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RESEARCH ARTICLE

Exploring Digital Leadership Competencies among School Administrators and Digital Maturity in Sarawak, Malaysia: From Teachers' Perspectives

Caroline Cathy Nubun[1]*, Zaiton Hassan[2], Hana Hamidi[3]

[1,2,3] Faculty of Cognitive Sciences and Human Development, University of Malaysia Sarawak, Sarawak, Malaysia

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***Corresponding Author:**

hzaiton@unimas.my

ABSTRACT

Digital technology is evolving rapidly, offering new opportunities, particularly in the educational settings. However, the adaptation of these technologies has been slower prior to Covid-19 in Malaysia compared to some other Southeast Asian countries. In addition, school administrators in Malaysia exhibit limited digital competencies, and there is a dearth of research on digital maturity in the context of Malaysian education. The aim of this paper is to investigate school administrators' competencies from teachers' perspectives and categorize the digital maturity of selected schools in Malaysia. Utilizing qualitative method, Focus Group Discussion (FGD) was conducted among six Malaysian teachers through an online platform. The results reveal that digital leadership competencies among the school administrators encompass Vision and Mission, Digital Culture, Digital Professional Development, digitally go-forward, Digital Safety and Digital Resilience. Based on the evidence, the digital maturity in these selected schools, as indicated by the Educational Process-Capability Digital Maturity (EP-CMM) framework, falls under Level 3, labelled "Management" which it supports a continuous development process but not yet to continuous enhancement process. Thus, empowering and upgrading the competencies of school administrators can contribute to the development of policies and initiatives in Malaysia. This can be achieved by understanding the level of digital maturity through integrating digital technology into daily administrative tasks, while leading the digital cultural changes in their schools.

INTRODUCTION

Digital transformation is a game-changer in the workplace as well as in education. The escalating wave of digitalization has significantly transformed today's professional landscape, presenting new challenges for administrators, and impacting organizations (Edmead, 2016; Van Veldhoven & Vanthienen, 2019). Awang Jidon et al. (2023) stated that prior to COVID-19, Malaysia's adoption of the technology was slower than that of its neighbouring countries in Southeast Asia. Within the Malaysia Digital (MyDigital) Economy initiative, Policy Thrust 4 is dedicated to ensuring the successful integration and adoption of digitalization in talent development across various levels of education. According to MyDigital (2021), there has been modest progress toward enhancing access to digital learning. Analyzing the current state of digital maturity in schools is crucial for intervention and formulation of mission and vision. The Global Human Capital Trends (Volini et al., 2019) highlights that 80% of respondents believe that digital leadership demands unique skills crucial for organizational success. In contrast, however, the Malaysia Education Blueprint 2013-2025 reveals that 55% of current school administrators have never undergone preparatory or induction training before or during the initial first three years in their roles. This lack of preparation suggests that

administrators may find themselves leading teachers without adequate readiness (MOE, 2013). Considering these findings, it is imperative for school administrators to develop their digital competencies. This will empower them to instigate and adapt to changes brought about by new digital technologies.

Digital maturity is defined as "the status of an organization's digital transformation, providing information into what an organization has accomplished thus so far in its transformation efforts" (Chanias & Hess, 2016). In Malaysian schools, digital maturity represents the current state of digital transformation, aiding the identification of the strengths and weakness in the strategy for fostering digitalization. The leadership competencies, as stated by Kieser (2017) and Rossmann (2018), are examined in the context of leadership practices and skills, as a respond to challenges raised by Ferry (2018) regarding digital leadership in Malaysia. Digital competencies are defined as a set of abilities to effectively use digital technology for optimizing daily tasks effectively (Ferrari, 2012). Therefore, digital leadership competencies encompass practices and skills that enable the adaptation of digital technology in administrative tasks within schools.

School administrators are role models for teachers and students and should embrace digital leadership competencies. They must adeptly use digital technology to manage administrative tasks efficiently and systematically. According to Ferry (2018), Malaysian leaders, unlike their counterparts in the Asia Pacific region, are not adequately prepared for the digital landscape, posing a risk to hindering digital maturity. The model in this study is established in this preliminary phase and can serve as a grounded theory to evaluate and refine dimensions, constructs, and indicators pertaining to digital leadership among school administrators. However, based on Ugur and Koç (2019), the current level of digital leadership among school administrators remains low. They lack knowledge and digital skills, falling short of the standard set by the National Educational Technology for Administrators (NETS-A) (Omar & Ismail, 2019; Osman, 2014; Özkan et al., 2017). These gaps in digital leadership competencies among school administrators persist across various contexts and respondent groups.

In response, the education in Malaysia must undergo a transformation process and access its digital maturity to continually enhance the digitalization process in schools. Many schools lack knowledge about the digital transformation process, making it challenging for them to evaluate their current digital conditions. To propel Malaysia towards advanced digital technology, it is prudent to first comprehend and analyze usage trend and pattern (Azman et al., 2014). Identifying their primary weaknesses is crucial for schools to plan their interventions effectively and create action plans to overcome these weaknesses. Today, there are various approaches to process improvement, differing in target areas of conceptual and methodological frameworks (Duarte & Martins, 2011). Schools can determine their maturity stage through checklists or descriptions, enabling them to verify their weaknesses.

When schools digitize, digital leadership competencies exhibited by the school administrators have a significant impact on transformation processes. Administrators must adeptly navigate these digital transformations within the school organizations. This research explores the digital leadership competencies of school administrators and aims to categorize the digital maturity in Malaysian schools. Hence, the research questions are:

What are the digital leadership competencies of school administrators?

What is the category of digital maturity in these selected Malaysian schools?

2 LITERATURE REVIEW

2.1 Digital Leadership Competencies

Digital leadership is defined as leadership in digital context, involving administration of the school organizations in the digital age or by leaders with a personal digital experience (Gill & VanBoskirk, 2016). Digital leaders drive a change in school and integrating digital technologies into organizations through their competences. These leaders can set direction, persuade others, create lasting change based on knowledge, and forge connections to anticipate developments crucial to the future success of the school (Karakose et al., 2021; Sheninger, 2019). Digital leadership is a leadership style that prioritizes implementing digital transformation within an organization, enabling enterprises to digitize their work environments and cultivate learning cultures in school (Sagbas & Erdogan, 2022). School administrators engaging in digital leadership, particularly the Senior Leader Team (SLT), demonstrate curiosity for new innovations and willingness to learn new information, particularly in the context of Industry 4.0, where digital transformation and willingness to learn new information is the process of change through digitization. Compared to other leaders, digital leaders of school administrators possess various abilities, attitudes, traits, knowledge, and personalities.

According to Ilomäki et al. (2016), digital competence is a term frequently used to describe the knowledge and abilities expected of an average citizen to learn and function in a digitalized knowledge society. Ferrari (2012) defined digital competence as "the set of knowledge, skills, attitudes, abilities, strategies, and awareness that are required when using ICT [information and communication technologies] and digital media to perform tasks, solve problems, communicate, manage information, collaborate, create and share content, and build knowledge effectively, efficiently, appropriately, critically, creatively, autonomously, flexibly, ethically, reflectively for work, leisure, participation, learning, and socializing" (p. 30).

The National Educational Technology Standards for Administrators (International Society for Technology in Education, 2009) are the most recent set of guidelines describing the knowledge and skills that school administrators should possess about educational technology. Giving direction to digital leaders is the main goal of the National Education Technology Standards for Administrators (NETS-A). The outlines are stated below:

Visionary Leadership: Inspiring and leading the development and implementation of a collective vision for widespread technology integration to promote excellence and support transformation throughout the organization.

Digital-Age Learning Culture: Creating, promoting, and sustaining a vibrant learning environment in the digital age that provides a challenging, pertinent, and engaging education for every student.

Excellence in Professional Practice: Promoting an environment for professional learning and innovation that empowers teachers to enhance student learning through the infusion of contemporary digital technologies and resources.

Systematic Improvement: Offering leadership and management in the digital era to consistently enhance the organization by efficiently utilizing information and digital resources.

Digital Citizenship: Facilitating comprehension of social, ethical, and legal matters and responsibilities associated with a developing digital culture.

Munsamy (2022) proposed a digital leadership competencies framework with six clusters:

Digital Competitive Intelligence: Understanding the big picture, being externally focused, and understanding potential risks through market intelligence and networking.

Digital Skills: Being aware of new and emerging digital skills required and the continuous development of the digital skills for employees.

Cultivating a Digital Culture: Being creative and innovative, embracing diversity through engaging with people across various organizational hierarchical levels and different generational cohorts, ensuring continuous improvement, and realizing the potential in digital.

Embracing digital: Adopting a positive attitude towards digitalization, role-modelling the new required behaviors, enabling collaboration to encourage a digital approach to be adopted across the organization.

Leadership Facilitating the Digital Drive: Facilitating sound business practices, ensuring the principle of care for employees is carried out, and enabling effective decision-making while creating business value.

Digital Adaptiveness and Resilience: Highlighting the ability to adapt, being self-aware and understanding the impact of external factors on digitalization.

Eremina et al. (2019); Van Laar et al. (2017) outlined digital leadership competence skills as encompassing ethical awareness, cultural sensitivity, adaptability, self-guidance, and continuous learning, information management, effective communication, collaborative profiency, creativity, critical thinking, and problem solving. These digital leadership competencies are particularly relevant to the situation in Malaysia, where the administration system still employs a top-down management approach.

2.2 Digital Maturity Model

Eremina et al. (2019) defined Digital Maturity as a concept that reflects an organization's readiness and ability to adapt and utilize cutting-edge technology in accordance with market trends. Digital maturity is a model used to assess the level of digital maturity in an organization. This model serves as a benchmark for school administrators, enabling them to evaluate the digital maturity of their school. Additionally, it empowers administrators to devise strategies for enhancing digital practices and skills, fostering a digitally driven educational environment. The digital maturity model has recently emerged as a highly effective tool for aiding managers in the digital transformation of their organizations (Barry et al., 2023; Minh & Thanh, 2022).

Various digital maturity models have emerged since the explosion of digital transformation, with an increasing demand for their use (Teichert, 2019). The process used to analyze the organization's level of digital maturity is vital, and relying on models that serve as a reference framework based on evaluation axes and indicators (Zaoui & Souissi, 2022). In Malaysia, the evaluation of digital maturity is essential for digital leaders to plan interventions in enhancing the digital culture within the school environment. This flexible, user-centered approach implies ongoing development of the provided service or result, in this case, the assessment of digital maturity (Rigby & Ryan, 2018). A prescriptive maturity model aids in defining and implementing a development plan. Benchmarking is facilitated, comparisons between markets or regions become possible through a comparative maturity model (De Bruin et al., 2005; Van Looy et al., 2017).

The Capability Maturity Model (CMM) was created by the Software Engineering Institute in 1986. It describes the capacity to achieve a particular goal and leverage resources available for progression and advancement. This progression follows phases or stages that signify the evolutionary journey from the initial phase to advanced stage. According to Paulk et al. (1993), capacity maturity model denotes “the ability to articulate, oversee, gauge, and regulate the effectiveness of processes with applications spanning the entire enterprise”. Following the creation of CMM, numerous maturity

models have been developed by researchers, practitioners, consultancies, and software providers for various purposes. Fraser et al. (2002) stated that the maturity models comprise key components such as (a) maturity level or stage, (b) descriptor for each level of maturity, (c) generic description of each level, (d) dimensions, (e) elements associated with corresponding dimensions, and (f) a description of each element for each level of maturity. Paulk (1993) outlined five levels of the Capability Maturity Model, as shown in Table 1.

Table 1: Levels of Capability Maturity Model

Levels	Description
Level 1: Initial	Processes are ad hoc and sometimes chaotic. Predicting performance or learning from experience becomes challenging when everything is new and unique.
Level 2: Repeatable	Establish policies to effectively manage fundamental aspects of the project, including cost tracking, scheduling, and functionality. Set up systems to guarantee that projects with comparable applications will replicate the early achievements.
Level 3: Defined	Document and establish standards, integrating them across all projects. Ensure that the certified version is used for both the initial and maintenance phases, specifically for programme development.
Level 4: Managed	Extensive procedures have been established for both operations and product quality, and precise measurements are used in the evaluation process. Everything is measured.
Level 5: Optimizing	Emphasize the importance of ongoing process improvement by implementing technology, incorporating innovative ideas, and using feedback mechanisms. The application of statistical thinking enables the organization to comprehend process capability and identify practically significant differences in performance resulting from process changes.

The CMM should be implemented by organizations gradually because each level is intended to accomplish a certain objective associated with determining the operational maturity level.

2.3 Educational Process-Capability Maturity Model (EP-CMM)

Some of the CMM levels have been revised to better suit the needs of users and align more closely with industry practices. The CMM remains a preferred model due to its simplicity and ease of comprehension. In the educational organizations, the model is useful as it can be examined and verified (Fraser et al., 2002). Specifically, this study employs the Educational Process-Capability Maturity Model (EP-CMM) because it is tailored for use in the educational sector. By evaluating existing practices, determining an organization's competitive standing, providing feedback to school administrators on the quality of performance, and facilitating the management to educational process development, the model contributes to the enhancement and measurement of educational process maturity (Alshaheen & Alshaheen, 2019).

EP-CMM focuses on the steady enhancement of an organization's performance and operatives across five levels. Educational organizations can optimize their processes at level 5, pushing towards where their educational processes are maximized. Consequently, the achievement signifies organizational maturity, offering the best possible educational services. Table 2 displays the level of the developed model (Alshaheen & Alshaheen, 2019).

Table 2: Educational Process-Capability Maturity Model

Levels	Description
Level 1: Initial	At this stage, the educational institution is unable to see the significance of implementing quality standards, has an ambiguous operations plan, and functions in an erratic workplace. As a result, there are no set protocols or guidelines for working; instead, tasks are accomplished individually and services are rendered. This suggests that the organization is still in its early stages.
Level 2: Planning	To guarantee the effective execution of their strategies and the accomplishment of their objectives at this level, the organizations have created detailed plans, defined protocols, and arranged all material requirements. Quality management planning is accomplished by supporting top management in applying quality standards, adopting effective strategy planning, engaging in development of curriculum, and focusing on the needs of the stakeholders.
Level 3: Management	At this stage, quality management emerges as a critical strategy to aid in the process of continuous improvement while the educational process is being implemented. The main requirements for this level include the implementation of professional developments, management and coordination of employee and work team experiences, and the establishment of recording procedures for each educational and administrative level.
Level 4: Measurement	At this stage, educational organizations concentrate on developing statistical measurement instruments and initiatives for both educational and administrative processes. Prioritizing the integration of feedback mechanisms to address challenges, they maintain an unwavering commitment to enhancing quality management programs. Employing statistical tools, they oversee their operations, compare measurements against evaluated outcomes, and rectify any deviations in process performance.
Level 5: Learning	At this stage, educational organizations reach the highest level of quality maturity, focusing on continuous enhancement with the aim of transforming themselves into a 'learning organization'. They employ creative concepts, strategies, and modern approaches to enhance their processes, integrating successful practices and lessons into future strategies. They consistently oversee the criteria and assessment approaches employed to enhance educational processes, prioritize emerging digital technologies, and establish a routine change management system.

This EP-CMM can be tested as a self-assessment tool for educational organizations to find their weaknesses and strengths. These organizations can plan interventions to move from their currents state to a higher level.

3 METHODOLOGY

This study employs a qualitative approach through Focus Group Discussion (FGD). One group of FGD comprises six teachers who participated via Google Meet. Purposive sampling was employed to ensure representations across various education office districts, positions in schools, years of teaching experience, and school types. To adhere to the ethical standards of scientific research, the names of the teachers and their respective schools were kept confidential. Teachers are identified by coded abbreviations of "P" followed by a number (i.e., P1, P2, . . ., P6). The following table displays the demographic of the participants.

Table 3: Demographic Information of Participants

Participants	Position in School	Gender	Years of Teaching Experience	School Type	Age	Code
Participant 1	Education District Officer	Female	15	Primary School	40	P1
Participant 2	Teacher	Male	16	Primary School	42	P2
Participant 3	School Administrator	Female	23	Primary School	45	P3
Participant 4	School Administrator	Male	24	Secondary School	39	P4
Participant 5	Teacher	Female	13	Secondary School	39	P5
Participant 6	Teacher	Male	13	Secondary School	37	P6

The participants were encouraged to express their opinions and experiences with digital technology in teaching, learning, and administration. They shared their school administrators' competence practices in digital leadership and skills, as well as categorizing the digital maturity within their schools. The researcher served as a moderator for this FGD.

Among the six participants, one was an education district officer, two were school administrators, and the rest were teachers. This diverse background resulted in different approaches to handling and using digital technology. Drawn from various sources, it is asserted that a top-down management approach to digital transformations is deemed necessary for success (Westerman et al., 2014). The education district officer explained how the school reported digitally and keyed in the necessary data. The school administrators, who were viewed as the senior leader team (SLT) in school, shared their experiences in encouraging teachers and students to integrate digital technology into their teaching and learning sessions. Additionally, the participants discussed their administrative work involving digital systems such as APDM, SKPMg2, HRMIS, and others. Additionally, the teachers provided insights into their use of digital technology, detailing how they handle digital tools in teaching, learning, and administration, particularly in storing student records.

The FGD lasted approximately two hours and was recorded with permission from all the participants for later transcription. The researchers utilized Atlas.Ti version 23 software for data analysis. Thematic analysis, known for its applicability to questionnaire data analysis and suitability for any size of datasets was chosen. It can produce both theory-driven and data-driven analyses. It is also considered appropriate for understanding participant experiences when constructing a particular phenomenon within specific contexts (Braun & Clarke, 2012). The procedures outlined by Braun and Clarke (2012) were adopted for this study due to the researchers' familiarity with the data. These procedures involved coding, which included assigning labels to each generated code and compiling them, identifying themes and patterns to make meaning, comparing themes to both coded extracts and the entire dataset, defining and labelling the themes, and finally, writing up the analysis. The identified themes will contribute to explaining key points related to the study's research questions and assist in representing the answers or meanings provided for each research question (Attride-Stirling, 2001).

4 RESULTS AND FINDINGS

This study aims to explore digital leadership competences of school administrators and assess the current state of digital maturity in education in Malaysia. The focus is on competences required for school administrators to succeed in digital transformation within their schools. The identified themes were grouped into six main categories. The main themes described the digital leadership competencies exhibited by the school administrators and provided a description of the identified state of digital maturity based on the participant responses. The subthemes encompassed behavioral aspects related to these competences.

4.1 School Administrators' Digital Leadership Competencies

The findings reveal the competence demonstrated by school administrators in applying digital leadership. The participant teachers provided insights into how their school administrators exhibit digital leadership competencies, including: Vision and mission, Digital culture, Digital professional development, Digitally go-forward, Digital safety and Digital resilience.

4.1.1 Vision and Mission

Vision and Mission refer to how school administrators encourage teachers and students in an e-learning environment. They inspire and lead transformation, working collectively to achieve the school's vision and mission in integrating technology in their school (A'mar & Eleyan, 2022). The code of technological plan serves as the vision for realizing digital learning and teaching, becoming a strength for administrators. Two subthemes are critical thinking and self-direction. Critical thinking involves using digital technology to make choices and suggest new ideas as mission (Greene et al., 2014; Lubienski & Lee, 2016; Reker, 2019). Chai et al. (2015) and Sullivan (2011) asserted that self-direction is about setting personal goals and managing to reach them within the organizational context.

Table 4.1.1

Subthemes	***Quotations***
Critical Thinking	*"Their critical thinking of vision and mission by combining traditional and digital learning. The technological plan is included in our school's strategic plan."* (P5)
Self-Direction	*"I have taken NPQEL courses because I want to be a headmaster. We have many modules, and one of them is digital."* (P4)

4.1.2 Digital Culture

Within the subtheme of digital culture, the code encompasses the support and maintenance of the culture of digital teaching, learning, and administration. The subthemes include:

1. Cultural Awareness: Demonstrates cultural understanding and respect to others when integrating digital technology (Shonfeld et al., 2021; Yang et al., 2014)

2. Creativity: Involves using digital technology to generate new ideas or adapt and adopt existing ones in innovative ways (Hinrichsen & Coombs, 2013; Mengual-Andrés et al., 2016).

3. Communication: Involves using digital tools to transmit information effectively within the school community (Claro et al., 2012; Scherer et al., 2022). These digital resources have the potential to attract students' attention and interest (Raamani & Thannimalai, 2018).

Table 4.1.2

Subthemes	***Quotations***
Cultural Awareness	*"Digital leadership practices will help build the digital culture in schools. Leaders should be prepared to support digitalization effectively. In addition, they should recognize potential areas for improvement in digitalization to build a community of innovations." (P1)*
Creativity	"My school administrators created e-rph during the COVID-19 pandemic. It is easier to observe teachers' activities during e-learning. It is also paperless." (P2)
Communication	*"We still use WhatsApp as a platform to deliver information to parents. School administrators also support students in joining competitions via digital platforms, which is more convenient because we do not have to travel and foot the bill. Some of the competitions are still conducted digitally." (P5)*

4.1.3 Digital Professional Development

Excellence in professional practice entails school administrators planning continuous training and professional development for themselves and the teachers to ensure their knowledge and skills remain up to date. The subthemes include:

1. Lifelong Learning: Involves constantly exploring new opportunities to integrate digital elements into the environment, ensuring continuous improvement of competence (Chai et al., 2015).

2. Technical Skills: Involves the ability to use various devices and applications to complete practical tasks within the school system, whether online or offline (Ng, 2012; Van Deursen et al., 2016).

Table 4.1.3

Subthemes	***Quotations***
Lifelong Learning	*"The school administrators support digitalization because it is the process of VUCA (Volatility, Uncertainty, Complexity and Ambiguity), where digitalization is rapidly changing. We are encouraged to attend CPD (Continuous Professional Development) sessions to manage digital equipment and utilizing technology in teaching or administration." (P6)*

Technical	*"Personally, I agree that school administrators must be prepared for this digital era. They must be a step ahead of the teachers so that they can serve as role models in school."* (P6) *"During the pandemic, some teachers, especially the veterans, were stressed when dealing with digital tools. The school administrators asked certain teachers to aid and provide one-on-one consultations to teachers with problems in implementing digital teaching and learning. Furthermore, digital training has been conducted*." (P3)

4.1.4 Digitally go-forward

For the theme of digitally go-forward, the subthemes include information management and collaboration. School administrators effectively build and continuously improve administration through digital tools and resources (Stronge & Xu, 2021)

1. Information Management: Involves using digital technology efficiently and organizing information to make decisions about the most suitable resources (Acharjya & Ahmed, 2016; Sparks et al., 2016).

2. Collaboration: Entails developing interactive communication to generate social networks and teamwork, to achieve a common goal (Huda, 2023; Sobaih et al., 2020). Scherer et al. (2015) stated that problem-solving involves using digital tools to acquire implicit and/or explicit information about a problem or a solution.

Table 4.1.4

Subthemes	***Quotations***
Information Management	"The school administrators use e-documents, and we will fill them out in Google Sheets or Google Forms when they ask for data. It is easy to access and very systematic. Teachers can also manage documents digitally, rather than on paper. This encourages the creation and participation in using digital technology to improve productivity." (P1)
Collaboration	*"The school administrators are doing their best to prepare digital environment in schools, so that everybody can use the infrastructure and access internet at school. They give feedback regarding the infrastructure and internet accessibility to the District Education Office (PPD) and the National Education Department (JPN). The school administrators also collaborate with the Parent-Teacher Association to address problems in school*." (P4)
Problem Solving	*"In my opinion, the skills of handling digital tools and utilizing digital resources are crucial for school administrators. It can help improving the administration and making it more systematic."* (P4)

4.1.5 Digital Safety

Digital safety revolves around the ethics and discipline in using digital resources. School administrators should exemplify good leadership by understanding the safety, ethics, and laws associated with digital environment. It encourages teachers and students to adhere to ethical standards and laws when handling digital technology. Digital leadership is not about transforming a

company into a digital organization, but to exploit digitalization to become a better organization (Westerman et al., 2014).

Table 4.1.5

Subthemes	***Quotations***
Ethical Awareness	"School administrators must inform teachers and students about the ethics of handling digital technology. This is in line with the broadcast letter from the Education Ministry, outlining the guidelines and ethics in social media for teachers and students." (P6) "Students must be monitored by school administrators, teachers, and parents when using social media. This is because, nowadays, there are many cases involving teenagers in social media, especially with scammers. Students who engage excessively in mobile games should also be cautioned, because they are wasting their time and spending too much time on it. They must be disciplined and controlled." (P1)

4.1.6 Digital Resilience

The subthemes of digital resilience include flexibility, creativity, and self-awareness that globally, digital transformation is constantly evolving. Flexibility involves adapting one's thinking, attitude, or behavior to change the digital environment (Park & Park, 2021; Van Laar et al., 2017). In addition, self-awareness entails showing awareness on the impact of emerging digital trends and landscape to own work and life (Munsamy, 2022).

Table 4.1.6

Subthemes	***Quotations***
Flexibility	"We can use digital technology everywhere and anywhere, and it is all about flexibility. We can hold meetings or discussions via Google Meet, Zoom, or Webex. We can conduct them either fully online or in a hybrid mode." (P3)
Self-Awareness	"I think school administrators should be aware and are willing to embrace digital change." (P2)

Digital transformation within a school will reflect effectiveness of school administrators in applying the components of digital leadership competences in the organization. As evident from the subthemes and quotations, digital leadership competences play a crucial role in the success of this transformation. Digital leadership competence of school administrations can further facilitate this transformation in digital culture, enabling effective leadership in the current era and enhancing the quality of the education in Malaysia through digital technologies.

4.2 Digital Maturity in Malaysian Education

As the digital landscape is continually evolving digital maturity is not a static term (Teichert, 2019). Spremić et al. (2020) claimed that achieving digital maturity empowers organizations to enhance their service offerings, attain a heightened level of competitiveness, and establish an environment that fosters appropriate responses in disruptive circumstances.

The code of staff management experiences aligns with the opinion of P3. P3 stated that *"[i]t does matter how school administrators play their digital leadership role in encouraging teachers, staff, and students to implement digital technology through experiences or learning from the others." School*

administrators support teachers and students in utilizing digital technology, fostering collaboration, and enhancing their knowledge and skills.

P6 emphasized that "school administrators should commit to implementing digital transformation in their school, so that they can plan interventions to enhance digital competence among teachers, staff, and students. School administrators can continuously plan professional development." The code of implementation of training programs can assist school administrators to update their knowledge and skills, enabling them to be shared with teachers and staff to further foster their commitment towards digital transformation. Hess et al. (2016) in agreement, stated that digital transformation is a shift of digital technology, boosting the productivity and effectiveness of the organization.

The work team in the organization plays a vital role in demanding quality of administration in education organizations. For example, weekly meetings or briefings, problem reviews, monitoring, and feedback sessions contribute to effective administration. This work team can also be managed in collaboration with the district education office or the state education office. In P6's opinion, *"the digital infrastructure such as internet connections, ICT support services and software helps increase the implementation of digital [technology] in school. After the pandemic, there were various initiatives and support available from KPM, JPN and PPD to cultivate digitalization. Moreover, the KPM in collaboration with other stakeholders has also prepared numerous platforms to aid digital technology in education."*

Based on the quotations from the participants, the identified category for digital maturity in this study is at "Level 3: Management". The code aligns with the EP-CMM keywords (Alshaheen & Alshaheen, 2019). School administrators demonstrated commitment to digital transformation but are yet to develop programs for teaching, learning and administration. P5 noted that "*[m]y school administrators rely heavily on system management by PPD, JPN, and KPM. They are yet to find their own tools in administration, particularly for digital exams and student records. Some system management is still in progress and maintenance, yet the data must be sent*."

There are ways to enhance the quality of management conducted by school administration. The findings from this study highlight that strategies and interventions can be implemented to elevate the digital maturity category in these schools.

5 CONCLUSION

The COVID-19 pandemic has been identified as a driver of organizational change, driving shifts toward digitalization and digital transformation. This study primarily aims to investigate digital leadership competence practices and competence skills of school administrators in Malaysian education. Additionally, it delves into digital maturity based on the descriptions from the Education Process Capability Digital Maturity (EP-CMM). This study uncovers the digital leadership competencies of school administrators, including Vision and Mission, Digital Culture, Digital Professional Development, Digitally Go-forward, Digital Safety and Digital Resilience. As per the EP-CCM, the identified category for digital maturity in Malaysian education is currently at "Level 3: Management".

5.1 Contribution of the Study

From an organizational standpoint, the study contributes to best practices by demonstrating that organizations equipped with necessary digital infrastructure, a digitally skilled workforce, and agile operations are better prepared for future events of a similar nature. Furthermore, the findings provide insights into the advantages and limitations of digital tools, offering valuable guidance for other schools in self-assessment and improvement. Another implication for organizations points to the significance that investing in effective technological infrastructure within schools contributes to sustainability. In times of pandemics, this investment enables remote working, prevent outbreaks

like the COVID-19, and safeguarding society. Remote working aligns with certain United Nations Sustainable Goals, allowing individuals to allocate more time and energy towards their well-being, including aspects such as diet, exercise, and relationships, impacting both the environment and organization.

5.2 Limitations of the study

This study is limited to one group of FGD and an in-depth examination of one state. Expanding future study to three or four groups from across Malaysia could provide a more comprehensive perspective. Given the qualitative nature of this study, a complementary quantitative study would enhance generalizability, reduce subjectivity, and validate the findings. Furthermore, investigating a digitally mature organization itself is a limitation. Further research should be conducted to develop an adequate model to determine the depth of the current state of digital maturity. There is a scarcity of empirical research that investigates the relationship between defined leadership skills and successful performance in highly digitalized organizations (Cortellazzo et al., 2019). Future research should explore how much this relationship is influenced by the leader's operational environment (Haddon et al., 2015). The conversation is intended to inspire and promote further research on digital leadership.

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