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A scoping review on mapping the digital leadership constructs for educational settings: what we can learn?

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ABSTRACT

Another style of leadership utilized in the field of education, notably digital leadership, has become more prevalent. Studies on digital leadership are receiving more attention, but there has not been much focus on scoping reviews. To determine the constructs of digital leadership, this study undertakes a scoping review. Accordingly, a scoping review on human-influenced and non-human-influenced constructs in measuring digital leadership was carried out in this study. This scoping review follows six processes: i) identification of the research question; ii) literature research; iii) selection of relevant studies; iv) charting the information; v) collating, summarizing, and reporting of study results; vi) discussion of the results and implications for future research. A scoping review was conducted via the Web of Science, Scopus, and Google databases to identify empirical studies on constructs in digital leadership since 2014. Next, the titles and abstracts for selected full-text articles were screened manually. Data from the included articles were charted and summarized. To develop specific and empirical data for measuring digital leadership, the study found that 22 constructs were influenced by humans and three constructs were non-human-influenced. Interpersonal and intrapersonal skills were separated from the constructs that were influenced by humans, with 15 constructs constituting intrapersonal skills and seven constructs constituting interpersonal skills. The results will help identify the crucial components of successful digital leadership. Future research is warranted in creating programs such as workshops, training, and conferences to promote digital leadership and further improve the study.

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1. INTRODUCTION

Leadership is the capacity of a person to inspire their group in order to reach a target or significant organizational milestone [1]. Effective and suitable leadership techniques will be able to inspire teachers' enthusiasm and productivity, which consequently influences how well students learn [2]. There are many distinct leadership philosophies in use, according to earlier studies, but digital leadership has recently drawn increasing attention [3]. A worthwhile purpose for digitalization is evinced by digital leaders possessing digital leadership, who are not only skilled at tactical planning but can also take advantage of the newest technological advancements to put strategies into action [4]. Therefore, digital leadership has unquestionably

emerged as one of the most crucial aspects of leadership [3]. As leaders face new difficulties as a result of digital disruption [5], digital leadership is a vital component of the endeavor to modernize organizations [6].

Among the definitions of digital leadership found in the dataset are as: a necessary leadership outlook for overcoming digital age obstacles [7]; digital leadership is implementing the necessary changes to ensure that the organization's ecosystem and digitalization strategy are successful [8]; digital leadership combines technological innovation with leadership abilities to assist in decision-making [9]; or it is the human element of a leadership functioning through the utilization of digital tools in the virtual setting [10]. The digital environment introduces a new approach to leadership, namely digital leadership, which has particular difficulties in relation to digital technologies [11]. Leaders face problems as a result of digital transformation [12], yet digital leadership enables firms to manage risks and ongoing uncertainty [13]. However, digital leadership must maintain the team's cohesiveness on an emotional and intellectual level [11]. As such, a culture of trust and compassion for individuals and their variety is fostered through digital leadership, which is an adaptable and ethical attitude that quickly learns and adapts to changes [11].

Digital leadership must not only foresee trends but also resolve intricate issues brought on by technology and guide the team as a result of these developments [5]. Effective digital leadership requires team members to keep a great degree of trust [14]. Digital leadership trains people to work together and prosper in a digital environment [11]. To maintain focus and purpose in a constantly changing environment that demands strong adaptation, digital leadership must, therefore, give liberty to its teams without making them feel isolated. It must also strike a balance between tried-and-true solutions and innovative ideas [15].

Digital leadership is cooperative and encourages group effort [16]. Relationship-building in digital leadership aids leaders in navigating diversity and prevents followers from feeling alone [17]. Digital leadership must also be change-oriented, which necessitates being flexible, inventive, and open-minded [5]. Besides, it appears to have a crucial component that utilizes innovation for organizational benefits [8], [18]. Digital leadership also appears to be interpersonally driven (i.e., relating well to people) and has personal qualities (i.e., controlling one's inner self), strategic emphasis (i.e., aids the organization in accomplishing its long-term objective), and delivery-related elements (i.e., the ability to bring about the desired results) [11].

Digital leadership has been getting more consideration at the present time [19]. According to the chosen papers, research on digital leadership has increasingly advanced and gained greater academic interest [3]. For example, the variety of journals in the dataset of a previous study [11] demonstrates that diverse fields have expressed an interest in digital leadership, thus demonstrating the breadth of the subject. In this respect, it is important to look at digital leadership because it is essential to advance change and a speedy decision-making process in today's digital trends [7]. Therefore, a scoping review is conducted in this study to determine the human-influenced and non-human-influenced constructs in measuring digital leadership.

Nonetheless, digital leadership has likewise faced difficulties [11]. For example, it is difficult for digital leadership to relearn how to engage in trust-driven leadership rather than control-driven, as trust is more easily established in real-world interactions as opposed to virtual interactions [20]. Studying the issue of digital leadership is important due to its significance to organizations because it mandates that leaders create novel techniques for thriving in times of uncertainty [21]. Furthermore, the field of digital leadership will remain relevant and pique the interest of many, especially when it comes to drawing a great deal of studies because this particular field has not yet reached its mature stage [19], [22], [23].

The current definitions of digital leadership are ambiguous, especially regarding the key elements needed for digital leadership to survive in the modern world [11]. Although there are a few definitions of digital leadership identified in the literature, for instance, as the human element of technology-driven leadership in the virtual environment [10] or technological innovation combined with leadership abilities to assist in decision-making [9], the research patterns in this field as well as how they connect to other relevant facets (such as digital transformation, virtual leadership, and e-leadership) remain unclear [11]. Moreover, despite the fact that many scholars have looked at the problems and effects of digital leadership from many angles, more research is still needed [3]. According to Cortellazzo *et al.* [24] in the digital leadership review, additional theoretical contributions involving leadership with digital transformation are required.

In addition, based on a study by Musid *et al.* [25], one of the issues in digital leadership includes the lack of digital leadership knowledge and skills. Indeed, it is imperative that a leader is equipped with digital leadership abilities and technical knowledge to successfully assist teachers in the classroom based on the behavior modeled by the leader [26]. Notwithstanding the context of inside or outside the classroom, a principal or a teacher with inadequate knowledge and skills in digital leadership will be unable to carry out digital leadership in teaching and learning [25]. As a result, students will fall behind in the latest teaching and learning methods, thus impacting their academic performance and affecting their future.

2. LITERATURE REVIEW

2.1. Variables of digital leadership

According to the affiliation statistics on the global scope of the study field under investigation [27], digital leadership work was created in 28 different nations. The United States is the leading nation for which the majority of digital leadership publications are from, followed by Europe and Asia [11]. Other than communication [11], transparency also appears to be one of the key components of digital leadership in the modern day [11]. In addition to the association of digital leadership with its outcome [9], [28], a prior study has also examined the strong relationship that involves digital leadership with digital teaching practice [29].

Furthermore, another study [28] has demonstrated how productivity and contentment can both be increased as a result of the high adoption of digital leadership. However, it should be noted here that digital leadership must significantly enable its followers to undertake new projects; thus, one facet of leadership that has remained crucial over time is empowerment [5]. The emergent digital leadership paradigm seemingly entails the important leadership qualities to take off in a digital world, including agility, communication, cooperation, empowerment, direction-setting, trust, and innovation [11].

2.2. Scoping review

The benefit of a scoping review is that it uses a more methodical approach than standard review articles to gather, assess, and present available information [30]. In contrast to meta-analyses or systematic reviews, scoping reviews consider a wider range of studies on a particular topic [30], in this case, the variability of constructs rather than a single, focused research issue. To establish a framework and foundation for future research, a scoping review attempts to identify and organize current research [31]. Therefore, this study aims to explore the human-influenced and non-human-influenced contexts by using a scoping review.

3. RESEARCH METHOD

Following the six processes outlined [30], we created our scoping review. A scoping review by Peifer *et al.* [31] also uses [30] and it looks systematically at flow studies that were published between 2000 and 2016. Several studies, including [32]–[38], have made reference to the scoping review framework [30]. The six processes include i) the identification of the research question; followed by ii) literature research and iii) the selection of relevant studies; as well as iv) charting the information; v) collating, summarizing, and reporting of study results; and finally vi) a discussion of the results and implications for future research. The most important phase out of these six steps is Step 4, which involves charting the information or data. Since scoping studies cannot provide a concise review of many papers, Arksey and O'Malley [30] stated that it is important to synthesize the material. This is also supported by another researcher [39], who described the descriptive-analytical method—which entails summarizing process data—as a highly beneficial but difficult component of scoping studies. Figure 1 shows the flow diagram based on the scoping review process [30].

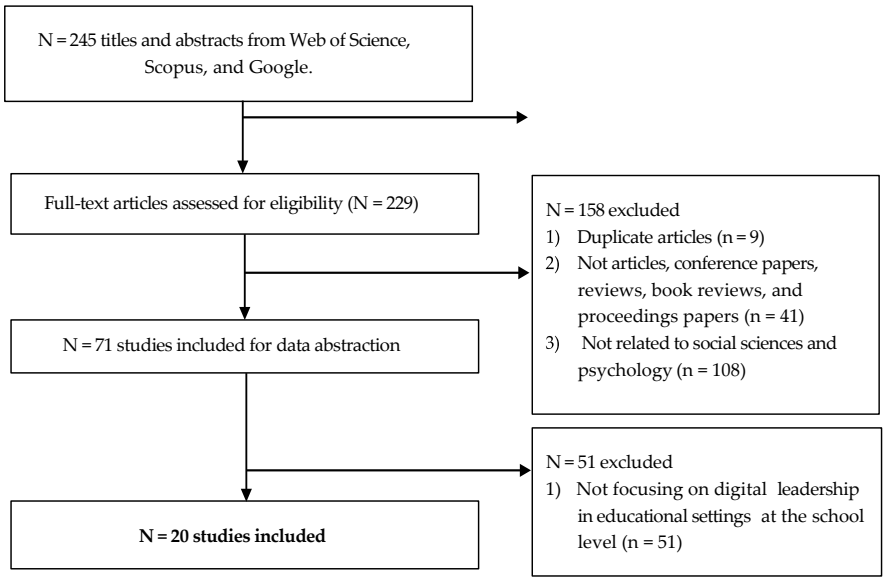

Figure 1. Flow diagram based on the scoping review process

3.1. Identification of the research question

This study aims to search for a systematic overview or a scoping review of the constructs of digital leadership, specifically human-influenced and non-human-influenced constructs. For human-influenced constructs, there were two categories identified earlier, namely interpersonal skills and intrapersonal skills. According to Gohary *et al*. [40], non-human is related to technological factors. In addition, another study [41] explained that non-human refers to systems and infrastructure.

3.2. Literature research

We used the databases of Web of Science (WoS), Scopus, and Google. Accordingly, we searched for empirical research using the term "digital leadership" and only included empirical studies that were published between 2014 and 2022, and non-English articles were excluded from this study. As a result, 84 articles were retrieved from WoS, including 140 and five articles from Scopus and Google, respectively.

3.3. Selection of relevant studies

The authors discovered 229 papers in total and graded each of the papers according to how pertinent it was to the scoping review. Articles, conference papers, reviews, book reviews, and proceedings papers make up the literature type for this scoping study. Additionally, publications from the social sciences and psychology fields were chosen for this level. However, nine articles were eliminated because they contained duplicate articles. A total of 149 publications were also excluded since these publications failed to meet the outlined criteria for the analysis. Resultantly, another 51 papers from the Scopus database were picked, along with 15 articles and five articles from the WoS database and manual search, respectively.

3.4. Charting the information

The authors individually reviewed each paper. To fulfill the research goal, the authors examined each research title and abstract as well as the context of each paper to ensure that all the papers were appropriate for inclusion and met the inclusion criteria. A total of 51 articles were excluded since they are empirical studies that do not concentrate on school-level digital leadership within the context of education.

3.5. Collating, summarizing and reporting of study results

The authors read the full papers after a thorough study of the article abstracts to determine the topics in the data abstraction. The authors then carried out content analysis by utilizing thematic analysis to identify the theme associated with digital leadership constructs. Thematic analysis was used because it provides a flexible approach to analyzing qualitative data [42]. In this study, thematic analysis was preferred to other qualitative approaches since it helps to find themes and patterns or address meanings within the data material.

3.6. Discussion of the results and implications for future research

The authors discussed human-influenced and non-human-influenced constructs. For human-influenced constructs, interpersonal and intrapersonal skills were discussed in addition to summarizing the categories in the results section. At this point, additional explanations and future research implications were provided. Table 1 shows an overview of the methods employed in the scoping review process.

Table 1. Methods of scoping review process

Process		Explanation
Identification of the research question	Constructs of digital leadership	Human-influenced (interpersonal and intrapersonal skills) and non-human-influenced constructs
Literature research	Databases	Web of Science (WoS), Scopus, and Google
	Term	Digital leadership
	Timeline	2014 to 2022
	Language	English
	Number of articles	229 articles (WoS=84, Scopus=140, and Google=5)
Selection of relevant studies	Literature type	Articles, conference papers, reviews, book reviews, and proceedings papers
	Field	Social sciences and psychology
	Number of articles	71 articles (WoS=15, Scopus=51 and Google=5)
Charting the information	Reviewing each paper	Examining research titles, abstracts, and contexts
	Number of articles	20 articles
Collating, summarizing and reporting of study results	Determine topics in data abstraction	Thorough study of article abstracts
	Content analysis	Thematic analysis
Future research	Context	Human-influenced (interpersonal and intrapersonal skills) and non-human-influenced constructs

4. RESULTS AND DISCUSSION

4.1. Overview of the included studies

A total of 20 articles pertinent to this study are listed in Table 2, which displays the names of the authors, the study year, the country, and the paper's title. Out of the 20 publications, six digital leadership studies were conducted in the context of Malaysia [29], [43]–[47], four in the United States of America (US) [26], [48]–[50], three in Indonesia [51]–[53], and one each in Turkey [54], Israel [55], the United Kingdom (UK) [56], Cyprus [57], Canada [58], Kuwait [59], and Thailand [60]. Two articles were published in 2022 [47], [59], while eight were published in 2021 [26], [29], [43], [45], [46], [53], [54], [60], according to the year of publication. In addition, three articles were released in 2020 [51], [52], [55], two articles in 2019 [44], [49], one article in 2017 [50], three articles in 2015 [56]–[58], and one article in 2014 [48].

Table 2. Overview of the included studies

Study	Country	Title
[58]	Canada	A review of digital leadership: Changing paradigms for changing times, by E. Sheninger
[57]	Cyprus	Are headmasters' digital leaders in school culture?
[51]	Indonesia	Influence of the principal's digital leadership on the reflective practices of vocational teachers mediated by trust, self-efficacy, and work engagement
[52]	Indonesia	Leadership selection at vocational education based on digital leadership model using AHP method
[53]	Indonesia	Implementation of principal's digital leadership in communication and teacher professional development at school
[55]	Israel	Typology of digital leadership roles tasked with integrating new technologies into teaching: Insights from metaphor analysis
[59]	Kuwait	The impact of digital leadership on teachers' technology integration during the COVID-19 pandemic in Kuwait
[29]	Malaysia	The effects of principals' digital leadership on teachers' digital teaching during the COVID-19 pandemic in Malaysia
[43]	Malaysia	The authority of principals' technology leadership in empowering teachers' self-efficacy towards ICT use
[44]	Malaysia	Digital leadership among school leaders in Malaysia
[45]	Malaysia	Empowering teacher self-efficacy on ICT: How does technology leadership play a role?
[46]	Malaysia	Understanding digital public relations practices among exemplar school principals in Malaysian schools
[47]	Malaysia	Contemporary communication conduit among exemplar school principals in Malaysian schools
[60]	Thailand	A digital leadership development model for school administrators in basic education to fulfill the Thailand 4.0 policy
[54]	Turkey	Examining teachers' perspectives on school principals' digital leadership roles and technology capabilities during the COVID-19 pandemic
[56]	UK	Young people, digital media making and critical digital citizenship
[26]	US	Digital learning for North Carolina educational leaders
[48]	US	Vital skills of the elementary principal as a technology leader
[49]	US	Digital leadership: Changing paradigms for changing times
[50]	US	Indicators of digital leadership in the context of K-12 Education

4.2. Number of articles according to constructs

Figure 2 lists all constructs along with the number of articles. The study identified 25 constructs in total, 12 of which are related to professional practice excellence, 10 to visionary leadership, eight to the learning culture of the digital age and systemic improvement, seven to digital technology and digital citizenship, six to communication, and three to managerial skills and public relations. One article mentions adaptation to continual change, including the embedding of social media, being proactive in problematic situations, empowerment, individual skills, intrinsic motivation, openness, pedagogical element, self-control, school climate, and trust. There are also two articles discussing digital learning competency, branding, student learning and engagement, learning environment and spaces, and opportunity.

4.3. Human and non-human influenced constructs in measuring digital leadership

Table 3 lists the number of articles used to measure digital leadership in both human and non-human contexts. Following a detailed analysis of 25 digital leadership characteristics, these 25 constructs were split into two groups: contexts with human influence and those without human influence. Two categories of human-influenced constructs—interpersonal and intrapersonal—were distinguished in this study. The 22 human-influenced constructs were then divided into interpersonal skills and intrapersonal skills.

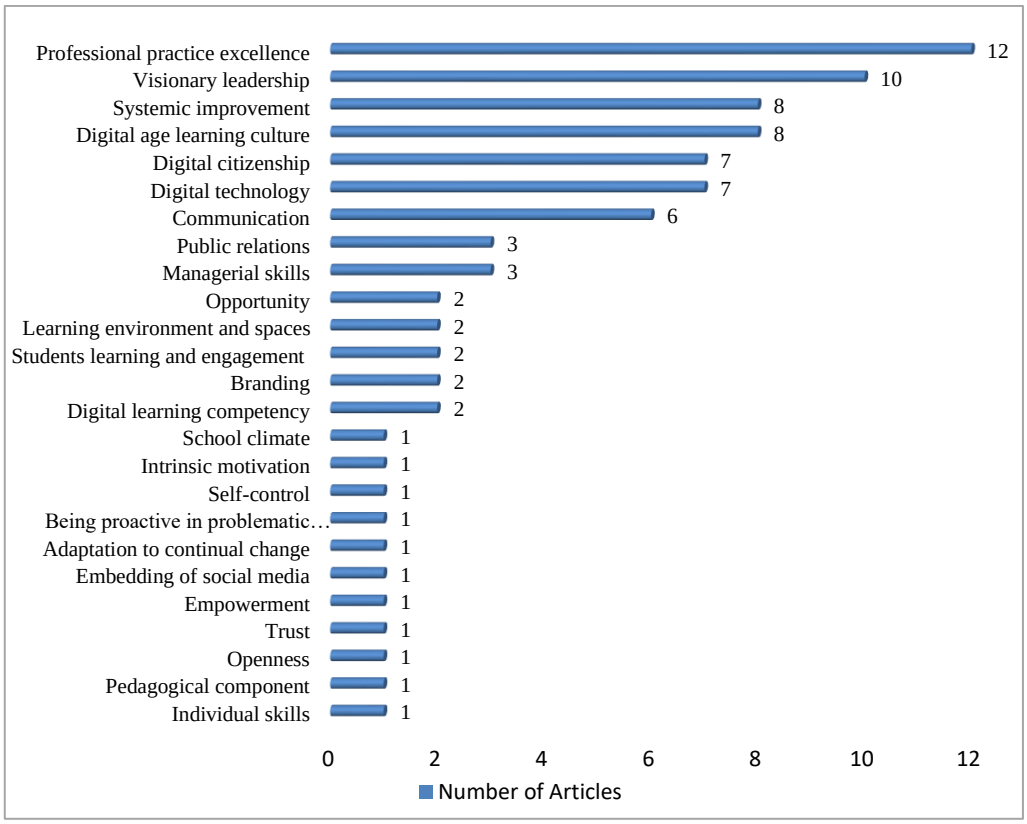

Figure 2. Number of articles according to constructs

Table 3. Number of articles according to human and non-human contexts

Context	Constructs	Number of articles (N=20)
	Interpersonal skills	
	Visionary leadership	10
	Digital age learning culture	8
	Systemic improvement	8
	Digital citizenship	7
	Public relations	3
	Branding	2
	Student learning and engagement	2
Human-influenced	Interpersonal skills	
	Professional practice excellence	12
	Communication	6
	Managerial skills	3
	Digital learning competency	2
	Opportunity	2
	Individual skills	1
	Adaptation to continual change	1
	Being proactive in problematic situations	1
	Embedding of social media	1
	Empowerment	1
	Intrinsic motivation	1
	Openness	1
	Pedagogical component	1
	Self-control	1
	Trust	1
	Digital technology	7
Non-human-influenced	Learning environment and spaces	2
	School climate	1

Based on Table 2, Malaysian publications make up most of the articles used in this study. In this regard, digital leadership implementation in Malaysia will have a significant impact on the educational system by improving the employability of students in the educational field of the 4.0 era [61]. Most

Middle Eastern nations, including Cyprus, Israel, Kuwait, and Turkey, respectively have one publication, according to the results of the current review. For individuals in Kuwait who are not technologically literate, the pressure on school administrators is enormous [59]. Therefore, additional research should be done on digital leadership among Kuwaiti principals. Besides, there is presently no research on equipping Thailand administrators with fundamental education to transform them into digital leaders, which is necessary to not only advance Thailand Education 4.0 but also prepare for the world of digital learning in society [60]. Since this analysis indicated only one digital leadership study conducted in the year 2021, further studies should, therefore, be carried out to identify the factors influencing Thailand's successful digital leadership.

Based on Figure 2, there are 25 constructs related to digital leadership. Evidently, 12 of the 20 articles talked about the excellence of professional practice. Ten essays on visionary leadership were then identified. Next, eight pieces of work discussed systemic improvement and learning culture in the era of technology or best known as the digital age. Additionally, topics that entail digital citizenship and technology were covered in seven articles. Another six pieces of work also touched on communication. However, other constructs were only mentioned sporadically in those 20 papers on digital leadership. The 25 components were split into two contexts, settings with human influence and situations without human influence. Interpersonal and intrapersonal skills make up the two groups for contexts with a human influence.

Interpersonal demonstrates an active connection between cognition and behavior, which successfully draws attention to a person's outward traits [62]. A person's ability to comprehend, cooperate, and work with others is referred to as interpersonal skills (e.g., comprehending other people's intents, drives, and aspirations) [63]. Other interpersonal concepts include assertiveness, empathy, emotional expression, flexibility, influence, relationships, and teamwork [63]. Seven interpersonal skills—digital age learning culture, visionary leadership, systemic improvement, digital citizenship, public relations, branding, and student learning and engagement—were derived from the 22 human-influenced constructs.

A leadership approach that focuses on future transformations is known as visionary leadership [64]. In education, the visionary leadership strategy emphasizes interdependence and mutual needs among schools, teachers, and other administrative staff [65]. Visionary leadership also refers to leadership conduct that is focused on future developments through the capacity of leaders to engage in anticipating, innovating, formulating, socializing, and implementing ideas by involving and educating all employees within the organization in order to successfully work on achieving the established goals and objectives [64]. In this regard, the visionary leadership strategy is an action expected to realize the quality of the future [66].

The learning culture of the digital age implies that school administrators are constantly searching for educational innovations that put a strong emphasis on enhancing digital learning [67]. They also utilize the use of technology for learning on a regular basis effectively. To suit the various needs of every student, school administrators create a learning environment with technology and educational materials, and they continue to implement efficient technological and cultural studies teaching methods throughout the curriculum. School administrators also engage in community learning activities that promote collaboration, creativity, and innovation in the digital sphere. The following actions will result in systemic improvement: i) implementing change to meet the objectives of technology-based learning and producing media-rich information and resources; ii) accomplishing collaboration in metrics application, including the collection and analysis of data, as well as the identification of necessary results to improve the performance of teachers and the outcome of student learning; iii) employing human resources with expertise in technology usage to accomplish operational goals and academic objectives; iv) achieving strategic partnerships to bring forth systemic quality; v) creating and ensuring the sustainment of infrastructure by implementing technology to support and realize high-quality management and operations as well as teaching and learning as signs of systemic improvement [68].

Next, the term "intrapersonal skills" describes a process that occurs within a person to help them comprehend their own strengths and shortcomings (for example, understanding themselves and appreciating their emotions, anxieties, and motivations) [63]. Additional intrapersonal concepts include emotional regulation, optimism, self-awareness, self-esteem, and self-motivation [63]. The final 15 human-influenced constructs in this study encompass intrapersonal skills, which include professional practice excellence, communication, managerial skills, digital learning competency, opportunity, individual skills, adaptation to continual change, embedding of social media, being proactive in problematic situations, empowerment, intrinsic motivation, openness, pedagogical component, self-control, and trust.

Principals who encourage professional development among teachers might boost the teachers' confidence in embracing digital teaching and learning [29]. As such, it is imperative that principals provide opportunities for professional development to teachers if they want to guarantee the acquisition of necessary skills among teachers in order to progress the teachers' professional practices. In this respect, principals must create professional development programs to assist teachers in implementing digital-oriented practices and strategies in teaching. The quality of a teacher's professional practice can be measured by their access to digital learning prospects as well as their participation in digital learning communities [50].

One of the capabilities that can be exploited in school-based digital leadership practices is communication [44]. Leaders must make their communication tactics more dynamic in the digital age [69]. Therefore, in the digital age in particular, school administrators must encourage and train educators to possess digital literacy abilities as well as digital pedagogy and communication skills [70]. Leaders develop their ability to communicate and organize information using new digital tools [8]. Hence, in order to improve the learning environment and access to information, motivation, immediacy, personalization, communication, and a positive relationship between classroom design and technology use must be established [69].

4.4. Limitations and implications

Notwithstanding the research implications, this scoping review is not without some limitations. First, because the goal is to uncover human- and non-human-influenced variables for measuring digital leadership, scoping reviews have inherent constraints, and this study is no exception. A scoping review typically does not undertake a meta-analysis; however, this approach is deemed suitable considering that the goal is to summarize the available research on scoping reviews. Besides, due to the large number of included research, this study only included those that were published in English. The findings can, therefore, be applied to scoping reviews that are prepared in English. The literature type for this scoping study also includes articles, conference papers, reviews, book reviews, and proceedings papers since they give ample time for the authors to complete the review. Additionally, it takes time to conduct a scoping review based on books. Since this study is directly tied to the subject of education, only papers from the social sciences and psychology fields were considered for the scoping review on digital leadership.

With regard to school-level digital leadership in the context of education, this study has found some papers that are specifically linked to this topic. About 25 constructs relevant to digital leadership in a school context were also discovered. Seven constructs, based on the 25 constructs, were cited at least six times in each of the 20 publications used in the scoping review. These constructs were separated into two groups: those that are influenced by humans and those that are not. The human construct was divided into two groups, interpersonal and intrapersonal skills, to make the data more insightful. This will help with initiatives like training in order to build digital leadership in the educational sector. This scoping review's implications also include delivering information to stakeholders when making decisions about digital leadership.

The results may assist in planning teacher training by indicating which aspects should be the focus of the course. Besides, the results further contribute to the literature, which supports the need for significant initiatives to support digital leadership. Future teachers, such as those in teacher preparation programs or the faculty of education at universities, should be exposed to digital leadership. Meanwhile, current educators ought to pursue new training in digital leadership, as this will guarantee that the strategy will continue for at least five to ten years. These findings also provide concrete evidence to support relevant theories for assessing digital leadership. This is because the constructs found in this study were provided by different sources or scholars. As a result, additional research has been conducted to divide the influence of the theories' constructs into either human or non-human. Moreover, compared to previous leadership theories, the digital leadership theories in this study place a stronger emphasis on digital and technology. The outcomes of this scoping review may also be related to various ideas of digital leadership. Hence, these findings should be taken into account when determining a person's capacity for digital leadership using the given variables. This is due to the possibility that the dimensions discovered in this analysis will be used as measurement factors for educators' digital leadership. In addition, the scoping review results demonstrate that human-influenced factors, particularly interpersonal skills, contribute more to the effective implementation of digital leadership than non-human-influenced factors, such as infrastructure and finances, which were the focus of earlier studies. Thus, in order to develop digital leadership, preparation must begin at the individual level.

5. CONCLUSION

This review found that these constructs could be separated into two groups: those that were impacted by humans and those that were not. Most digital leadership conceptions are modified by humans, and most of the constructs modified by humans were intrapersonal skills. Therefore, training for current and prospective educators should emphasize the development of intrapersonal abilities like communication, digital learning proficiency, and excellence in professional practice. The results of this study will make it easier to pinpoint the key elements of successful digital leadership such as visionary leadership, professional practice excellence, digital age learning culture, and systemic improvement. The results also demonstrate that, among current leadership philosophies, digital leadership has become increasingly important. As the discipline of digital leadership matures in businesses and the academic literature, it may place a greater emphasis on digital technologies as a major pillar from which new leadership traits can emerge.

Future scoping reviews may explore developing initiatives such as workshops, training, and conferences to foster digital leadership and enhance the study. This scoping analysis also makes recommendations for future research to examine how well teachers perform globally in terms of digital leadership. Only the educational environment, specifically the social sciences and psychology fields, was the focus of this study. Additionally, only English-language publications released between 2014 and 2022 were included, along with articles, conference papers, reviews, book reviews, and proceeding papers in particular.

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