

# Digital Leadership with The Constructs Diversity: A Systematic Literature Review

Nurhafizah Abdul Musid <sup>#1</sup>, Mohd Effendi Ewan Mohd Matore <sup>\*2</sup>, Aida Hanim A. Hamid <sup>#3</sup>

Musid, N. A., Mohd Matore, M. E. E., A. Hamid, A. H.

nurhafizah10@gmail.com, effendi@ukm.edu.my, [aidahanim@ukm.edu.my](mailto:aidahanim@ukm.edu.my)

## Article Info

**Page Number:** 2182-2202

**Publication Issue:**

**Vol. 71 No. 4 (2022)**

## Article History

**Article Received:** 25 March 2022

**Revised:** 30 April 2022

**Accepted:** 15 June 2022

**Publication:** 19 August 2022

## Abstract

Digital leadership among teachers in educational field is very crucial. Although there are studies on digital leadership, studies that are based on systematic literature review of the construct in measuring digital leadership among teachers worldwide remain limited. The review will help to get better understanding on the underlying construct. Hence, the present study conducted a systematic literature review on the constructs in measuring digital leadership among teachers worldwide. The review of current research was contingent on PRISMA, specifically Preferred Reporting Items for Systematic Reviews and Meta-Analyses. The review process constitutes five crucial stages of methodology: (i) review protocol guideline, (ii) research question formulation, (iii) identification-based systematic searching strategies, (iv) eligibility screening and quality appraisal, (v) and data extraction and analysis. Two established databases were referred, namely Scopus and Web of Science. Five constructs were discovered based on thematic analysis: (i) professional practice excellence, (ii) digital age learning culture, (iii) digital citizenship, (iv) systemic improvement, and (v) visionary leadership. The study's findings will aid in decision making and problem solving with the use of digital leadership. Future study should investigate the level of digital leadership, which alludes to the issues identified in this study.

**Keywords:** Digital leadership; systematic literature review; construct; teacher; education.

## Introduction:

According to the United Nations Educational, Scientific and Cultural Organization (UNESCO) Institute for Statistics (UIS), between 2000 and 2019, the overall number of teachers around the world rose from 62 million to 94 million teachers, constituting a 50 percent increase [1]. It shows that global teacher workforce has expand and more teachers are needed in the future. To reach universal primary and secondary education in 2030, 68.8 million teachers in total are needed, which covers 24.4 million and 44.4 million teachers for primary and secondary education, respectively [1]. Teachers play an important role in education of their students as a source of social learning, promote academic learning and models of citizenship and work [2]. Therefore, it is important to ensure teachers and future teachers to be effective dan competent teachers. Teachers must not only change their teaching and learning styles but also their behaviors and assessment approaches as a result of the emerging coronavirus outbreak — a pandemic which brings great challenge to the global education system [3].

One of the skills that should be acquired by teachers is leadership skills. Teachers must have excellent leadership skills as one of the necessary factors that facilitate the teachers' instructional quality not only inside the classroom but also outside [4]. There are several leadership models in educational field such as transformational, instructional and transactional [5]. However, in the new era, leaders need to cope with the development in technology and gain more knowledge related to changes in the structure of their organizations [6]. The digital leadership approach has gained strong influence in the context of current changes in the world [7]. In this current era of digitalization, this leadership approach is interesting to be focused as it will solve any issues in conventional leadership which does not emphasize on digital as one of the competencies needed by leaders [8].

### **Literature Review:**

There is no standard definition for digital leadership [9,10], and different models and approaches have been developed in recent years [10]. Research on digital leadership is still at an early stage even though it is increasingly popular theoretically and practically, and lack of in-depth explorations on characteristics of digital leadership [9]. In general, digital leadership defines as a social influence process which is partially or fully mediated by the usage of digital communication technology resulting in changes of individual attitudes and behavior, emotions, thinking, or performance within groups and/or organizations [11,12]. [13] defines digital leadership in the field of education as integration of digital technology in the leadership approaches of school leaders towards long-term transformations by using technology at schools. The aim of digital leadership in schools is to produce digitally able citizens in this digital age [14].

Considering the lack of sufficient information on digital leadership, conducting a systematic literature review (SLR) on digital leadership would provide constructs or characteristics of digital leadership in educational field. SLR is an approach of extensively locating and synthesising research through transparent, replicable and organised procedures in every step of the process [15]. There are several issues related to traditional literature review which are transparency and bias [16]. In usual practice, many authors would choose articles which favour to their field of study [17]. Consequently, such practice will bring challenge to future scholars in terms of replicating the study, validating the interpretations, or examining comprehensiveness of the study [16].

Based on the literature gap, the current study applies SLR, which highlights the constructs of digital leadership in educational field that may provide empirical evidence in conducting future research. The research objectives for this SLR are to identify the pattern of publications in digital leadership in terms of country, year, and context, and to identify the constructs of digital leadership. Both objectives play as a guide for authors in writing this review. In addition, this research will bring benefit in terms of training in digital leadership needed by teachers based on the constructs.

## Methodology:

### i) Review Protocol – PRISMA

The SLR is contingent on Preferred Reporting Items for Systematic Reviews and Meta-Analyses or PRISMA. Publication standards is a guidance for authors which provide them with sufficient information that help them assess and examine a review's thoroughness and quality [18]. PRISMA can be fundamental in reporting systematic reviews for research and reviewing report which evaluates randomised trials [19]. There are a few advantages of using PRISMA for reporting systematic reviews which are examining a large database in a defined time, identifying exclusion and inclusion criteria and defining research questions which allow a systematic research [20].

### ii) Resources

This review is drawn from two journal databases: (i) Scopus and (ii) Web of Science (WoS). Other than their robustness, the justifications on selecting these two main databases are that they entail more than 256 research areas and disciplines [18], possess the functions of advance searching, index more than 5000 publishers and control the quality of articles [21,22]. The WoS database comprises beyond 33,000 journals with more than 256 fields of studies including social science and it ranks data from back file and citations by three types of measures: (i) citations, (ii) papers, and (iii) citations per-paper [23]. Scopus is the next database employed in this review. Scopus offers more than 28,000 journals of peer-reviewed literature worldwide including social science as one of the subject area [23].

### iii) Systematic Review Process of Article Selection

#### a) Identification

There are three steps in selecting articles for this study. The first step is to identify the keywords related for the research questions. The authors also referred to thesaurus, related terms and past keywords related to keywords identified in the earlier step. After keywords have been finalized, search strings were developed for the searching process through Scopus and Web of Science (WoS) databases, including Google Scholar. As a result, there are 84 articles from WoS database and 140 articles from Scopus database. A manual searching has also been conducted for additional articles and five articles found related to this study. Overall, there are 229 articles were retrieved in the identification step.

Table 1: Search string employed for the systematic review process

Databases	Keywords used
Scopus	TITLE-ABS-KEY ("digital leadership")
Web of Science (WoS)	TS=("digital leadership")

#### b) Screening

The screening stage is the first stage employed to omit duplicate articles. Therefore, there were nine articles were removed in this first stage. A remaining of 220 articles were screened according to inclusion and exclusion criteria which had been identified by the researchers in the next stage. The literature is the first criterion by which the researchers focused on article, conference paper, review, book reviews and proceedings paper. In terms of language, this research only referred to articles written in English. The timeline chosen for this study was from 2014 till 2022 (nine years). In addition, articles that were published in social sciences and psychology disciplines were selected for this stage. In total, there were 149 articles which did not comply to the criteria stated earlier and removed from this study. As a result, there were 15 articles from WoS database, and 51 articles chosen from Scopus database.

Table 2: Inclusion and exclusion criteria

<b>Criterion</b>	<b>Eligibility</b>	<b>Exclusion</b>
Literature type	Article, conference paper, review, book reviews, proceedings paper	Conference review, note, book, early access, editorial materials, book chapter
Language	English	Non-English
Timeline	2014 to 2022	<2014
Field	Social sciences and psychology	Other than social sciences and psychology

### c) **Eligibility**

There was a total of 71 articles identified at the initial level of the third stage (eligibility). At this stage, research titles, including the abstracts and key contents, were checked to make sure that these articles are fit for purpose and have met the inclusion criteria for this research in order to achieve the objective of the study [18]. A total of 12 articles from WoS and 28 articles from Scopus was removed because they were not related to digital leadership in educational settings at school level. Therefore, only three articles from WoS, 23 articles from Scopus and five articles from manual searching are ready to be analyzed for the next step.

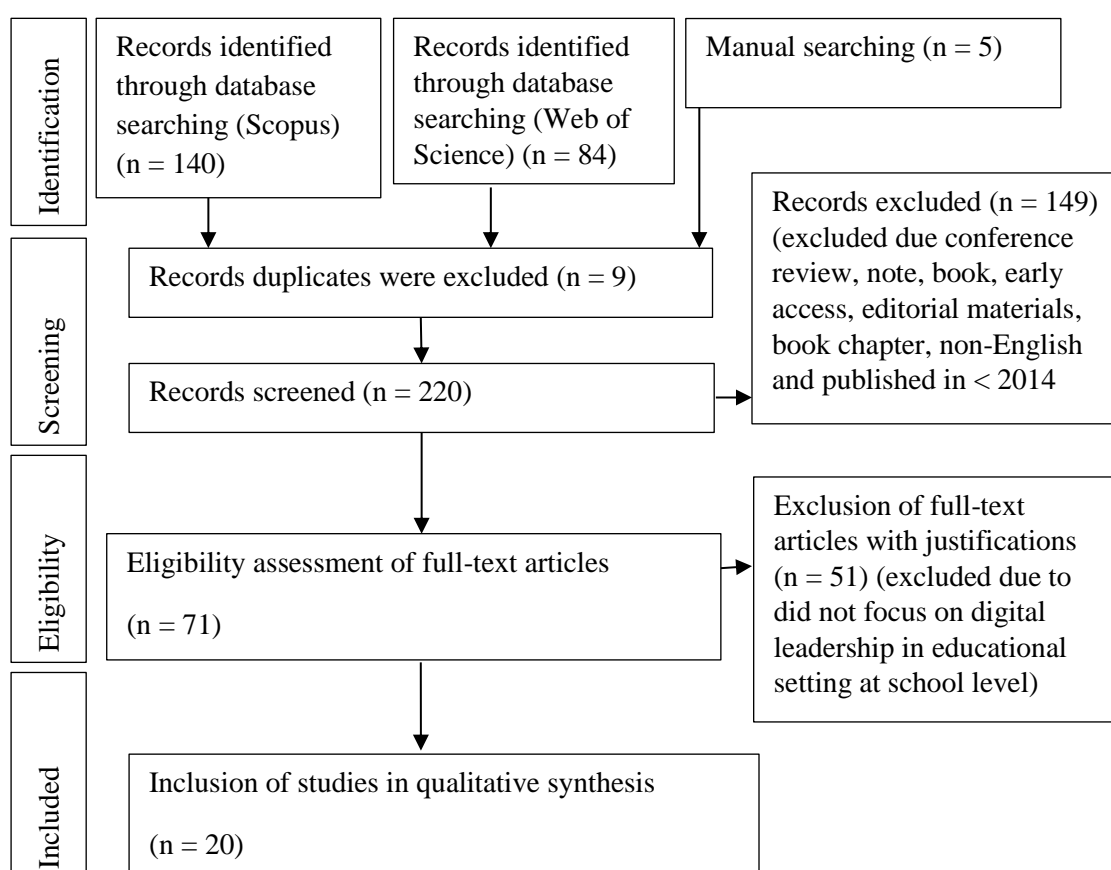


Fig. 1: Research flow diagram adapted from [19]

**d) Data abstraction and analysis**

This phase includes the assessment and analysis of the remaining 26 articles (Table 3). The data abstraction started with in-depth reading on the abstracts of the articles followed by full articles to identify the themes. Next, using qualitative analysis, the researchers conducted content analysis to determine the theme related to constructs of digital leadership.

Table 3: Overview of the included studies

Author & Year	Country	Studies
[24]	Malaysia	Contemporary communication conduit among exemplar school principals in Malaysian schools
[25]	Turkey	Examining teachers' perspectives on school principals' digital leadership roles and technology capabilities during the covid-19 pandemic
[26]	United States of America	Digital learning for North Carolina educational leaders
[27]	Malaysia	The authority of principals' technology leadership in empowering teachers' self-efficacy towards ICT use

[28]	Malaysia	Understanding digital public relations practices among exemplar school principals in Malaysian schools
[29]	Malaysia	Empowering teacher self-efficacy on ICT: How does technology leadership play a role?
[30]	Malaysia	The effects of principals' digital leadership on teachers' digital teaching during the Covid-19 pandemic in Malaysia
[31]	Indonesia	Influence of the principal's digital leadership on the reflective practices of vocational teachers mediated by trust, self efficacy, and work engagement
[32]	Indonesia	Leadership selection at vocational education based on digital leadership model using AHP method
[33]	Israel	Typology of digital leadership roles tasked with integrating new technologies into teaching: Insights from metaphor analysis
[34]	United Kingdom	Young people, digital media making and critical digital citizenship
[14]	Cyprus	Are headmasters digital leaders in school culture?
[35]	Canada	A review of digital leadership: Changing paradigms for changing times, by E. Sheninger
[36]	United States of America	Digital leadership: Changing paradigms for changing times
[37]	Kuwait	The impact of digital leadership on teachers' technology integration during the COVID-19 pandemic in Kuwait
[38]	Thailand	A digital leadership development model for school administrators in basic education to fulfil the Thailand 4.0 policy
[39]	Indonesia	Implementation of principal's digital leadership in communication and teacher professional development at school
[13]	Malaysia	Digital leadership among school leaders in Malaysia
[40]	United States of America	Indicators of digital leadership in the context of K-12 Education
[41]	United States of America	Vital skills of the elementary principal as a technology leader

## Results:

### i) Pattern of Publication in Terms of Country and Year

This systematic literature review able to gather 20 articles. Among 20 articles, six studies on digital leadership were conducted in Malaysia [13,24,27-30], four studies examined digital

leadership in United States of America [26,36,40,41], three studies focused on digital leadership in Indonesia [31,32,39] and one study conducted on digital leadership in Turkey [25], Israel [33], United Kingdom [34], Cyprus [14], Canada [35], Kuwait [37] and Thailand [38] respectively.

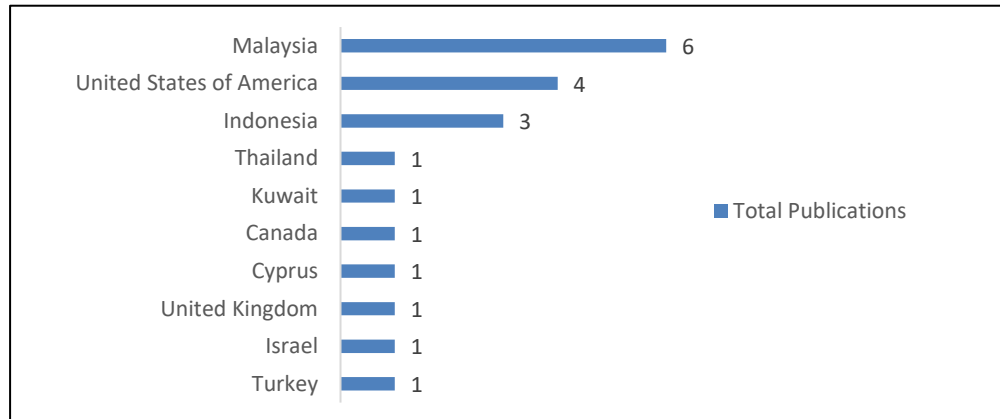


Fig. 2: Countries in which the studies took place

Figure 2 depicts the total number of publications on digital leadership in a few nations throughout the world. There are 10 countries in all that have actively published articles on digital leadership in educational settings. In Asia and Pacific region such as Malaysia, Indonesia, and Thailand, 10 out of the 20 articles, or half of the studies, were conducted. Five more studies were carried out in the North American region, including the United States of America and Canada. The remaining four studies took place in Europe, including Cyprus, Israel, Turkey, and the United Kingdom, as well as one in the Middle East, in Kuwait.

In terms of the publication year, three articles were recently published in the year 2022 [24,33,37], and eight articles were published in 2021 [25-30,38,39]. Apart from that, two articles were published in 2020 [31,32], two articles in 2019 [13,36], an article in 2017 [40], three articles in the year 2015 [14,34,35] and an article was published in 2014 [41].

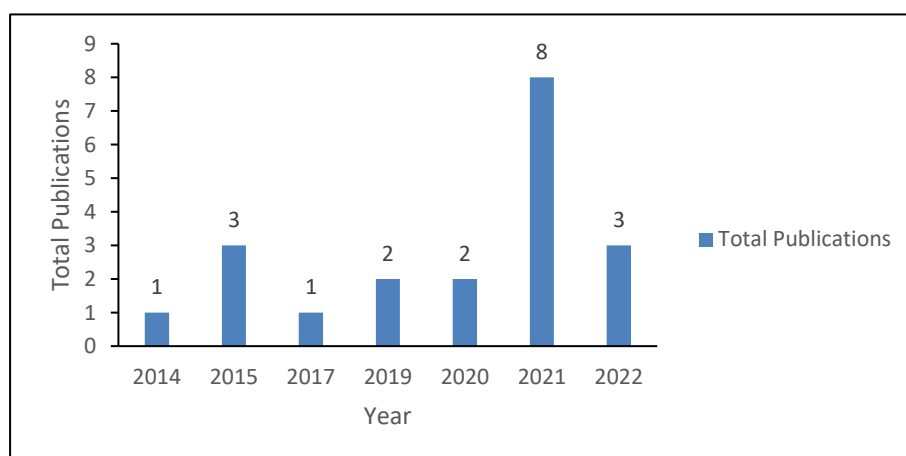


Fig. 3: Year of publication

Figure 3 illustrates the total number of articles on digital leadership by year of publication. There were just a few studies on digital leadership in the educational field before the Covid 19 pandemic swept the planet, which was before 2019. Only five studies were conducted in total: one in 2014, three in 2015, and one in 2017. Following the devastating effects of the Covid-19 pandemic worldwide, there appears to be an increase in the number of studies on digital leadership. For example, two studies were conducted in 2019 and 2020. The number of publications of eight studies in 2021 represents a substantial rise. Given that it is currently the first quarter of 2022, and much research have not yet been published, the remaining three studies were conducted in 2022.

## ii) Constructs in Digital Leadership

The result for the review was 25 constructs related to digital leadership. The 25 constructs were communication, digital technology, managerial skills, individual skills, digital learning competency, digital age learning culture, professional practice excellence, digital citizenship, visionary leadership, systemic improvement, public relations, pedagogical component, openness, trust, empowerment, embedding of social media, adaptation to continual change, being proactive in problematic situations, self-control, intrinsic motivation, branding, students learning and engagement as well as the learning environment and spaces, opportunity and school climate. Based on this finding, it provides a sufficient information regarding constructs of digital leadership in educational field.

Table 4: The constructs and subconstructs in measuring digital leadership

Author & Year	Context of Digital Leadership Measurement	Constructs/ Themes	Subconstructs/ Subthemes
[24]	Principals	Communication	<ul style="list-style-type: none"> <li>• Preferred communication medium</li> <li>• Social media as a recent trend</li> <li>• A present and future necessity</li> <li>• Social media as an efficient medium of communication</li> <li>• Systematic groups, e.g., WhatsApp and Telegram</li> </ul>
[25]	Principals	Technology use	<ul style="list-style-type: none"> <li>• Capabilities in technology</li> <li>• Promoting digital technology</li> <li>• Staying current and up to date with technology</li> <li>• Development of a digital school culture</li> </ul>



			<ul style="list-style-type: none"> <li>• Digital literacy</li> </ul>
		Managerial skills	<ul style="list-style-type: none"> <li>• Innovation management</li> <li>• Change management</li> <li>• Risk management</li> <li>• Visionary</li> <li>• Cooperation</li> <li>• Entrepreneurship</li> <li>• Trust</li> <li>• Equality</li> <li>• Mutual responsibility</li> <li>• Decision-making involvement</li> <li>• Accountability</li> <li>• Motivation</li> <li>• Overseeing individual differences</li> </ul>
		Individual skills	<ul style="list-style-type: none"> <li>• Openness to learning</li> <li>• Communication skills</li> <li>• Critical thinking</li> <li>• Creativity</li> <li>• Practical intelligence</li> <li>• Ability to solve problems</li> <li>• Global thinking</li> </ul>
[26]	Principals	Digital learning competency	N/A
	Teachers	Digital learning competency	N/A
[27]	Principals	Digital age learning culture	N/A
		Visionary leadership	N/A
		Professional practice excellence	N/A
		Digital citizenship	N/A
		Systemic improvement	N/A
[28]	Principals	Public relations	<ul style="list-style-type: none"> <li>• Social media as a conduit in public relations practice</li> <li>• Facebook: Primary conduit for public relations practice</li> </ul>

- Websites, Twitter, and Instagram: Secondary conduit for public relations practice

[29]	Principals	Digital age learning culture	N/A
		Visionary leadership	N/A
		Professional practice excellence	N/A
		Digital citizenship	N/A
		Systemic improvement	N/A
[30]	Principals	Visionary leadership	N/A
		Professional practice excellence	N/A
		Digital age learning culture	N/A
		Systemic improvement	N/A
		Digital citizenship	N/A
[31]	Principals	Visionary leadership	N/A
		Professional development	N/A
		Digital age learning culture	N/A
		Digital citizenship	N/A
		Systemic improvement	N/A
[32]	Principals	Visionary leadership	N/A
		Excellence in professional practice	N/A
		Digital age learning culture	N/A

		Digital citizenship	N/A
		Systemic improvement	N/A
[33]	Principals	Pedagogical component	N/A
		Technological component	N/A
		Organizational and managerial component	N/A
[34]	Head Teacher	Openness	N/A
		Trust	N/A
		Empowerment	N/A
		Embedding of social media	N/A
[14]	Headmasters	Adaptation to continual change	N/A
		Being proactive in problematic situations	N/A
		Being visionary	N/A
		Sense of value to learning and development	N/A
		Communication skills	N/A
		Self-control	N/A
		Management skills	N/A
		Intrinsic motivation	N/A
[35]	School leaders	Communication	N/A
		Professional growth and development	N/A
		Public relations	N/A

		Branding	N/A
		Learning environment and spaces	N/A
		Student engagement and learning	N/A
		Opportunity	N/A
[36]	School leaders	Communication	N/A
		Professional growth and development	N/A
		Public relations	N/A
		Branding	N/A
		Learning environment and spaces	N/A
		Student engagement and learning	N/A
		Opportunity	N/A
[37]	Principals	Digital age learning culture	N/A
		Visionary leadership	N/A
		Professional practice excellence	N/A
		Systemic improvement	N/A
		Digital citizenship	N/A
[38]	School administrators	Visionary leadership	N/A
		Use of digital	N/A
		Use of digital technology in management	N/A

		Digital technology support and management	N/A
		Use of digital technology in measurement and evaluation	N/A
		Ethics in the use of digital technology	N/A
[39]	Principals	Communication	N/A
		Teacher Professional Development	N/A
[13]	School principals	Communication	<ul style="list-style-type: none"> <li>• Online file sharing</li> <li>• Virtual means of: information sharing; discussion; communication;</li> </ul>
		School climate	<ul style="list-style-type: none"> <li>• Virtual means of: promoting school goals; promoting professional and development; teaching and learning; and student performance monitoring.</li> </ul>
[40]	Principal	Visionary leadership	<ul style="list-style-type: none"> <li>• Digital learning space</li> <li>• Integrated technology vision</li> </ul>
		Digital age learning culture	<ul style="list-style-type: none"> <li>• Adequate devices</li> <li>• Technology plan support by all stakeholders</li> <li>• Effective use of technology</li> </ul>
		Professional development	<ul style="list-style-type: none"> <li>• Technology modelling</li> <li>• Digital learning opportunities</li> <li>• Digital learning community</li> </ul>
		Systemic improvement	<ul style="list-style-type: none"> <li>• Optimized learning success</li> <li>• Strategic partnership</li> <li>• Digital filter</li> </ul>

[41]	Elementary principals	Digital citizenship Digital age learning culture	Competed personnel
		Excellence in professional practice	<ul style="list-style-type: none"> <li>• Assist with instructional innovation aimed at improving digital-age learning.</li> <li>• Create and encourage effective technology usage for learning on a regular basis.</li> <li>• Encourage learner-centered settings via technology and learning source of aids to meet diverse needs of learners.</li> <li>• Keep up with educational research and developing trends in the use of technology in the classroom and examine the potential of new technology in increasing student learning.</li> <li>• Model and promote effective stakeholder communication and collaboration through the use of digital age tools.</li> <li>• Assign resources, time, and access for continuous professional growth in technology and integration.</li> <li>• Alleviate and engage in learning communities that encourage and support the use of technology among administrators, staff, and faculty in learning.</li> </ul>
		Systemic improvement	<ul style="list-style-type: none"> <li>• Direct intentional change to optimize learning goal achievement via technology and media-oriented resources appropriately.</li> <li>• Develop and utilize strategic partnerships for promoting systemic improvement.</li> </ul>
		Visionary leadership	Participate in continuous development, implementation, and communication processes through

integrated technological strategic  
plans as per a mutual vision.

---

Note: N/A denotes “Not Available” as the subconstructs/subthemes are not stated in the studies.

### Discussion:

Most of the articles in this study were published in Malaysia. In Malaysia, the implementation of digital leadership by using digital mastery and elements of technology will bring great effect to the education system as it will increase students' marketability in the education 4.0 era [42]. Students will be more passionate about the use of digital device such as tablet and phones, and digital learning because they will be provided with internet access [43]. As stated by [27], teachers will have various options in teaching and learning process as the presence of information technology and communication brings new perspectives to the patterns of students' learning.

The findings from this current review found that most countries in the middle east such as Turkey, Israel, Kuwait and Cyprus have one publication respectively. In Kuwait, technological literacy placed a huge burden on school principals for those who are not familiar with the use of technology [37]. Therefore, more study should be conducted regarding digital leadership among principals in Kuwait. Meanwhile in Thailand, there are no study on building basic education administrators to be digital leaders in order to drive Thailand Education 4.0 and prepare for digital and learning society [38]. More research should be done to identify factors for successful digital leadership in Thailand as finding from this review found that only one study related to digital leadership has been conducted in 2021.

Based on Figure 2, it shows increasing trends in publications on digital leadership. The highest publications on digital leadership were in 2020 with eight articles. This is related to current situation which refers to Covid-19 pandemic that effects worldwide. As stated by [30], Covid-19 pandemic is one of the factors that boost up transformation in the education system which involved digital technology. The exponential growth and transformation seen in technology impacted teaching process, and the change of methods and speed of accessing information [44]. Hence, rapid changes occurred in educational practices like other fields and the need for educational institutions to cope up with the digital transformations [25]. As a result, more studies have been conducted related to technology and digital such as digital leadership.

The findings from this review stated that less study in digital leadership has been conducted before 2019. When Covid-19 hit the whole world, rather than the conventional face-to-face learning, the online distance learning served as the sole option for attending school [37]. This situation also impacted leadership style and digital leadership becomes preferred leadership style in this digital age. According to [45], technology-oriented leadership style that encourages ICT usage in schools is the evidence of new technologies and current development of innovation in education. Therefore, it is advisable to apply ICT in studying leadership practice in schools [28]. According to [46], the new leadership style called digital leadership relates technology with leaders.

In addition, 19 out of 20 reviewed articles were studies on digital leadership among principals, school administrators and school leaders. This shows that digital leadership among school administrators have been a great concern in the educational field worldwide. This is because of high demand to integrate information communication and technology (ICT) in teaching and learning, besides the need for a new, suitable leadership style among school principals in the digital age [24]. A principal is the role model in the organization and can trigger for better ethical, legal, and more safe use of ICT [27].

Among 25 constructs discovered from this review, the highest frequency was excellence in professional practice and also stated as professional practice excellence, professional development, sense of value to learning and development, professional growth and development, and teacher professional development. The second highest frequency was visionary leadership and also known as being visionary. The third most repeated construct was digital age learning culture, the fourth construct was systemic improvement, and the fifth highest construct was digital citizenship.

Based on the five dominant constructs, the word digital was repeated in two of the constructs namely digital age learning culture and digital citizenship. It shows that the beginning of transformation by integrating technology to education system and the society [14]. The availability of ICT in education has contributed to significant difficulty for teachers to develop successful teaching and learning [29]. Therefore, teachers who are digital savvy will have more advantages in terms of planning and implementing the teaching and learning process.

The construct which shows highest frequency was excellence in professional practice. School administrators should foster a culture of innovation and professional learning where teachers can employ current technology and digital resources to facilitate student learning, such as through the allocation of resources, time, and access so that teachers continue to improve their integration and fluency with technology [47]. The next construct that recorded the highest frequency was visionary leadership. Administrators should foster excellence and transformation across organizations by developing and implementing a common vision for comprehensive integration of technology [47]. Next, the systemic improvement construct implies that administrators propose digital age leadership as well as management to continually enhance the organisation by utilising information and technology resources effectively [47].

The findings in the current study have shed light that maybe useful for future study. Firstly, more study in digital leadership among school teachers should be conducted. In digital leadership, technology plays important role and technology effects pedagogy [14]. Hence, teachers who are responsible for teaching and learning process in the classroom should have digital leadership. As a result, it will bring benefit for students' performance. Secondly, another perspectives that should be the area of concern for future study is the assessment of digital leadership. For example, type of test used in measuring digital leadership. Assessment does not only play a crucial role in education but it also significantly contributes to the teaching process [48]. It is because assessment has vital role in informing and improving continuous learning [49]. Important tools in measuring learning process are tests, examinations, and evaluation models [48].



### Managerial Implication:

Current teacher training should include digital leadership in the module as early exposure for future teachers. This review also contributes to the body of knowledge which identify relevant constructs for digital leadership for principals in Asean countries such as Malaysia and Indonesia. The current review is important as it contains information on constructs of digital leadership which need to be possessed by education leaders, administrators, and educators to cultivate digital leadership.

### Conclusion:

The present systematic review has identified the pattern of publications in digital leadership in terms of country, year, and context. According to this review, Malaysia possessed the most publication in digital leadership and 2021 recorded the most publications in digital leadership. The context of the studies in digital leadership focused more on principals rather than teachers. This review also managed to identify constructs used in measuring digital leadership in educational field. There were five constructs which showed highest frequency in measuring digital leadership according to this review: (i) professional practice excellence, (ii) digital age learning culture, (iii) digital citizenship, (iv) systemic improvement, and (v) visionary leadership. Therefore, elements of digital leadership should be included in the training for future school leaders. The study's findings will aid in decision making and problem solving with the use of digital leadership. These findings show that digital leadership is increasingly becoming a concern in the educational field. Future systematic literature review may take into account the actions carried out for teacher digital leadership in order to improve this study. This systematic review also suggests a suggestion for future research which is to investigate the level of digital leadership, which alludes to the issues identified in this study.

### References:

- [1] UNESCO, "World Teachers' Day 2020 Fact Sheet," Available at [http://uis.unesco.org/en/files/world\\_teachers\\_day\\_fact\\_sheet\\_2020-pdf](http://uis.unesco.org/en/files/world_teachers_day_fact_sheet_2020-pdf), 2020.
- [2] P. Cardoso, M. d. C. Taveira & M. O. Teixeira, "The Role of Teachers in the Guidance Process," Available at [file:///C:/Users/user/Downloads/TheZRoleZofZTeachersZinZGuidance%20\(5\).pdf](file:///C:/Users/user/Downloads/TheZRoleZofZTeachersZinZGuidance%20(5).pdf), 2014.
- [3] V. Gherheș, C. E. Stoian, M. A. Fărcașiu & M. Stanici, "E-learning vs. Face-to-Face Learning: Analyzing Students' Preferences and Behaviors," *Sustainability*, vol. 13, no. 4381, pp. 1–15, 2021, doi:10.3390/su13084381.
- [4] L. L. Warren, "The Importance of Teacher Leadership Skills in the Classroom," *Education Journal*, vol. 10, no. 1, pp. 8–15, 2021, doi:10.11648/j.edu.20211001.12.
- [5] V. Gougas & L. Malinova, "School Leadership. Models and Tools: A Review," *Open Journal of Social Sciences*, vol. 9, no. 1, pp. 120–139, 2021, doi:10.4236/jss.2021.91009.

- [6] T. Erhan, H. H. Uzunbacak & E. Aydin, "From Conventional to Digital Leadership: Exploring Digitalization of Leadership and Innovative Work Behavior," *Management Research Review*, pp. 1–20, 2022, doi:10.1108/MRR-05-2021-0338.
- [7] K. Ehmig-Klassen & D. Schallmo, "Digital Leadership : Approaches and Practical Insights from the B2B Sector," *Proceedings of ISPIM Connects Valencia - Reconnect, Rediscover, Reimagine*, 29 November-1 December, Valencia, Spain, pp. 1–18, 2021.
- [8] F. Matriadi, Ikramuddin, M. Adamy & Chalirafi. "Implementation of Digital Leaderships on Pertamina Hulu Energy in Aceh," *International Journal of Engineering, Science & Information Technology (IJESTY)*, vol. 1, no. 2, pp. 125–129, 2021.
- [9] A. E. Gfrerer, L. Rademacher & S. Dobler, "Digital Needs Diversity: Innovation and Digital Leadership from a Female Managers' Perspective," *XXXI ISPIM Innovation Conference*, 7-10 June, Berlin, Germany, pp. 335–349, 2020, doi:10.1007/978-3-030-69380-0.
- [10] S. L. Zulu & F. Khosrowshahi, "A Taxonomy of Digital Leadership in the Construction Industry," *Construction Management and Economics*, vol. 39, no.7, pp. 565–578, 2021, doi:10.1080/01446193.2021.1930080.
- [11] B. J. Avolio, S. Kahai & G. E. Dodge, "E - Leadership: Implications for Theory, Research, and Practice," *The Leadership Quarterly*, vol. 11, no. 4, pp. 615–668, 2000.
- [12] B. J. Avolio, J. J. Sosik, S. S. Kahai & B. Baker, "E - Leadership: Re-Examining Transformations in Leadership Source and Transmission," *The Leadership Quarterly*, vol. 25, no. 1, pp. 105–131, 2014.
- [13] Mat Rahimi Yusof, Mohd Faiz Mohd Yaakob & Mohd Yusri Ibrahim, "Digital Leadership among School Leaders in Malaysia," *International Journal of Innovative Technology and Exploring Engineering*, vol. 8, no. 9, pp. 1481–1485, 2019, doi:10.35940/ijitee.i8221.078919.
- [14] F. A. Aksal, "Are Headmasters Digital Leaders in School Culture?" *Education and Science*, vol. 40, no. 182, pp. 77–86, 2015, doi:10.15390/EB.2015.4534.
- [15] J. P. T. Higgins, D. G. Altman, P. C. Gotzsche, P. Juni, D. Moher, A. D. Oxman, J. Savovic et al, "The Cochrane Collaboration's Tool for Assessing Risk of Bias on Randomised Trials," *BMJ*, vol. 343, no. d5928, pp. 1–9, 2011.
- [16] H. A. M. Shaffril, A. A. Samah & S. Kamarudin, "Speaking of the Devil: A Systematic Literature Review on Community Preparedness for Earthquakes," *Natural Hazards*, vol. 108, no. 3, pp. 2393–2419, 2021, doi:10.1007/s11069-021-04797-4.
- [17] H. A. M. Shaffril, S. F. Samsuddin & A. A. Samah, "The ABC of Systematic Literature Review: The Basic Methodological Guidance for Beginners," *Quality and Quantity*, vol. 55, pp. 1319–1346, 2020, doi:10.1007/s11135-020-01059-6.
- [18] H. A. M. Shaffril, A. A. Samah, S. F. Samsuddin & Z. Ali, "Mirror-Mirror on the Wall, What Climate Change Adaptation Strategies are Practiced by the Asian's Fishermen of All?" *Journal of Cleaner Production*, vol. 232, pp. 104–117, 2019, doi:10.1016/j.jclepro.2019.05.262.
- [19] D. Moher, A. Liberati, J. Tetzlaff & D. G. Altman, "Preferred Reporting Items for Systematic Reviews and Meta-Analyses: the PRISMA Statement," *BMJ*, vol. 339, no. b2535, pp. 1–8, 2009, doi:10.1016/j.jclinepi.2009.06.005.

- [20] P. C. Sierra-Correa & J. R. C. Kintz, "Ecosystem-Based Adaptation for Improving Coastal Planning for Sea-Level Rise: A Systematic Review for Mangrove Coasts," *Marine Policy*, vol. 51, pp. 385–393, 2015.
- [21] M. Gusenbauer & N. R. Haddaway, "Which Academic Search Systems are Suitable for Systematic Reviews or Meta-Analyses? Evaluating Retrieval Qualities of Google Scholar, PubMed, and 26 other resources," *Research Synthesis Methods*, vol. 11, no. 2, pp. 181–217, 2020, doi:10.1002/jrsm.1378.
- [22] A. Martin-Martin, E. Orduna-Malea, M. Thelwall & E. Delgado Lopez-Cozar, "Google Scholar, Web of Science, and Scopus: A Systematic Comparison of Citations in 252 Categories," *Journal of Informetrics*, vol. 12, no. 4, pp. 1160–1177, 2018.
- [23] H. A. M. Shaffril, S. E. Krauss & S. F. Samsuddin, "A Systematic Review on Asian's Farmers' Adaptation Practices towards Climate Change," *Science of the Total Environment*, vol. 644, pp. 683–695, 2018, doi:10.1016/j.scitotenv.2018.06.349.
- [24] E. F. Saraih, S. L. Wong, S. Asimiran & M. N. M. Khambari, "Contemporary Communication Conduit among Exemplar School Principals in Malaysian Schools," *Research and Practice in Technology Enhanced Learning*, vol. 17, no. 4, pp. 1–23, 2022. doi:10.1186/s41039-022-00179-x.
- [25] T. Karakose, H. Polat & S. Papadakis, "Examining Teachers' Perspectives on School Principals' Digital Leadership Roles and Technology Capabilities during the Covid-19 Pandemic," *Sustainability*, vol. 13, no. 13448, pp. 1–20, 2021, doi:10.3390/su132313448.
- [26] M. L. Ellis, Y. H. Lu & B. Fine-Cole, "Digital Learning for North Carolina Educational Leaders," *TechTrends*, vol. 65, no. 5, pp. 696–712, 2021, doi:10.1007/s11528-021-00649-x.
- [27] Siti Noor Ismail, Mohd Norakmar Omar & Arumugam Raman, "The Authority of Principals' Technology Leadership in Empowering Teachers' Self-Efficacy towards ICT Use," *International Journal of Evaluation and Research in Education*, vol. 10, no. 3, pp. 878–885, 2021, doi:10.11591/ijere.v10i3.21816.
- [28] E. F. Saraih, S. L. Wong, S. Asimiran & M. N. M. Khambari, "Understanding Digital Public Relations Practices among Exemplar School Principals in Malaysian Schools," *Pertanika Journal of Social Sciences and Humanities*, vol. 29, no. 2, pp. 1273–1291, 2021, doi:10.47836/pjssh.29.2.28.
- [29] Mohd Norakmar Omar & Siti Noor Ismail, "Empowering Teacher Self-Efficacy on ICT: How does Technology Leadership Play a Role?" *Malaysian Online Journal of Educational Management*, vol. 9, no. 3, pp. 1–22, 2021.
- [30] N. Hafiza Hamzah, M. Khalid M. Nasir & Jamalullail Abdul Wahab, "The Effects of Principals' Digital Leadership on Teachers' Digital Teaching during the Covid-19 Pandemic in Malaysia," *Journal of Education and e-Learning Research*, vol. 8, no. 2, pp. 216–221, 2021, doi:10.20448/journal.509.2021.82.216.221.
- [31] R. Agustina, W. Kamdi, S. Hadi, Muladi & D. Nurhadi, "Influence of the Principal's Digital Leadership on the Reflective Practices of Vocational Teachers Mediated by Trust, Self Efficacy, and Work Engagement," *International Journal of Learning*,

- Teaching and Educational Research, vol. 19, no. 11, pp. 24–40, 2020a, doi:10.26803/ijlter.19.11.2.
- [32] R. Agustina, W. Kamdi, S. Hadi, Muladi, D. Nurhadi & S. Umniati, “Leadership Selection at Vocational Education Based on Digital Leadership Model Using AHP Method,” Proceedings 4th International Conference on Vocational Education and Training, 19 September, Malang, Indonesia, pp. 36-40, 2020b, doi:10.1109/ICOVET50258.2020.9230124.
- [33] O. Avidov-Ungar, T. Shamir-Inbal & I. Blau, “Typology of Digital Leadership Roles Tasked with Integrating New Technologies into Teaching: Insights from Metaphor Analysis,” Journal of Research on Technology in Education, vol. 54, no. 1, pp. 92–107, 2022, doi:10.1080/15391523.2020.1809035.
- [34] D. McGillivray, G. McPherson, J. Jones & A. McCandlish, “Young People, Digital Media Making and Critical Digital Citizenship,” Leisure Studies, vol. 35, no. 6, pp. 1–15, 2015, doi:10.1080/02614367.2015.1062041.
- [35] A. Riveros, “A Review of Digital Leadership: Changing Paradigms for Changing Times , by E. Sheninger,” Leadership and Policy in Schools, vol. 14, no. 4, pp. 490–494, 2015, doi:10.1080/15700763.2015.1026451.
- [36] E. Sheninger, “Digital Leadership: Changing Paradigms for Changing Times,” 13th International Technology, Education and Development Conference, 11-13 March, Valencia, Spain, 10029, 2019.
- [37] M. K. AlAjmi, “The Impact of Digital Leadership on Teachers’ Technology Integration during the COVID-19 Pandemic in Kuwait,” International Journal of Educational Research, pp. 1–28, 2022, doi:10.1016/j.ijer.2022.101928.
- [38] T. Suksai, P. Suanpang & R. Thangchitcharoenkhul, “A Digital Leadership Development Model for School Administrators in Basic Education to Fulfill the Thailand 4 . 0 Policy,” PSAKU International Journal of Interdisciplinary Research, vol. 10, no. 2, pp. 11–20, 2021.
- [39] I. Rusnati & M. F. Gaffar, “Implementation of Principal’s Digital Leadership in Communication and Teacher Professional Development at School,” Advances in Social Science, Education and Humanities Research, vol. 526, pp. 90–95, 2021, doi:10.2991/assehr.k.210212.018.
- [40] L. Zhong, “Indicators of Digital Leadership in the Context of K-12 Education,” Journal of Educational Technology Development and Exchange, vol. 10, no. 1, pp. 27–40, 2017.
- [41] A. Garcia, & C. Abrego, “Vital Skills of the Elementary Principal as a Technology Leaders,” Journal of Organizational Learning and Leadership, vol. 12, no. 1, pp. 12–25, 2014.
- [42] R. A. Bahtiar, S. Ibrahim, H. Ariffin, N. H. Ismail & W. M. K. Isa, “Educational Goals and Agenda Sustained during the Covid-19 Movement Control Order,” Available at <https://iab.moe.edu.my/index.php/ms/sumber/menu-berita-pemberitahuan/69-pengumuman-2020>, 2014.
- [43] M. A. S. M. Arip, F. M. Saad, N. Jaapar, K. M. Ali, N. H. Athdzar & W. N. W. A. Rashid, “Factors Effects and Strategies for Dealing with Lack of Concentration of

- Secondary School Students in the Classroom: A Qualitative Study,” *Journal of Chemical Information and Modeling*, vol. 53, no. 9, pp. 1689–1699, 2019.
- [44] Z. Alakoc, “Technological Modern Teaching Approaches in Mathematics Teaching,” *Turkish Online Journal of Education Technology*, vol. 2, pp. 43–49, 2003.
- [45] C. Brown, L. Czerniewicz, C. Huang & T. Mayisela, “Curriculum for Digital Education Leadership: A Concept Paper. Commonwealth of Learning. Canada,” Available at <https://www.flickr.com/photos/dfataustraliaid/10701437386/>, 2016.
- [46] E. Sheninger, *Digital Leadership: Changing Paradigms for Changing Times*. Thousand Oaks: Corwin Press, 2014.
- [47] International Society for Technology in Education, “ISTE Standards for Administrators,” Available at [https://cdn.iste.org/www-root/Libraries/Images/Standards/Download/ISTE Standards for Administrators%2C 2009 \(Permitted Educational Use\).pdf](https://cdn.iste.org/www-root/Libraries/Images/Standards/Download/ISTE%20Standards%20for%20Administrators%202009%20(Permitted%20Educational%20Use).pdf), 2009.
- [48] I. Tosuncuoglu, “Importance of Assessment in ELT,” *Journal of Education and Training Studies*, vol. 6, no. 9, pp. 163–167, 2018, doi:10.11114/jets.v6i9.3443.
- [49] B. Cowie & B. Bell, “A Model of Formative Assessment in Science Education,” *Assessment in Education: Principles, Policy & Practice*, vol. 6, no. 1, pp. 101–116, 1999.