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EDITORIAL

Digital Leadership and Sustainable School Improvement—A Conceptual Analysis and Implications for Future Research

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Background/purpose – We live in the age of digital transformation, and our lives are fundamentally shaped by the influence of digital technologies. This transformation is calling for profound changes in the education of new generations, and forcing schools to realize structural and pedagogical transformation so as to equip students with the knowledge and skills necessary for life in the 21st century. Under these circumstances, digital leadership has become significant in sustaining digitally-driven school improvement. Digital leadership, used as an umbrella term to refer to technology-referenced leadership models such as e-leadership, technology leadership, virtual leadership, or leadership 4.0, aim at integrating digital technologies into the functioning and improvement of organizations and leveraging their sustainability in the digital era. This study aims to discuss the potential contribution of digital leadership to sustainable school improvement efforts in the digital era, and suggests implications for future studies.

Materials/methods – This is a conceptual paper which briefly defines digital leadership, school improvement, and the relationship between these two variables. Based on this analysis, it also points out some aspects to be addressed by future studies.

Practical implications – In this paper, we argue that digital leadership has much to offer to enhance school improvement in accordance with the requirements of this age. We also analyze the digital leadership and school improvement literature to identify potential gaps in research and suggest implications for the future investigation of digital leadership with a particular focus on school improvement.

Conclusion – An overview of digital leadership and school improvement literature suggest that future research should particularly address digital leadership from a distributed and social justice perspective, and provide further evidence on the mechanisms and means of enacting effective digital leadership in enabling schools to respond properly to their fast-changing digital environment.

Keywords – Digital leadership, school improvement, principal, leadership, school effectiveness.

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1. INTRODUCTION

The 21st century is called the era of the Industrial Revolution 4.0, or the Digital Age, which is characterized with drastic changes in the way people live, work, and interact with each other due to technological breakthroughs (Peng, 2021). Today, all aspects of human life have been largely influenced by the new digital environment underpinned by information and communication technologies (ICT) (Limna et al., 2022). Broadening access to innovative technologies such as automated machinery, robotic devices, artificial intelligence (AI), the Internet of Things (IoT), digital networking, and augmented reality continues to ignite digital transformation in the modern society (Azrai et al., 2020, Oberer & Erkollar, 2018).

In the face of these rapid and constant changes, educational systems are also urged to innovate themselves and align their teaching-learning environments to the changing needs of their student populations (Ilomäki & Lakkala, 2018; Zhong, 2017) that "learn in different ways and have different experiences with technology compared to many of their teachers and most of their administrators" (Levin & Schrum, 2014, p. 640). As such, newer technologies are to become an integral part of students' learning not only to enhance their academic achievement but to equip them with the skills required to function successfully in the digital society (Battro & Fischer, 2012; Limna et al., 2022).

This new context of education assigns new leadership roles to school administrators for the successful integration and implementation of technology in all educational activities (Avidov-Ungar et al., 2022; Pata et al., 2022). As Shin et al. (2023) state, digital transformation in today's schools does not only necessitate updating resources or implementation of newer technologies, but also requires efforts to attune the school structure, tasks, staff, and culture to these new circumstances. As a result, digital leadership has become one of the significant pillars in enabling the digital transformation of schools (Karakose et al., 2022; Yusof et al., 2019), and supporting the sustainability of school improvement efforts in the digital era.

2. LITERATURE REVIEW

2.1. Digital Leadership

In the literature, several terms are used to refer to the new leadership style required in the digital era, with no or slight differences in meaning, such as technology leadership, e-leadership, leadership 4.0, or virtual leadership. Digital leadership is used as an umbrella term to refer to all these types of leadership models aiming at the successful integration of digital technologies into the functioning and improvement of organizations (Karakose et al., 2022).

In the present paper, we refer to digital leadership as a school-level leadership construct that combines leadership skills with digital competences in order to establish schools that are digitally-enabled and responsive to their fast-changing, digital environment. As an innovative, change-oriented and team-based leadership model, digital leadership is not only about using ICT or digital technologies in performing leadership functions at school, but comprises several significant elements such as possessing particular leadership skills and qualities, providing professional development and support, establishing a digital-friendly culture, developing positive relationships, enabling systemic and structural improvement (Hamzah et al., 2021; Yusof et al., 2019).

Digital transformation of schools could be realized through aligning the goals, vision, governance, structure, decision processes, values, culture, and climate of school with the new circumstances (Eberl & Drews, 2021), and some qualities of digital leaders come into

prominence to realize and sustain this transformation. As defined in the literature, successful digital leaders are adaptable, open to new ideas, resilient, and agile as well as willing to explore and master new skills and knowledge of latest technologies (Shin et al., 2023; Sterrett & Richardson, 2020; Yusof et al., 2019). Using these skills, digital leaders not only adapt to the fast-changing technology and innovation but also promote the effective integration of these technologies into the teaching-learning environment through modelling and professional support (Hamzah et al., 2021). According to a recent study by Karakose et al. (2021), digital leaders are good at using digital technologies, providing support for the digital transformation and technology-based professional development, building a digital learning culture, and employing leadership skills to optimize the benefits of digital technologies for learning.

In the same vein, Sheninger (2014) asserted that digital leadership is enacted in schools based on seven pillars, which he listed as communication, public relations, branding, professional growth and development, student engagement and learning, learning environment and spaces, and discovery of opportunities. Accordingly, in the digital era, establishing newer means of communication through social media helps convey the school mission to stakeholders, build professional partnerships, and construct a better knowledge of the school. Thus, school leaders could establish better public relations and achieve a successful branding of the school through creating a positive image among diverse school actors. According to Sheninger (2014) social media could also be used to promote teachers' professional development through creating professional learning communities where teachers can interact and exchange ideas with colleagues from around the world about using the latest technologies for the benefit of their students. This would certainly enrich their experiences with technology, offer them new ways of thinking and acting, and support their confidence in using new technologies. By enhancing teachers' digital capabilities and enabling them to work together, digital leaders enable the improvement and better functioning of schools (Shin et al., 2023). The fifth pillar of digital leadership builds upon student engagement and learning, which basically aims to equip students with the latest knowledge and competence of digital technologies. This certainly requires establishing a learning environment and spaces around a shared vision that regards technology as the central component of teaching and learning as well as equipping schools with the latest digital resources. Finally, Sheninger (2014) suggested that digital leadership necessitates developing strategic partnerships with other organizations surrounding schools such as other schools and learning centers, universities or corporate institutions in order to discover newer possibilities and opportunities and form collaborations for innovative projects. He asserted that digital leaders are to "become more knowledgeable about society and look for opportunities to connect the real world to an educational system clinging to preparing students for an industrialized workforce that is no longer needed" (p. 191).

As can be seen clearly from the above-mentioned elements, digital leadership is transformational and visionary in nature as it aims to build an innovative school vision that can be instantly updated in line with newer opportunities as well as altering the culture and functioning of schools to align with the requirements of the digital era. As a result, scholars often cite transformational and visionary leadership as integral components of digital leadership (Karakose et al., 2022). Digital leaders become the role models and initiators of digital transformation through constantly upgrading their digital competences and stimulating teachers and students to do the same (Hamzah et al., 2021). Thus, they can build a school-wide culture around the willingness and ability for change, an open and collaborative atmosphere reliant upon the transparent flow of information, self-responsibility, and

proactive behavior as well as work environments that are flexible enough to experiment with innovative technologies (Oberer & Erkollar, 2018; Shin et al., 2023). Therefore, transformational leadership is an integral component of successful digital leadership (Amelda et al., 2021).

On the other hand, International Society for Technology in Education (ISTE) (2023) defines digital leadership as a 'visionary leadership' in their Standards for Administrators (ISTE-A) stating that, in the digital era, school leaders "inspire and lead development and implementation of a shared vision … of purposeful change that maximizes use of digital age resources to meet and exceed learning goals, support effective instructional practice, and maximize performance of district and school leaders", "engage in an ongoing process to develop, implement and communicate technology-infused strategic plans aligned with [this] shared vision … to create, promote and sustain a dynamic, digital age learning culture that provides a rigorous, relevant and engaging education for all students". Several researchers assert that digital leaders need to be visionary to act as a role model for the school staff, and provide effective mentoring to promote their talents (Eberl & Drews, 2021), visionary school leaders are more capable of optimizing the use of digital resources in school and fostering the effective integration of technology into the classroom (AlAjmi, 2022), and visionary leadership enacted through building an integrated technology vision and a technology plan to support all actors and stakeholders could be a significant sign of digital leadership in school (Zhong, 2017). Through planning and carrying out such a vision, digital leaders make a great stride towards pursuing educational goals rapidly updated by the digital environment surrounding schools (Shin et al., 2023; Yusof et al., 2019).

2.2. School improvement

The ultimate goal of school improvement is ameliorating the learning conditions of schools and enhancing student learning through realizing systemic changes in the structures and practices of schools (Lewis, 2015; Wiyono et al., 2023). School improvement efforts have become the cornerstone of national educational policies for improving the desired student outcomes and enabling school effectiveness (Rhodes & Brundrett, 2009).

School improvement is realized through restructuring the common tasks, activities, practices of learning, teaching and leading at schools, and thus it is often associated with the successful engagement of change in school structures, routines, professional learning, curriculum, and pedagogical orientations (Ilomäki & Lakkala, 2018; Meyer et al., 2023). As Wiyono et al. (2023) encapsulate, sustainable school improvement requires a systemic approach to change with multiple perspectives, development of internal conditions as a key focus of change, a focused goal-orientation, the use of integrated implementation strategies and efforts to institutionalize change. As a result, school improvement occurs through developing the intellectual, social, and organizational capital of schools (Tam et al., 2018). The intellectual capital is the values, beliefs, knowledge, and skills of the school staff while social capital relates to a climate of trust, mutual respect, and reciprocal relationship between the internal and external stakeholders. The organizational capital, on the other hand, comprises the leadership and management knowledge, skills and practices. Scholars concur that this organizational capacity, namely school leadership, has the central role in enacting a successful change and improvement (Fullan, 2015; Hargreaves & Fink, 2006; Pata et al., 2022; Tülübaş, 2022).

Research has shown that principals as school leaders influence the quality of teaching and learning both directly and indirectly, and hence have a central role in enacting school

improvement (Azrai et al., 2020; Karadag, 2020; Leithwood et al., 2020). The school principal actively engages with all the stages of school improvement initiatives through motivating and involving school staff in creating common visions and values to support continuous improvement, building the social and intellectual capacity via creating opportunities for professional development and building an atmosphere of trust, experimentation, and collaboration as well as developing networks with internal and external stakeholders (Ilomäki & Lakkala, 2018).

As validated by some early and recent studies (Bryk et al., 2015; Hallinger & Heck, 2002; Leithwood & Jantzi, 2006; Lewis, 2015; Meyer et al., 2023), sustainable and effective school improvement fundamentally depends on goal-setting and pursuing a proper plan for achieving these goals. First and foremost, the achievement of improvement goals does not solely result from the efforts of the principal but requires the commitment and acceptance of all parties including teachers, students, parents, and other stakeholders surrounding the school (Meyer et al., 2023; Wiyono et al., 2023). Therefore, establishing a shared vision and developing clear goal-focused strategies would help elevate and guide school-wide efforts to realize and sustain improvement. The principal could support this process through conveying clear expectations, operationalizing participatory decision-making processes, creating opportunities for professional development, aligning strategies to the goals, and building a more collaborative climate with a clear recognition of hard work and tolerance of mistakes (Meyer et al., 2023; Timperley, 2005; Sun & Leithwood, 2015), all of which would eventually enhance the school capacity for continuous improvement (Harris, 2001).

2.3. Supporting School improvement with Digital Leadership

As Flanagan and Jacobsen (2003, p. 124) eloquently stated at the beginning of this millennium, "principals and teachers face the huge task of reinventing schools and classrooms in a society that has been transformed by digital technologies". However, this revolution in education would not come by the installment of computers and digital networks in schools but requires profound changes in the mindsets, knowledge, and skills of school administrators and teachers. Although schools have come a long way in supporting student learning via technology, digital technologies have not still been properly applied in education as much as it has become integral into social and work life (Ilomäki & Lakkala, 2018; Sheninger, 2014). On the other hand, there is growing consensus that technology integration is not a preference or choice but a significant imperative for the modern school to accomplish its goal of equipping students with competences and skills necessary for life in the 21st century (Pata et al., 2022; Zhong, 2017). As a result, school improvement efforts have become more important than ever so as to increase schools' capacity to keep up with the drastic changes in the digital era, to maintain digital transformation in schools, and to integrate digital technologies into the learning environment (Hamzah et al., 2021).

The well-rounded use of digital technologies in education requires the combination of organizational and pedagogical interventions (Wong & Li, 2011), and school principals have a significant responsibility for the innovative use of these technologies to improve both organizational and pedagogical practices (AlAjmi, 2022; Ilomäki & Lakkala, 2018; Yirci et al., 2023). As Zhong (2017) underlined, digital transformation in schools necessitates transforming schools "from a technology-referenced learning environment to technology-based learning community to meet 21st century learning requirements" (p. 27). This could only be achieved through restructuring teaching and learning practices, designing new

learning spaces and transforming schools into dynamic learning organizations that are responsive to their digital environments (Pata et al., 2022).

Digital leadership theory emphasizes that digital leaders combine their technology knowledge and skills with their leadership qualities to create a school culture that promotes the improvement, growth, and learning of school community members (Eberl & Drews, 2021; Sheninger, 2014). By this means, digital leaders have a positive effect on student achievement and school effectiveness through improving and encouraging digital teaching and learning (Chang, 2012; Greaves et al., 2010; Richardson & Sterrett, 2018). Based on the results of a comprehensive study on principals with an exemplary success in digital transformation in their schools, Levin and Schrum (2014) stated that these leaders followed some common procedures to make technology a lever for school improvement. With a clear vision and mission in mind, these principals were successful in gathering the collective efforts of school community around achieving these missions in the best way possible. They provided excessive support and opportunities of growth through creating structures and processes for the integration of technology into classroom, creating possibilities for high-quality and customized teacher professional development, redesigning the curriculum and pedagogical practices to enable student-based instruction that promotes digital competence, finding innovative ways of identifying and receiving sustainable resources and funds, and building partnerships with internal (e.g., parents) and external stakeholders (e.g. other schools, universities, businesses).

Briefly stated, the role of digital leaders in sustaining the improvement of schools is actually two-fold. They first act as role models by their efforts to maximize their knowledge and skills of newer technologies and their successful incorporation of these technologies into their leadership practice. Their modelling has a significant impact on motivating teachers to develop and integrate their technology skills into the classroom (AlAjmi, 2022; Raman et al., 2014; Zhong, 2017). On the other hand, digital leaders enhance the improvement of their school through creating a culture of trust, support, innovation, and empowerment, where everyone works in collaboration to elevate the collective capacity of school to keep up with the changing demands of the digital age (Sheninger, 2014).

3. CONCLUSION AND IMPLICATIONS

School improvement is a ‘distinct approach to educational change that enhances student outcomes as well as strengthening the school’s capacity for managing change’ (Hopkins et al., 1994, p. 3). In the digital era, sustainable school improvement has become a more complex and dynamic endeavor that has assigned additional roles and responsibilities to school principals. In these new circumstances, digital leadership has emerged as a promising leadership model to leverage schools’ capacity to keep up with the demands of its digital environment. Although existing research has contributed greatly to the conceptual definition of digital leadership as well as its defining characteristics and roles, our knowledge to some aspects of its theory and practice seems to be limited, particularly with regard to digitally-driven school improvement (Pata et al., 2022).

The broader leadership literature has already established close links between leadership and school improvement, and indicated that effective school improvement requires distributed forms of leadership since real improvement results from a school-wide, collective endeavor (Frost, 2008; Hallinger & Heck, 2010; Rhodes & Brundrett, 2009; Shaked & Schechter, 2016). More recent studies on digital leadership in schools also showed that

successful digital leaders acted upon the principles of distributed leadership to improve technology-integrated practices in schools (Davis-Singaravelu, 2022; Levin & Schrum, 2014; Meyer et al., 2023; Tam et al., 2018). Spillane (2005) describes distributed leadership as a system of practice comprised of a collection of interacting components: leaders, followers, and situation. These three interacting components must be understood together because the system is more than the sum of the component parts or practices" (p. 150). This system perspective is essential to accomplish digitally-driven school improvement because real and sustainable change requires the acceptance, commitment, and concerted efforts of the school leaders with the whole school community (Shaked & Schechter, 2016). Therefore, future studies could address digital leadership with a distributive lens to develop a much thorough understanding into their interplay and influence in school effectiveness.

In addition to teacher empowerment, building collective capacity, and enacting participative management, a distributive lens to leadership also accommodates the practice of leadership at different levels of educational system from higher echelons of management to the level of district managers, principals, and middle managers (Avidov-Ungar et al., 2022; Sterrett & Richardson, 2020). Since technology integration in education is multi-faceted and requires more systemic changes, the practice of digital leadership at all these levels would be significant in improving schools. However, research on the practice and influence of digital leadership at varying levels of educational system is currently quite limited, so further investigation into the roles of leaders in the central and local educational contexts in enabling digitally-driven improvement of schools would yield beneficial results.

Future studies addressing the relationship between digital leadership and school improvement in a variety of national cultures, school contexts or policy environments would also enrich this research field because both leadership and school improvement is highly sensitive to the realities of cultural and contextual factors (Rhodes & Brundrett, 2009). As Gurr et al. (2021) encapsulated, school improvement results from the interaction of individual leadership factors with community factors in and out of school, and suggested that "leadership and context should be considered in reciprocal and nuanced ways across a complex variety of contextual levels" (p. 73). Scholars contend that sufficient contextual relevance and alignment with local practices are crucially significant in the success of school improvement initiatives, and policy borrowing without considering the contextual and cultural factors could result in failures (Cosner et al., 2018; Harris et al., 2016; Liljenberg & Wrethander, 2023).

One final point we would like to make is bound up to social justice perspective. Research indicates that injustices resulting from the socio-economic, racial or cultural factors could seriously damage the academic achievement and well-being of students (Saunders, 2017), and the enactment of social justice leadership could help alleviate these negative outcomes (Karakose, Tülübaş, & Papadakis, 2023). From the perspective of digital transformation, technology-integrated education inextricably brings with it the problem of equity because students are often separated by the 'digital divide' resulting from gender, culture or economic injustices (Flanagan & Jacopsen, 2003). As the gap between students with easy access to technology versus with poor or no access increases, the divide between their knowledge and skills of technology grows to create digital injustices (Lythreatis et al., 2022). This could eventually prevent schools from achieving its goal of "equip[ing] all children from all groups to leave school fully prepared to lead productive, successful, fulfilling lives" (Shields, 2004, p. 124). This social justice perspective is also emphasized in ISTE Standards for Educational Leaders (2023), and the principals' role in increasing equity and access to technology is listed

as part of digital leadership practice in schools. Considering that literature on both social justice leadership and digital leadership is rather young and their integrated investigation is quite limited, such research could contribute greatly to developing more comprehensive framework of school improvement for providing students with equal rights and opportunities to access newer technologies, equal rates of success in attaining the knowledge and skills of these technologies, and equal conditions for actualizing their possible selves (Tan, 2021) while framing digital learning in school.

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REFERENCES

AlAjmi, M. K. (2022). The impact of digital leadership on teachers' technology integration during the COVID-19 pandemic in Kuwait. *International Journal of Educational Research, 112*, 101928. https://doi.org/10.1016/j.ijer.2022.101928

Amelda, B., Alamsjah, F., & Elidjen, E. (2021). Does the digital marketing capability of Indonesian banks align with digital leadership and technology capabilities on company performance?. *CommIT (Communication and Information Technology) Journal, 15*(1), 9-17. Retrieved March 8, 2023, from https://garuda.kemdikbud.go.id/documents/detail/2180225

Avidov-Ungar, O., Shamir-Inbal, T., & Blau, I. (2022). Typology of digital leadership roles tasked with integrating new technologies into teaching: Insights from metaphor analysis. *Journal of Research on Technology in Education, 54*(1), 92-107. 1. https://doi.org/10.1080/15391523.2020.1809035

Azrai, E. P., Rini, D. S., & Suryanda, A. (2020). Micro-teaching in the Digital Industrial Era 4.0: Necessary or not. *Universal Journal of Educational Research, 8*(4A), 23-30. https://doi.org/10.13189/ujer.2020.081804

Battro, A. M., & Fischer, K. W. (2012). Mind, brain, and education in the digital era. *Mind, Brain, and Education, 6*(1), 49-50. 1. https://doi.org/10.1111/j.1751-228X.2011.01137.x

Bryk, A. S.; Gomez, L. M.; Grunow, A., & LeMahieu P. G. (2015). *Learning to improve: How America's schools can get better at getting better.* Harvard Education Press.

Chang, I. H. (2012). The effect of principals' technological leadership on teachers' technological literacy and teaching effectiveness in Taiwanese elementary schools. *Journal of Educational Technology & Society, 15*(2), 328-340. Available at https://www.jstor.org/stable/jeductechsoci.15.2.328 (accessed on 12 March 2023).

Cosner, S., De Voto, C., & Andry Rah'man, A. (2018). Drawing in the school context as a learning resource in school leader development: Application-oriented projects in active learning designs. *Journal of Research on Leadership Education, 13*(3), 238-255. https://doi.org/10.1177/1942775118763872

Davis-Singaravelu, S. (2022). The potential to build collective capacity for organisational learning in the context of teachers' use of digital technology for school improvement. *Education Sciences, 12*(1), 33. https://doi.org/10.3390/educsci12010033

Eberl, J. K., & Drews, P. (2021). Digital Leadership–Mountain or molehill? A literature review. In Ahlemann, F., Schütte, R., & Stieglitz, S. (Eds), I*nnovation through information systems. Wi 2021. Lecture notes in information systems and organization* (48th ed., pp. 223-237). Springer, Cham. https://doi.org/10.1007/978-3-030-86800-0_17

Flanagan, L., & Jacobsen, M. (2003). Technology leadership for the twenty-first century principal. *Journal of Educational Administration.* https://doi.org/10.1108/09578230310464648

Frost, R. (2008). Developing student participation, research and leadership: The HCD student partnership. *School Leadership and Management, 28*(4), 353-368. https://doi.org/10.1080/13632430802292308

Fullan, M. (2015). *The new meaning of educational change* (5th ed.). Teachers College Press.

Greaves, T., Hayes, J., Wilson, L., Gielniak, M., & Peterson, R. (2010).*The technology factor: Nine keys to student achievement and cost-effectiveness.* Market Data Retrieval.

Gurr, D., Longmuir, F., & Reed, C. (2021). Creating successful and unique schools: leadership, context and systems thinking perspectives. *Journal of Educational Administration*, 59(1), 59-76. https://doi.org/10.1108/JEA-02-2020-0045

Hallinger, P., & Heck, R. H. (2002). What do you call people with visions? The role of vision, mission and goals in school leadership and improvement. In Leithwood , K., & Hallinger, P. (Eds.), *Second international handbook of educational leadership and administration* (pp. 9-40). Springer.

Hallinger, P., & Heck, R. H. (2010). Collaborative leadership and school improvement: Understanding the impact on school capacity and student learning. *School leadership and Management, 30*(2), 95-110. https://doi.org/10.1080/13632431003663214

Hamzah, N. H., Nasir, M. K. M., & Wahab, J. A. (2021). The effects of principals' digital leadership on teachers' digital teaching during the COVID-19 pandemic in Malaysia. *Journal of Education and E-Learning Research, 8*(2), 216-221. https://doi.org/10.20448/journal.509.2021.82.216.221

Hargreaves, A. & Fink, D. (2006). *Sustainable leadership*. Jossey-Bass.

Harris, A. (2001). Building the capacity for school improvement. *School Leadership & Management, 21*(3), 261-270. https://doi.org/10.1080/13632430120074419

Harris, A., Jones, M., & Adams, D. (2016). Qualified to lead? A comparative, contextual and cultural view of educational policy borrowing. *Educational Research, 58*(2), 166-178. 1. https://doi.org/10.1080/00131881.2016.1165412

Hopkins, D., Ainscow, M., & West, M. (1994). *School improvement in an era of change*. Cassell.

Ilomäki, L., & Lakkala, M. (2018). Digital technology and practices for school improvement: Innovative digital school model. *Research and Practice in Technology Enhanced Learning*, *13*, 1-32. https://doi.org/10.1186/s41039-018-0094-8

International Society for Technology in Education (ISTE). (2023). *Standards for Administrators.* Retrieved March 14, 2023, from https://cdn.iste.org/wwwroot/Libraries/Images/Standards/Download/ISTE%20Standards%20for%20Administrators%2C%202009%20(Permitted%20Educational%20Use).pdf

International Society for Technology in Education (ISTE). (2023). *Standards for Educational Leaders*. Retrieved March 14, 2023, from https://www.iste.org/standards/iste-standards-for-education-leaders

Karadag, E. (2020). The effect of educational leadership on students' achievement: A cross-cultural meta-analysis research on studies between 2008 and 2018. *Asia Pacific Education Review, 21*(1), 49-64. https://doi.org/10.1007/s12564-019-09612-1

Karakose, T., Kocabas, I., Yirci, R., Papadakis, S., Ozdemir, T. Y., & Demirkol, M. (2022). The development and evolution of digital leadership: a bibliometric mapping approach-based study. *Sustainability, 14*(23), 16171. . https://doi.org/10.3390/su142316171

Karakose, T., Polat, H., & Papadakis, S. (2021). Examining teachers' perspectives on school principals' digital leadership roles and technology capabilities during the COVID-19 pandemic. *Sustainability, 13*(23), 13448. https://doi.org/10.3390/su132313448

Karakose, T., Tülübaş, T., & Papadakis, S. (2023). The scientific evolution of social justice leadership in education: Structural and longitudinal analysis of the existing knowledge base, 2003–2022. *Frontiers in Psychology, 14*, 1139648. https://doi.org/0.3389/fpsyg.2023.1139648

Leithwood, K., Harris, A., & Hopkins, D. (2020). Seven strong claims about successful school leadership revisited. *School Leadership & Management, 40*(1), 5-22. https://doi.org/10.1080/13632434.2019.1596077

Leithwood, K., Jantzi, D., & McElheron-Hopkins, C. (2006). The development and testing of a school improvement model. *School Effectiveness and School Improvement, 17*(4), 441-464. https://doi.org/10.1080/09243450600743533

Levin, B. B., & Schrum, L. (2014). Lessons learned from secondary schools using technology for school improvement: It's just not that simple!. *Journal of School Leadership, 24*(4), 640-665. https://doi.org/10.1177/105268461402400403

Lewis, C. (2015). What is improvement science? Do we need it in education?. *Educational Researcher, 44*(1), 54-61. https://doi.org/10.3102/0013189X15570388

Liljenberg, M., & Wrethander, M. (2023). Leadership for school improvement–linking learning to leading over time. *Professional Development in Education, 49*(1), 30-44. https://doi.org/10.1080/19415257.2020.1752288

Limna, P., Jakwatanatham, S., Siripipattanakul, S., Kaewpuang, P., & Sriboonruang, P. (2022). A review of artificial intelligence (AI) in education during the digital era. *Advance Knowledge for Executives, 1*(1), 1-9. Retrieved March 14, 2023, from https://ssrn.com/abstract=4160798

Lythreatis, S., Singh, S. K., & El-Kassar, A. N. (2022). The digital divide: A review and future research agenda. *Technological Forecasting and Social Change, 175*, 121359. 1. https://doi.org/10.1016/j.techfore.2021.121359

Meyer, F., Bendikson, L., & Le Fevre, D. M. (2023). Leading school improvement through goal-setting: Evidence from New Zealand schools. *Educational Management Administration & Leadership, 51*(2), 365-383. https://doi.org/10.1177/1741143220979711

Oberer, B., & Erkollar, A. (2018). Leadership 4.0: Digital leaders in the age of industry 4.0. *International Journal of Organizational Leadership*. Retrieved March 14, 2023, from https://ssrn.com/abstract=3337644

Pata, K., Tammets, K., Väljataga, T., Kori, K., Laanpere, M., & Rõbtsenkov, R. (2022). The patterns of school improvement in digitally innovative schools. *Technology, Knowledge and Learning, 27*(3), 823-841. https://doi.org/10.1007/s10758-021-09514-5

Peng, B. (2022). Digital leadership: State governance in the era of digital technology. *Cultures of Science*, 5(4), 210-225. https://doi.org/10.1177/2096608321989835

Raman, A., Don, Y., & Kasim, A. (2014). The relationship between principals' technology leadership and teachers' technology use in Malaysian secondary schools. *Asian Social Science, 10*(18), 30-36. http://doi.org/10.5539/ass.v10n18p30

Rhodes, C., & Brundrett, M. (2009). Leadership development and school improvement. *Educational Review, 61*(4), 361-374. https://doi.org/10.1080/00131910903403949

Richardson, J. W., & Sterrett, W. L. (2018). District technology leadership then and now: A comparative study of district technology leadership from 2001 to 2014. *Educational Administration Quarterly, 54*(4), 589-616. https://doi.org/10.1177/0013161X18769046

Shaked, H., & Schechter, C. (2016). Sources of systems thinking in school leadership. *Journal of School Leadership, 26*(3), 468-494. https://doi.org/10.1177/105268461602600304

Sheninger, E. (2014). *Digital leadership: Changing paradigms for changing times.* Corwin Press.

Shields, C. M. (2004). Dialogic leadership for social justice: Overcoming pathologies of silence. *Educational Administration Quarterly, 40*(1), 109-132. https://doi.org/10.1177/0013161X03258963

Shin, J., Mollah, M. A., & Choi, J. (2023). Sustainability and organizational performance in South Korea: The effect of digital leadership on digital culture and employees' digital capabilities. *Sustainability, 15*(3), 2027. https://doi.org/10.3390/su15032027

Spillane, J. P. (2005, June). Distributed leadership. *The Educational Forum, 69*(2), 143-150. https://doi.org/10.1080/00131720508984678

Sterrett, W., & Richardson, J. W. (2020). Supporting professional development through digital principal leadership. *Journal of Organizational & Educational Leadership, 5*(2), 4. Retrieved March 10, 2023, from https://digitalcommons.gardner-webb.edu/joel/vol5/iss2/4

Sun, J., & Leithwood, K. (2015). Direction-setting school leadership practices: A meta-analytical review of evidence about their influence. *School Effectiveness and School Improvement, 26*(4), 499-523. https://doi.org/10.1080/09243453.2015.1005106

Tam, V. C., Chan, J. W., Li, S. C., & Pow, J. (2018). Developing and managing school human capital for information and communication technology integration: A case study of a school-based e-learning project in Hong Kong. *International Journal of Leadership in Education, 21*(4), 447-461. 1. https://doi.org/10.1080/13603124.2017.1318958

Tan, C. (2021). Conceptualising social justice in education: A Daoist perspective. *Compare: A Journal of Comparative and International Education, 51*(4), 596-611. https://doi.org/10.1080/03057925.2019.1660144

Timperley, H. S. (2005). Distributed leadership: Developing theory from practice. *Journal of Curriculum Studies*, *37*(4), 395-420. https://doi.org/10.1080/00220270500038545

Tülübaş, T. (2022). The influence of educational employees' policy alienation on their change cynicism: An investigation in the Turkish public schooling context. *Educational Process: International Journal, 11*(1), 40-64. https://dx.doi.org/10.22521/edupij.2022.111.4

Wiyono, B. B., Komariah, A., Alghamdi, A. A., & Fahlevi, M. (2023). The influence of principals' e-leadership on the effectiveness of schools' public relations and organizational improvement. *Sustainability, 15*(2), 1296. https://doi.org/10.3390/su15021296

Wong, E. M., & Li, S. C. (2011). Framing ICT implementation in a context of educational change: A structural equation modelling analysis. *Australasian Journal of Educational Technology, 27*(2), 361–379. Retrieved March 18, 2023, from https://ajet.org.au/index.php/AJET/article/download/975/249.

Yirci, R., Karakose, T., Kocabas, I., Tülübas, T., & Papadakis, S. (2023). A bibliometric review of the knowledge base on mentoring for the professional development of school administrators. *Sustainability, 15*(4), 3027. https://doi.org/10.3390/su15043027

Yusof, M. R., Yaakob, M. F. M., & Ibrahim, M. Y. (2019). Digital leadership among school leaders in Malaysia. *International Journal of Innovative Technology and Exploring Engineering (IJITEE)*, 8(9). Retrieved March 10, 2023, from https://www.researchgate.net/profile/Mohd-Faiz-MohdYaakob/publication/334508172_Digital_Leadership_Among_School_Leaders_in_Malaysia/links/5d2ed0a7458515c11c36d004/Digital-Leadership-Among-School-Leaders-in-Malaysia.pdf

Zhong, L. (2017). Indicators of digital leadership in the context of K-12 education. *Journal of Educational Technology Development and Exchange (JETDE), 10*(1), 3. https://doi.org/10.18785/jetde.1001.03

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