A Literature Review on the Challenges and Strategies of Utilizing Digital Leadership Model in Schools

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***Abstract*—** The objective of this study is to identify the challenges and strategic implications associated with the implementation of the digital leadership paradigm in educational institutions. This study employs a qualitative approach and a literature review as its primary method. The data sources employed in this study were journal articles from Google Scholar, which were then subjected to a meticulous screening process. In the initial phase of the study, 87 articles were identified for further analysis. The application of inclusion criteria resulted in the exclusion of 71 articles. Consequently, 16 articles were identified as the primary data source. The results identified 31 challenges and 25 strategies that are believed to enhance the efficacy of digital leadership models in educational settings. These findings are particularly salient in light of the growing trend of digitalization in education. The implications of this study are twofold: firstly, there is a responsibility to address the identified challenges, and secondly, there is a need to mitigate the tendency of challenges by utilizing the strategies obtained. Given the limitations in data exploration, further research that can expand or develop the concept of digital leadership in schools is highly recommended.

Keywords—literature review; challenges and strategies; digital leadership

I. INTRODUCTION

The portrait of education in a global context is shaped by a convergence of global values, technological advances, and changes in pedagogy driven by globalization. This has led to the emergence of global education services markets and the export of higher education [1]. The incorporation of technology in educational settings has prompted the implementation of a leadership paradigm that aligns with the growing trend of technology integration: digital leadership.

The implementation of digital leadership models in educational institutions has been demonstrated to offer a range of benefits. The research conducted by Sukmawati [2] revealed that the advantages of digital leadership include enhanced accessibility, transformative learning, effective collaboration, innovative university management, and the development of new leadership skills to meet evolving educational goals. Another finding from Kok Ming and Mansor [3] research suggests that effective integration of technology into teaching and administrative processes, responsive structures, and data security can facilitate innovation and positive change [4]. Furthermore, it has the potential to enhance digital learning, support literacy, encourage innovation, facilitate pedagogical collaboration, and cultivate a positive digital culture [5].

However, a study by Abdul Musid [6] revealed a different outcome. The use of digital leadership was found to create problems similar to those associated with financial limitations, low levels of knowledge and understanding, difficulties in completing tasks, and unsatisfactory research in this area. Additionally, the availability of technology and biases that impact educational leadership in schools were identified as contributing factors [7]. Further investigation is required to gain a deeper understanding of the challenges and strategies associated with the utilization of digital leadership.

Prior research on the challenges and strategies associated with digital leadership has been conducted by Suharto [8]. The study's findings revealed that the key challenges associated with digital leadership include resistance to change, information security concerns, and the existence of skills gaps. To effectively address these challenges, the research underscores the importance of implementing effective communication strategies, investing in cybersecurity, and providing employee training to ensure a successful digital transformation. However, it is essential to note that the research was conducted within the context of an international trade field study. Digitalization encompasses a multitude of levels, extending beyond mere technological advancement to encompass a comprehensive transformation [9]. A paucity of research exists in the field of education in schools.

This research is aligned with the national education policy and has a clear literature trail. There is a need to further explore the digital leadership model in schools. This will enable the challenges associated with the use of digital leadership in schools to be properly addressed and strategies to be identified that can be used to effectively address these challenges to prevent or overcome them in a way that is beneficial to

education, particularly in schools. If these challenges are not addressed, there is a risk that the potential adverse effects of not being able to face the challenges of digital leadership will occur. As Chimielecki [10] discovered, it can be a significant threat in the context of the increasing digitization of education. The necessity for this research is further underscored by the need for educational leaders to adapt to the challenges of digitalization, incorporate new skills such as digital literacy and ethical awareness, and effectively mitigate the adverse effects [11].

The objective of this research is to identify the challenges and strategic implications of using the digital leadership paradigm in schools. To achieve this objective, two research questions were formulated. The first research question is: What are the challenges in the use of digital leadership models, especially in schools, as evidenced in previous relevant research? The second research question is: What strategies have been employed to address the challenges in the use of digital leadership models, especially in schools, as evidenced in previous relevant studies?

II. METHODS

This research employs a qualitative approach [12] and a literature study method. In this literature study method, the inclusion and exclusion criteria are delineated, along with their interpretation [13]. The selection of these approaches and methods was based on a consideration of the research objectives. A review of related research reports was conducted to provide objective information about the challenges and strategic implications of using digital leadership in schools. The research utilized journal articles as the primary source, analyzing various publications related to digital leadership challenges and strategies that have been published by accredited journal publishers. Google Scholar was selected as the most comprehensive source for citation coverage of the dataset, as it effectively links the dataset to scholarly documents in comparison to other bibliographic sources [14]. The process of searching for articles begins with an examination of the literature from the Google Scholar Portal. To ensure the reliability of the sources, we visited the official article pages and selected only those that met the criteria for inclusion. This initial stage yielded 113 articles. Subsequently, we employed inclusion and exclusion criteria to further refine the selection of articles. Please direct your attention to Table 1.

Table 1. Outlines the Inclusion and Exclusion Criteria

Aspect	Inclusion	Exclusion
Source Type	Peer-reviewed journal article	Books, Missing Link URLs, Duplicate Articles
Publication Year	Journal article publisher from January 2019 – August 2024	Journal articles published before January 2019
Language	English	Other languages (e.g. Chinese, Russian, Spanish)
Context	Digital Leadership in Education	Digital Leadership in Another Sector (e.g Politic, Health, etc)
Publisher Category	Publisher Indexed by Google Scholar and Accredited by Science and Technology (Sinta)	A publisher that Google Scholar does not index

Source: Modified from Tan et al. (2022)

The selection of articles is based on pre-established criteria, such as inclusion and exclusion, to comprehensively review relevant articles' content [13]. In this phase, 26 articles were excluded. Subsequently, 87 articles were selected for inclusion in the final stage of the process. The objective of this process was to identify articles that were both intended and aligned with the research objectives. Consequently, 16 articles were selected, and 71 additional articles were deemed to fail to meet the requisite criteria following an exhaustive review. The 16 articles were then subjected to a meticulous and comprehensive examination. The metadata about the aforementioned articles is delineated in the results table, which serves as a foundation for the analysis of the articles presented. This includes the author's name and year of publication, research objectives and methods, and elements of challenges and strategies for the implementation of digital leadership in schools.

III. RESULTS & DISCUSSION

Results

A literature review of the 16 selected articles was conducted through an analysis of all sections of each article, with the objective of identifying elements of challenges and strategies related to the use of digital leadership. The results of this literature review are presented in Table 2.

Table 2. Results of Article Analysis

Author Name (Publication Years)	Method of Research	Challenges	Strategies
Kok Ming and Mansor (2024)	A quantitative approach will be employed, utilizing questionnaires.	The necessity for further technological knowledge and the value of collaborative working practices.	It entails enhancing proficiency in digital transformation and facilitating the alignment between leadership and technology implementation in academic institutions.
Reis-Andersson (2024)	A qualitative approach, incorporating interviews and a survey, has been employed.	The scarcity of resources and the malfunctioning of infrastructure.	It is recommended that collaborative learning be encouraged, clear guidelines be established, and investment be made in teachers'

			digital competencies.
Reis-Andersson and Gunnars (2024)	A qualitative approach, with a literature review, forms an integral part of the methodology.	The allocation of resources and the implementation of policies.	It is recommended that efforts be made to encourage connected collaboration and to align leadership roles with the integration of pedagogical technology.
Alde (2024)	A quantitative approach with purposive sampling was employed.	The constraints of budgetary resources and the absence of effective organizational change management impede the development of digital leadership in educational institutions.	The "IT LEAD for School Administrators" program is designed to enhance the digital leadership skills of those in educational administration.
Asante and Novak (2024)	The Fuzzy-Set Qualitative Comparative Analysis (fsQCA) method with a symmetrical approach, specifically the Partial Least Square-Structural Equation Modeling (PLS-SEM) technique.	The efficacy of digital leadership is constrained by a dearth of trust and resources.	It is essential to establish a foundation of trust and provide comprehensive assistance.
Raptis et al. (2024)	A quantitative methodology, utilizing an online questionnaire.	The presence of resistance to change and the existence of varying levels of digital literacy.	It is recommended that greater emphasis be placed on enhanced communication and targeted investment in technology.
Yeop Johari et al. (2023)	A qualitative method employing a case study approach, comprising interviews, will be utilized.	These factors include a lack of knowledge, inadequate use of data, insufficient tools, and low engagement.	It entails enhancing digital literacy and augmenting the accessibility of resources for efficacious digital leadership in academic institutions.
Sari et al. (2023)	A qualitative approach with a literature review.	The presence of resistance to change and concerns about data privacy.	It is recommended that collaboration be encouraged, that transformational leadership be promoted, and that education data be utilized for informed decision-making.
Fengchao and Mingchi (2023)	A qualitative approach with a literature review.	The incorporation of technology and the assessment of resource quality.	It is recommended that efforts be made to promote digital transformation, to improve teacher training, and to encourage innovative educational practices.
Andronic (2023)	A comparative analysis will be conducted, as well as a synthesis, an induction, and a deduction. Additionally, statistical data will be collected, and monographic methods will be employed.	Infrastructure issues and the digital skills gap.	It is recommended that public-private partnerships, targeted funding programs, and comprehensive teacher training be employed to enhance digital education in schools.
Abdul Musid et al. (2022)	A qualitative approach, complemented by a comprehensive literature review, will be employed.	Financial and infrastructural constraints, deficiencies in knowledge and expertise, challenges in data collection and analysis, and inadequate research are among the key factors impeding progress.	Includes bespoke studies designed to augment digital leadership competencies.
Khoirul Anwar et al. (2022)	A qualitative approach, integrating a literature review.	Adapt to technology and drive innovation.	The implementation of role modeling, interpersonal communication, and focused human resources (HR) development initiatives is recommended to motivate teachers.
Brown (2022)	A qualitative research method, complemented by a comprehensive literature review.	The concept of complex learning ecologies and the phenomenon of resistance to change.	The necessity for critical self-reflection, clear direction, and the development of a transformative organizational culture is evident.
Klus and Müller (2021)	A qualitative approach, utilizing a questionnaire	The rapid evolution of industrial technology and the imperative	The objective is to highlight the importance of skills such as entrepreneurial

	for an online survey.	for ensuring its safety are two intertwined and pressing concerns.	thinking and flexibility as strategies for effective digital leadership in organizations, including schools.
Băeşu and Bejinaru (2020)	A qualitative methodology, coupled with a comprehensive literature review, has been employed.	The organization is experiencing rapid change and a high level of employee tension.	In order to facilitate transformation and innovation, it is essential to drive adaptability, leverage data, and maintain a cohesive digital vision.
Håkansson Lindqvist and Pettersson (2019)	A qualitative methodology, with interviews forming the primary data collection instrument.	There is a lack of clarity surrounding digital competencies, as well as a necessity for a supportive structure.	It is recommended that collaborative learning be encouraged, that professional development be provided, and that digital practices be modeled.

Discussions

Table 2 illustrates that, based on an analysis of pertinent literature, the challenges and strategies associated with the implementation of digital leadership in educational settings vary considerably. Given the differing research objectives of the various articles, the identified challenges and strategies also vary. However, there are instances where articles address similar challenges and strategies, as well as instances where articles discuss strategies that are similar to those discussed in other articles.

Challenges

The application of digital leadership in academic institutions has been identified to present 31 distinct challenges, including a dearth of knowledge [7], proficiency in requisite skills [6], the absence of trust [19], The absence of organizational change management impedes the development of digital leadership in educational institutions [18], In addition to deficiencies in technological expertise, there is a lack of initiative in the pursuit of innovation [24], collaboration [3], limited resources, budget [19], financial [6], resource distribution [17], quality of resources [22], as well as malfunctioning infrastructure issues Reis Anderson [16] and Andronic [23], to the need for a supportive structure [28].

Furthermore, another challenge identified in the implementation of digital leadership in educational institutions is the integration of technology, which necessitates a commensurate level of human resources [22] who are capable of adapting to technological advancements [24]. Several digital skills gaps were found [23], unclear digital competencies [28], varying levels of digital literacy [20], Use of inadequate data, inadequate tools, low engagement [7], and complex learning ecology [25].

We then highlight that the implementation of digitization policies faces varying degrees of difficulty due to technological disparities [17], rapid change [27], Resistance to change Sari [21] and Brown [25], Industrial Technology Safety [26], concerns about data privacy [21], tension among employees [27], Measurement issues and lack of research [6].

Strategies

In addition to challenges, each of the previous relevant studies also discussed strategies for using digital leadership in schools. The strategies consisted of 25 strategies, including the promotion of transformational leadership [21], Driving Digital Transformation [22], Bridging the gap between school leadership and technology implementation [3], Aligning leadership roles with educational technology integration [17], with increased digital transformation expertise [22], build trust and provide adequate support [19], Use education data to make informed decisions [21], Includes customized studies to enhance digital leadership skills [6], Clear guidelines and investment in digital literacy for teachers [16], Emphasize skills such as entrepreneurial thinking and flexibility as strategies for effective digital leadership in organizations, including schools [26].

In addition, providing professional development, modeling digital practices, and using digital tools were other strategies identified in the use of digital leadership in schools [28], Staff development focused on teacher motivation [24], Developing a transformational organizational culture [25], Improve teacher training [22], Includes improving digital literacy and increasing the availability of resources for effective digital leadership in schools [7], "IT LEAD for School Administrators program to build digital leadership skills [18], Public-private partnerships, targeted funding programs, and comprehensive teacher training to improve digital literacy in schools [23].

It was then proposed that the utilization of digital leadership should be underpinned by a strategic approach that prioritizes enhanced and critical communication, unambiguous direction, and the deployment of digital tools [25], The role of the educator is to provide a model for reflection and interpersonal communication [24], A strategic allocation of financial resources toward the advancement of technological capabilities [20], The program fosters collaborative learning [21]; [28], The objective is to facilitate connected collaboration [21], The promotion of innovative educational practices is a key objective [22], To facilitate transformation and innovation, it is essential to drive adaptability, leverage data, and maintain a cohesive digital vision [27].

Result Interpretation of Research

The findings indicate that the implementation of digital leadership models in educational institutions is currently

confronted with a multitude of substantial challenges. However, this does not imply that these obstacles are insurmountable. Instead, to effectively address the array of challenges that have emerged, a range of strategies can be proposed.

The research yielded several findings regarding the challenges associated with the implementation of digital leadership. These challenges can be broadly classified into three categories: policy implementation, rapid change, and resistance to change. This classification aligns with the findings of previous research in this field [29]. The findings of this study corroborate the assertion that the implementation of efficacious policies during periods of rapid change hinges upon the mitigation of resistance to change through the establishment of organizational justice, the cultivation of a sense of support, and the nurturing of robust relationships between leaders and members. This, in turn, enables the projection of readiness for change.

Moreover, the integration and adaptation of technology are thought to diminish the digital skills gap and facilitate the overcoming of disparate levels of digital literacy. This is consistent with the findings of research conducted by R. Balmes [30] which underscores the correlation between technology integration and transformative innovation. Additionally, R. Balmes [30] underscores the necessity for professional development in adapting to technology to overcome varying levels of digital literacy and skill gaps.

Another trend among the challenges that arise in the use of digital leadership in schools is the lack of requisite knowledge, skills, and gaps in technological knowledge, innovation drive, and collaboration. Another finding that is consistent with this trend is Klus and Muller [26] research, which indicates that deficiencies in knowledge, skills, and technological understanding can impede leaders' capacity to navigate challenges associated with digitalization. Consequently, there is a necessity for an innovative approach within digital leadership, complemented by robust information technology capabilities [26].

Another trend of challenges is the limited resources, budgets, finances, and infrastructure issues that are prevalent in this discourse. This discourse aligns with Klus and Muller [26] research, which highlights that while resource limitations may affect digital leadership, the main focus is on the skills and traits required to manage challenges related to digitalization, rather than on infrastructure or financial constraints.

Furthermore, strategic trends in the utilization of digital leadership models encompass the following: the establishment of a connection between leadership and the alignment of leadership roles with the integration of technology, the incorporation of enhanced expertise in digital transformation, and its implementation within educational institutions. In this context, digital leadership can be defined as the application of technology to effectively lead, manage, and respond in an educational environment amidst digital transformation [2] It also encompasses information management to manage digital transformation and improve organizational performance [31].

Other strategies that employ educational data include the implementation of customized studies to enhance digital leadership skills and the investment in the digital competencies of teachers as a strategy for effective digital leadership in schools. This is particularly relevant to the digital leadership style model, which emphasizes the skills and mindset required for decision-makers to understand and address the opportunities and challenges of digitalization [32].

Additional strategies prioritize enhanced communication and critical self-awareness, transparent guidance, interpersonal communication, collaborative learning, connected collaboration, innovative educational practices, adaptability, and maintaining a unified digital vision to drive transformation and innovation. This emphasis on digital leadership is highly pertinent to previous research, as it pertains to schools in enhancing accessibility, collaboration, innovation, and developing new leadership skills [2], Consequently, digital leadership represents a viable avenue for augmenting transparency improving Effective communication, and the strengthening organizational commitment [33] can be achieved by reducing social responsibility avoidance, which can also positively moderate the negative impact of this factor on organizational performance [34] particularly in educational settings.

IV. Conclusion

The research identified 31 challenges and 25 strategies that are thought to enhance the efficacy of the digital leadership model in schools. These findings are particularly relevant in light of the growing trend of digitization in education. The implications of this study's results are twofold: firstly, there is a responsibility to address the challenges identified through the utilization of the strategies obtained; secondly, there is a need to expand or develop the concept of digital leadership in schools through further research, given the limitations in data exploration.

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