform policy implementation. Scholars argue that digital maturity is best understood as a multidimensional construct encompassing technological capability, pedagogical innovation, organizational culture, and governance mechanisms (Haryanti et al., 2023). By evaluating these interconnected dimensions, digital maturity models enable institutions to identify developmental gaps and prioritize targeted improvement strategies. Moreover, digital maturity frameworks provide leaders with evidence-based insights that support long-term planning and resource allocation, thereby enhancing institutional resilience in rapidly changing technological environments. The increasing use of maturity models in education reflects a broader shift toward data-informed decision-making and accountability in school transformation efforts (Tsimpanis et al., 2023; Song et al., 2024; Valdivia-Salazar et al., 2025).

### *2.3 Practical Use of Digital Maturity Models in Schools*

The practical application of digital maturity models in schools has gained increasing attention as education systems seek structured approaches to managing digital transformation (Valdivia-Salazar et al., 2025). In practice, these models are used as data-based frameworks or self-assessment tools that enable schools to evaluate their current level of digital readiness and develop strategic improvement plans (Tsimpanis et al., 2023). By providing clear benchmarks and performance indicators, digital maturity models facilitate systematic monitoring of progress and support evidence-based decision-making among school leaders. Studies have shown that schools using structured maturity frameworks

are better positioned to coordinate digital initiatives, align professional development with institutional goals, and sustain innovation over time (Ladu et al., 2024). Additionally, digital maturity assessments promote reflective practice by encouraging school leaders and teachers to critically evaluate their digital capabilities and identify growth opportunities. The integration of maturity models into school planning processes, therefore, represents an important step toward institutionalizing digital transformation and ensuring its long-term sustainability.

#### *2.4 Role of School Leadership in Digital Transformation*

School leadership is widely recognized as a central determinant of successful digital transformation in education (Yuan et al., 2026). Effective leaders play a critical role in establishing a clear vision for digital innovation, mobilizing resources, and fostering a culture of collaboration and continuous learning. Leadership practices influence teacher engagement, technology adoption, and the sustainability of digital initiatives across the organization. Research indicates that transformational leadership behaviours, such as inspiring shared goals, encouraging experimentation, and supporting professional development, significantly enhance the implementation of digital innovations in schools (Dexter & Richardson, 2020; Yamamoto & Yamaguchi, 2019). Furthermore, leaders serve as change agents who guide stakeholders through complex organizational transitions associated with digital transformation. Their decisions shape the direction, pace, and effectiveness of technology integration efforts (Reis-Andersson, 2024). As such, understanding school leaders' experiences and perceptions of digital transformation tools is essential for evaluating the practicality and effectiveness of digital maturity frameworks in real-world educational settings, especially in the era of Artificial Intelligence (Yuan et al., 2026).

### **3. METHODOLOGY**

#### *3.1 Research Design*

This study employed a qualitative exploratory research design to investigate school leaders' feedback on the use of the Digital Maturity Model (DMM) in supporting school transformation. A qualitative approach was selected because the study aimed to capture participants' lived experiences, perceptions, and reflections regarding the practical application of the model within authentic school contexts (Lim, 2025). In this study, qualitative inquiry is particularly appropriate for examining complex organizational processes such as digital transformation, where contextual understanding and interpretive insights are essential. The study adopted thematic analysis as the primary analytical framework to systematically identify patterns and themes emerging from participants' narratives (Braun & Clarke, 2006). This design enabled the researchers to generate rich, context-sensitive evidence regarding the practicality, usefulness, and leadership implications of the Digital Maturity Model in guiding school-level digital transformation initiatives.

#### *3.2 Research Context and Participants*

The study was conducted in three schools that had implemented the Digital Maturity Model as part of their school transformation planning processes. The participants consisted of three purposively selected school leaders who held key decision-making responsibilities in their respective institutions. Purposeful sampling was employed to ensure that participants possessed direct experience in applying the Digital Maturity Model within real school settings and could provide informed feedback on its practical implementation. The participants included a school principal, a senior assistant, and a head of department, representing different levels of leadership within the school's organizational structure. These leadership roles were selected because school leaders play a critical role in planning, implementing, and monitoring digital transformation initiatives. Their experiences,

therefore, provide valuable insights into the operational feasibility and strategic value of the Digital Maturity Model in supporting school improvement.

### *3.3. Data Collection*

Data were collected using semi-structured interviews, which allowed participants to express their experiences and perspectives while ensuring consistency across interview sessions (Lim, 2025). The interview protocol was developed based on the key dimensions of the Digital Maturity Model, including leadership, pedagogy, infrastructure, data practices, and innovation readiness. The interviews focused on exploring participants' perceptions of the model's usefulness, practicality, and impact on school transformation planning. Each interview session lasted approximately 30 to 45 minutes and was conducted in a professional setting to ensure participant comfort and confidentiality. With participants' consent, the interviews were audio-recorded to ensure accuracy and completeness of data collection. Field notes were also taken to capture contextual observations and non-verbal cues that supported data interpretation and the triangulation process (Lim, 2025; Denzin, 1978). This systematic data collection procedure ensured the reliability and credibility of the qualitative evidence generated in the study.

### *3.4 Data Analysis*

The qualitative data were analysed using thematic analysis, a widely recognized method for identifying, analysing, and interpreting patterns within qualitative datasets (Braun & Clarke, 2006). The analysis followed a systematic six-step procedure to ensure methodological rigor and transparency. First, the researchers engaged in data familiarization by repeatedly reading the interview transcripts to gain a comprehensive understanding of participants' responses. Second, initial codes were generated to categorize meaningful text segments related to the use and impact of the Digital Maturity Model. Third, the coded data were organized into preliminary categories to facilitate theme identification. Fourth, the emerging themes were carefully reviewed and refined to ensure internal consistency and conceptual clarity. Fifth, each theme was clearly defined and labelled to reflect its substantive meaning. Finally, the themes were synthesized into a coherent narrative to support the interpretation and reporting of the study findings. This structured analytical process enabled the researchers to derive credible and meaningful insights regarding school leaders' experiences with the Digital Maturity Model.

### *3.5 Trustworthiness and Rigour*

To enhance the trustworthiness of the study, several strategies were implemented to ensure credibility, dependability, and confirmability of the findings (Lim, 2025). Credibility was strengthened through careful transcription of interview data and repeated verification of interpretations against the original responses. Dependability was supported by maintaining a clear audit trail documenting data collection and analysis procedures. Confirmability was ensured by grounding all interpretations in participants' statements and minimizing researcher bias during analysis. Additionally, peer review of coding and theme development was conducted to enhance analytical consistency and transparency. These measures collectively contributed to the methodological rigor of the study and ensured that the findings accurately reflected school leaders' experiences in using the Digital Maturity Model.

## **4. FINDINGS**

The thematic analysis of interview data from three school leaders revealed four interrelated themes describing the practical impact of the Digital Maturity Model (DMM) on school digital transformation processes. These themes show how the model functioned not merely as an assessment

instrument but as a strategic planning and leadership support framework within school contexts. The identified themes were (i) Strategic Clarity, (ii) Data-Informed Decision-Making, (iii) Leadership Empowerment, and (iv) Systematic School Improvement. Across all participants, the findings indicated that the Digital Maturity Model enhanced organizational coherence, strengthened leadership capacity, and supported structured implementation of digital transformation initiatives. The convergence of perspectives among the school leaders suggests that the model possesses strong practical utility in guiding school-level planning and continuous improvement. Table 1 shows the thematic analysis of school leaders' feedback on the use of the Digital Maturity Model in school transformation.

**Table 1.** Thematic analysis of school leaders' feedback.

| Initial Codes                                       | Categories                      | Themes                        |
|-----------------------------------------------------|---------------------------------|-------------------------------|
| Clear direction for digital planning                | Strategic planning clarity      | Strategic Clarity             |
| Identifying school strengths and weaknesses         | Institutional self-assessment   | Strategic Clarity             |
| Aligning digital initiatives with the school vision | Goal alignment                  | Strategic Clarity             |
| Setting measurable digital targets                  | Structured planning             | Strategic Clarity             |
| Using data to guide decisions                       | Evidence-based planning         | Data-Informed Decision-Making |
| Prioritizing improvement areas                      | Resource allocation             | Data-Informed Decision-Making |
| Monitoring digital readiness levels                 | Performance evaluation          | Data-Informed Decision-Making |
| Analyzing digital maturity results                  | Organizational decision support | Data-Informed Decision-Making |
| Confidence in leading digital initiatives           | Leadership confidence           | Leadership Empowerment        |
| Improved leadership coordination                    | Leadership capacity building    | Leadership Empowerment        |
| Monitoring transformation progress                  | Change management               | Leadership Empowerment        |
| Using a structured framework for planning           | Leadership guidance             | Leadership Empowerment        |
| Tracking progress over time                         | Continuous monitoring           | Systematic School Improvement |
| Regular evaluation of digital initiatives           | Institutional reflection        | Systematic School Improvement |
| Developing long-term improvement plans              | Sustainable development         | Systematic School Improvement |
| Embedding evaluation into school routine            | Organizational learning         | Systematic School Improvement |

The coding process followed an inductive thematic analysis approach in which meaningful statements from interview transcripts were first coded into descriptive units. These codes were then grouped into conceptual categories representing recurring patterns in participants' experiences. Finally, the categories were synthesized into four overarching themes reflecting the practical role of the Digital Maturity Model in supporting school transformation. This hierarchical coding structure ensured conceptual coherence and analytical transparency throughout the data analysis process.

#### 4.1 Strategic Clarity

The first theme, Strategic Clarity, reflects school leaders' perceptions that the Digital Maturity Model provided a structured framework for planning and aligning digital initiatives with institutional goals. Participants reported that the model enabled them to systematically identify strengths and weaknesses in their schools' digital practices, thereby supporting more focused and intentional decision-making. Rather than relying on informal judgments or fragmented planning processes, school leaders used the model to establish clear development priorities and measurable targets. This structured approach facilitated alignment between digital initiatives and the broader school vision, ensuring that technology integration efforts were purposeful and strategically coordinated (Mizova et al., 2025). One of the school leaders explained that the model transformed planning from reactive implementation into proactive strategy formulation, noting that *"the model gave us a clear direction because we could see exactly where our school stands and what we need to improve."* Another participant

emphasized that the framework supported collaborative planning among leadership teams by providing a shared reference point for discussing school development goals. These responses indicate that the Digital Maturity Model strengthened strategic coherence by enabling leaders to translate abstract digital transformation goals into concrete operational plans. The findings therefore show that structured diagnostic frameworks can enhance leadership clarity and reduce uncertainty in managing digital transformation initiatives.

#### *4.2 Data-Informed Decision Making*

The second theme, Data-Informed Decision-Making, highlights the role of the Digital Maturity Model in supporting evidence-based planning and resource allocation. School leaders reported that the model generated quantifiable indicators of digital readiness, enabling them to evaluate institutional performance and prioritize improvement areas with greater confidence. The availability of structured data reduced reliance on assumptions and enabled leaders to make more objective decisions regarding resource distribution, professional development, and program implementation. Participants emphasized that the model facilitated systematic evaluation of school readiness by providing measurable benchmarks across multiple dimensions of digital transformation. For example, one leader noted that *"we used the results to decide where to invest our resources because the data showed which areas needed the most support."* Another participant explained that the model supported transparent decision-making processes by allowing stakeholders to review assessment results and collectively determine improvement priorities. These findings suggest that the Digital Maturity Model promoted accountability and organizational learning by transforming data into actionable insights. The results further show that structured assessment tools can strengthen decision-making capacity in school leadership by providing reliable evidence to guide strategic planning.

#### *4.3 Leadership Empowerment*

The third theme, Leadership Empowerment, reflects school leaders' perceptions that the Digital Maturity Model enhanced their confidence and capability in managing digital transformation initiatives. Participants reported that the model provided a clear framework that supported leadership responsibilities, including monitoring progress, coordinating initiatives, and evaluating outcomes. By offering structured guidance, the model reduced ambiguity and enabled leaders to assume more proactive roles in driving innovation within their schools. School leaders indicated that the framework strengthened their sense of control over digital transformation processes by clarifying expectations and providing systematic procedures for implementation. One participant explained that *"the model made leadership easier because we had a clear framework to guide our decisions and monitor progress."* Another leader noted that the model encouraged reflective leadership practices by prompting regular evaluation of school performance and identification of improvement opportunities. These responses suggest that structured frameworks can enhance leadership self-efficacy and support effective change management in educational settings. The findings, therefore, highlight the importance of leadership tools that provide both strategic direction and operational guidance in complex organizational transformations.

#### *4.4 Systematic School Improvement*

The fourth theme, Systematic School Improvement, captures school leaders' perceptions that the Digital Maturity Model supported continuous and sustainable development rather than one-time implementation of digital initiatives. Participants reported that the model enabled them to track progress over time and monitor the effectiveness of improvement strategies. This ongoing evaluation process encouraged iterative refinement of school practices and reinforced a culture of continuous improvement. School leaders emphasized that the model provided a structured mechanism for reviewing institutional performance on a regular basis, thereby supporting long-term planning and organizational learning. One participant stated, *"We now review our progress every year, and the model*

*helps us improve step by step.*” Another leader highlighted the model’s role in fostering accountability by establishing clear benchmarks for measuring school development. These responses indicate that the Digital Maturity Model promoted sustainable transformation by embedding evaluation and reflection into routine school practices. The findings therefore demonstrate that structured maturity frameworks can support systematic improvement processes by enabling schools to monitor progress, adapt strategies, and sustain innovation over time.

## 5. DISCUSSION

The findings of this study provide evidence that the Digital Maturity Model (DMM) functions as a practical and strategically relevant framework for guiding school transformation. The four themes identified are: (i) Strategic Clarity, (ii) Data-Informed Decision-Making, (iii) Leadership Empowerment, and (iv) Systematic School Improvement. These themes reinforce the conceptualization of digital transformation as a systemic process rather than a technological intervention (Tagscherer & Carbon, 2023). These findings align with contemporary scholarship emphasizing that successful digital transformation depends on coordinated changes in leadership, pedagogy, infrastructure, and organizational culture (Haryanti et al., 2023; Yuan et al., 2026). The consistent convergence of perspectives among school leaders suggests that structured diagnostic frameworks play a critical role in translating digital vision into operational practice.

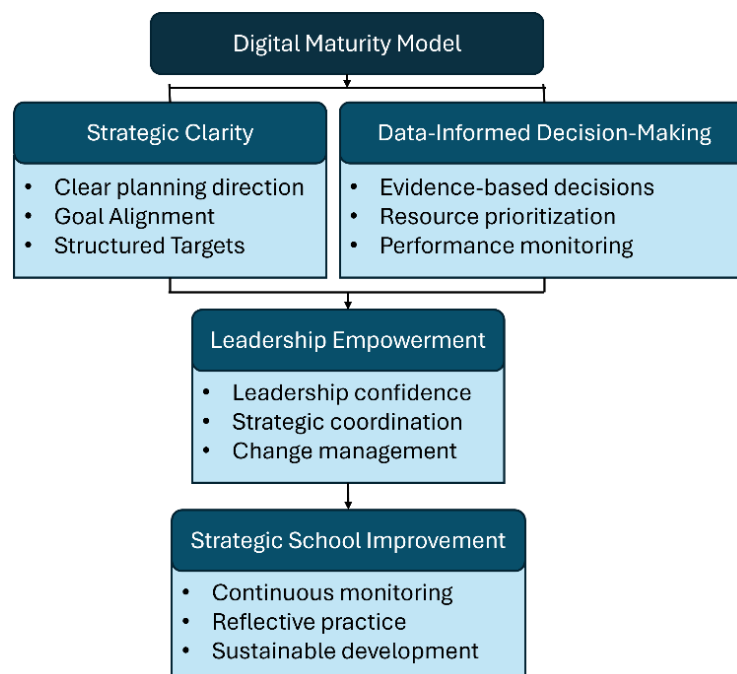
The theme of Strategic Clarity resonates strongly with principles of Transformational Leadership Theory, which posits that leaders influence organizational change by articulating a shared vision and aligning stakeholders toward common goals (Yuan et al., 2026; Tagscherer & Carbon, 2025). The participating school leaders reported that the Digital Maturity Model provided a structured planning mechanism that clarified institutional priorities and reduced ambiguity in decision-making. This finding supports prior research indicating that leadership clarity and strategic alignment are essential determinants of successful digital transformation in schools (McCarthy et al., 2023). By enabling leaders to systematically assess readiness across multiple dimensions, the model operationalizes leadership vision into measurable actions, thereby strengthening institutional coherence and organizational direction.

The second theme, Data-Informed Decision-Making, reflects the increasing importance of evidence-based leadership in contemporary education systems (Ming et al., 2024). This finding is consistent with Socio-Technical Systems Theory, which emphasizes the interaction between human judgment and technological systems in shaping organizational performance. School leaders in this study reported that the Digital Maturity Model transformed abstract digital initiatives into quantifiable indicators that informed resource allocation and program planning. This evidence suggests that structured maturity assessments enhance organizational accountability by enabling leaders to make transparent and data-driven decisions (Tsimpanis et al., 2023; Song et al., 2024; Valdivia-Salazar et al., 2025). Furthermore, the findings highlight the role of digital maturity models in fostering a culture of continuous evaluation and organizational learning within school environments.

The theme of Leadership Empowerment further highlights the central role of leadership capacity in sustaining digital transformation (Valdivia-Salazar et al., 2025). Participants reported increased confidence in managing digital initiatives after implementing the Digital Maturity Model, indicating that structured frameworks can strengthen leadership self-efficacy and change management capability. This finding aligns with research suggesting that leaders who possess clear tools and performance indicators are better equipped to guide institutional innovation and navigate complex transformation processes (Hariyani et al., 2025). The model therefore functions not only as an assessment instrument but also as a leadership development tool that enhances strategic competence and organizational readiness.

Finally, the theme of Systematic School Improvement supports the theoretical proposition that digital transformation is an iterative and developmental process rather than a one-time implementation program (Kahveci, 2025). The participating school leaders emphasized the importance of ongoing monitoring and reflection in sustaining improvement initiatives. This finding aligns with continuous improvement frameworks that emphasize cyclical evaluation, feedback, and adaptation as essential components of organizational development (Kahveci, 2025). By embedding structured evaluation into routine school practices, the Digital Maturity Model promotes sustainable transformation and institutional resilience in dynamic technological environments.

In summary, the findings extend existing literature on digital maturity by demonstrating how structured frameworks can translate theoretical constructs into practical leadership tools. The integration of leadership, data practices, and organizational learning within the model supports a multidimensional understanding of digital transformation, reinforcing the view that sustainable innovation requires alignment among people, processes, and technology. Figure 1 shows how the structured Digital Maturity Model supports leadership capacity, evidence-based decision-making, and continuous school improvement processes.



**Figure 1.** Thematic map of school leaders' feedback on the use of the digital maturity model in school transformation

## 6. CONCLUSION

This study provides empirical evidence supporting the practical value of the Digital Maturity Model as a structured framework for guiding school transformation. The thematic analysis of school leaders' feedback revealed that the model enhances strategic clarity, strengthens data-informed decision-making, empowers leadership capacity, and promotes systematic school improvement. These findings demonstrate that digital transformation in schools is most effective when supported by coherent frameworks that integrate leadership, evaluation, and continuous learning processes.

The significance of this study lies in its demonstration that digital maturity frameworks can function as both diagnostic and developmental tools for educational institutions. By translating

complex transformation goals into measurable indicators and actionable strategies, the model enables schools to move beyond technology adoption toward sustainable organizational innovation. The findings, therefore, contribute to the growing body of research emphasizing the importance of structured planning and leadership capacity in digital transformation initiatives.

In an era characterized by rapid technological change and increasing demands for educational innovation, the Digital Maturity Model offers a scalable and adaptable solution for supporting school development. Its multidimensional design and practical usability position it as a valuable instrument for guiding institutional transformation at both school and system levels. Future research may expand the application of the model across diverse educational contexts to further evaluate its impact on teaching quality, leadership effectiveness, and student outcomes.

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## References

- Arifani, Y., Suryanti, S., Raja Harun, RNS., Wahi, W., & Susanto, S. (2026). Editorial: Redefining learning in the digital age: pedagogical strategies and outcomes. *Frontier Education*, 11, 1811393. <https://doi.org/10.3389/feduc.2026.1811393>
- Asante, K., & Novák, P. (2023). When the push and pull factors in digital educational resources backfire: the role of digital leader in digital educational resources usage. *Education and Information Technologies*, 29(6), 6553-6578. <https://doi.org/10.1007/s10639-023-12095-8>
- Baxter, J., Floyd, A., & Jewitt, K. (2022). Pandemic, a catalyst for change: Strategic planning for digital education in English secondary schools, before during and post Covid. *British Educational Research Journal*, 49(2), 329-351. <https://doi.org/10.1002/berj.3845>
- Braun V., & Clarke V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Denzin N. K. (1978). *The research act: A theoretical introduction to sociological methods*. McGraw-Hill.
- Dexter, S., Francisco, A., & Luna, C. (2021). Five leading-edge K-12 districts' decision-making processes for EdTech innovations. *Journal of Educational Administration*, 59(3), 352-366. <https://doi.org/10.1108/jea-10-2020-0222>
- Dexter, S., & Richardson, J. W. (2019). What does technology integration research tell us about the leadership of technology? *Journal of Research on Technology in Education*, 52(1), 1–20. <https://doi.org/10.1080/15391523.2019.1668316>
- Haryanti, T., Rakhmawati, N. A., & Subriadi, A. P. (2023). The extended digital maturity model. *Big Data and Cognitive Computing*, 7(1), 17. <https://doi.org/10.3390/bdcc7010017>
- Hariyani, D., Hariyani, P., & Mishra, S. (2025). The role of leadership in sustainable digital transformation of the organization. *Sustainable Futures*, 10, 101130. <https://doi.org/10.1016/j.sftr.2025.101130>
- Kahveci, E. (2025). Digital transformation in SMEs: enablers, interconnections, and a framework for sustainable competitive advantage. *Administrative Sciences*, 15(3), 107. <https://doi.org/10.3390/admsci15030107>
- Ladu, L., Ladu, L., Koch, C., Koch, C., Parsa Asna Ashari, Parsa Asna Ashari, Blind, K., Blind, K., & Pavel Castka. (2024). Technology adoption and digital maturity in the conformity assessment industry: Empirical evidence from an international study. *Technology in Society*, 102564–102564. <https://doi.org/10.1016/j.techsoc.2024.102564>
- Lim, W. M. (2025). What is qualitative research? An overview and guidelines. *Australasian Marketing Journal*, 33(2), 199-229.

- Ly, N., & Nguyen, H. (2024). Exploring the nexus of organizational culture, digital capabilities, and organizational readiness for change in primary school in digital transformation: A quantitative analysis. *International Journal of Educational Methodology*, 10(2), 325-336. <https://doi.org/10.12973/ijem.10.2.325>
- Masiello, I., Fixsen, D., Nordmark, S., Mohseni, Z., Holmberg, K., Rack, J., & Augustsson, H. (2023). Digital transformation in schools of two southern regions of Sweden through implementation-informed approach: A mixed-methods study protocol. *Plos One*, 18(12), e0296000. <https://doi.org/10.1371/journal.pone.0296000>
- McCarthy, A. M., Maor, D., McConney, A., & Cavanaugh, C. (2023). Digital Transformation in education: Critical Components for Leaders of System Change. *Social Sciences & Humanities Open*, 8(1). <https://doi.org/10.1016/j.ssaho.2023.100479>
- Mizova, B., Parvanova, Y., & Peytcheva-Forsyth, R. (2026). Leading the digital transformation of education: The perspective of school principals. *Administrative Sciences*, 16(1), 57. <https://doi.org/10.3390/admsci16010057>
- OECD. (2025). Resourcing school education: policies for the digital transformation of education and future-readiness of teachers. Retrieved from <https://www.oecd.org/en/about/projects/resourcing-school-education.html> (accessed on 8 January 2025).
- Razak, N., Rasli, R., Subhan, S., Ahmad, N., & Malik, S. (2023). Systematic review on digital transformation among teachers in public schools. *International Journal of Evaluation and Research in Education (IJERE)*, 12(2), 1059. <https://doi.org/10.11591/ijere.v12i2.24498>
- Reis-Andersson, J. (2024). Leading the digitalization in K–12 education at the municipality level. *Cogent Education*, 11(1). <https://doi.org/10.1080/2331186x.2024.2368997>
- Song, R., Pang, F., Jiang, H., & Zhu, H. (2024). A machine learning based method for constructing group profiles of university students. *Heliyon*, 10(7), e29181. <https://doi.org/10.1016/j.heliyon.2024.e29181>
- Tagscherer, F., & Carbon, C.-C. (2023). Leadership for successful digitalization: A literature review on companies' internal and external aspects of digitalization. *Sustainable Technology and Entrepreneurship*, 2(2), 1–15. <https://www.sciencedirect.com/science/article/pii/S2773032823000032>
- Tagscherer, F., & Carbon, C.-C. (2025). The role of transformational leadership in navigating digital servitization. *Sustainable Technology and Entrepreneurship*, 4(2), 1–12. <https://doi.org/10.1016/j.stae.2025.100098>
- Tsimpanis, K., Avouris, N., Chounta, I. A., Daskalaki, S., Dimitriadis, Y., Gari, C. M. (2023). Implementing a data-driven framework for measuring digital readiness across European universities. *Proceedings of European University Information Systems Congress 2023*, 95, 129–139.
- Yamamoto, Y., & Yamaguchi, S. (2019). Relationships between ICT implementation at schools and factors related to transformational leadership: A case of primary school in Mongolia. *International Journal of Education and Development using Information and Communication Technology*, 15, 45–61.
- Yuan, P., Chen, X., & Song, H. (2026). School principals' perspectives and leadership styles for digital transformation: A Q-methodology study. *Behavioral Sciences (Basel, Switzerland)*, 16(2), 165. <https://doi.org/10.3390/bs16020165>
- Yuliandari, T., Putri, A., & Rosmansyah, Y. (2023). Digital transformation in secondary schools: A systematic literature review. *IEEE Access*, 11, 90459–90476. <https://doi.org/10.1109/access.2023.3306603>
- Valdivia-Salazar, C., Serquén, O., Guevara, L., Bravo-Jaico, J., Alarcón, R., Germán, N., Aquino, J., Maquen-Niño, GLE., & Moreno Heredia, A. (2025). Development and validation of an instrument to assess the maturity of digital transformation in higher education institutions. *Frontier Education*, 10, 1691178. <https://doi.org/10.3389/educ.2025.1691178>