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DEVELOPING DIGITAL LEADERSHIP IN THAI VOCATIONAL EDUCATION: A MODEL FOR SOUTHERN REGION ADMINISTRATORS

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Abstract

This mixed-methods research investigated the current state and ideal characteristics of digital leadership among vocational education institution administrators in Southern Thailand. Subsequently, it developed a comprehensive model for its enhancement. The study involved a large sample of 415 participants from 28 vocational institutions across 14 provinces. The quantitative analysis utilized descriptive statistics, standard deviation, and the Priority Needs Index (PNI Modified). Qualitative analysis involved content analysis of interview data, drawing on relevant literature. Results revealed a significant gap between digital leadership's current and ideal states. The proposed model comprises five key dimensions of digital leadership: modern visionary leadership, digital communication strategies, management system integration, vocational innovative organization, and digital learning ecosystems. Five development methods were also identified: digital self-learning, online self-learning, online training with programmed instruction, online study with certification, and AI-enhanced learning. The model's accuracy, suitability, feasibility, and usefulness were evaluated and deemed highly effective. The study concludes by offering recommendations for fostering digital leadership among administrators, emphasizing the importance of continuous professional development aligned with Thailand's evolving digital vocational education landscape.

Keywords: Digital Leadership Development, Vocational Education, Leadership Model

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Introduction

The National Education Act 2019 outlines reform issues and drives the direction of Thailand's education towards a focus on the ability of management and the development of student learning outcomes as key primary objectives. The Office of Basic Education Commission has emphasized quality improvement as the prime driver of curriculum implementation, teaching, and learning management, including learners' measurement and evaluation (National Education Act 2019 No.4.). Thailand has recognized the importance of education and aimed to bring in the Information and Communication Technology or ICT system to support education management and maximize students' learning. It has been conceived that ICT can exert great impacts on the education system, which mainly involves gathering data information and knowledge, organizing and processing data, and transmitting and communicating data and information with high speed and large volume (Phakamach et al., 2021a). An ICT system also facilitates the presentation and display of data and information with various media systems, such as images, audio, animation, video, applications, and digital platforms, which can create an interactive system that will make learning in the new era successful (Sinlarat, 2020). With the ever-increasing volume of the vast body of world-class knowledge, learning in the new era must learn with both volume and speed, which the learners need to be able to distinguish, search, and seek out what is relevant to their needs (Caredda, 2020).

In addition, to comply with the government's policy according to the Twenty Years National Strategy (2017-2036), the 3rd ICT Master Plan, and the National Education Act 2019, which all envisioned more application of computers and Internet in education provision, the Ministry of Education, therefore, has endorsed policies and standards to encourage educational institutions and educational agencies in utilizing ICT in education, by enabling teachers. educational personnel, and learners with capabilities to use educational platforms in teaching and learning, including management systems. Consequently, vocational education institutions need to explore and adopt ICT management systems to develop educational innovations for vocational learners and further improve the quality of education (Phakamach et al., 2021b; Jatuporn, 2024).

The management of vocational education institutions in the era of new educational reform, especially the management of academic affairs and practical skills training, is considered the heart of education management and the development of learners at the vocational level in Thailand to have competencies that meet the needs of the labor market. Vocational education institutions have been given the authority to manage academic affairs and practical skills training in terms of developing educational institution curricula, organizing learning and teaching processes, developing personnel competencies, organizing learner development activities, measuring and evaluating results, and practical learning media and resources (Phakamach et al., 2023b). In this regard, vocational education institutions are considered to influence the institution's effectiveness and learners' success. Good administrators or leaders must have knowledge, abilities, and various characteristics. One of the important characteristics is the administrators' leadership, who motivate, promote, support, and lead the teaching staff to perform their duties effectively and achieve their goals. Therefore, it can be said that the leadership of the administrators of vocational education institutions is significantly related to the learning achievement of the learners. In addition, administrators who are leaders of change towards educational quality are considered to be leaders of modern educational organizations who must focus on real reform because leaders who do not have knowledge and ability or do not understand quality may lead the organization to failure and get lost (Suksai et al., 2021; Phakamach et al., 2023a).

Under the disruptive digital transformation process, an organization needs to build its own digital resilience, particularly with effective human resource development, so as to adapt its operation toward the intended goals (Vial, 2019; Srimata et al., 2019; Kashive et al., 2022;

Jatuporn, 2024). For educational organizations, capacity building is practically shouldered by the leaders or administrators to handle such complex and challenging tasks (Lindqvist & Pettersson, 2019). Digital leadership competency is, therefore, essential for administrators in the era of disruptive transformation (Phakamach et al., 2021b; Jatuporn, 2024). To fulfill the demanding mission of the "Vocational Education Institution" in Thailand, human resource empowerment at both executive and teaching force levels is conceived as a key strategy. It is also envisioned that to support and maintain smooth operation, so-called continuous human resource development must be effectively practiced (Phakamach et al., 2023b).

From this rationale, the research team was interested in studying "Digital Leadership Development Model for Vocational Education Institution Administrators in Southern Region of Thailand" with the aim of providing information to support the leadership development of vocational education institution administrators in particular and eventually enhance the effectiveness of vocational education institution operations in Thailand in general.

Literature Review

The era of digital education is an era of educational transformation. Administrators are crucial mechanisms for educational institutions' existence and learners' success. Good administrators must possess knowledge, abilities, and various essential characteristics to lead personnel to achieve goals effectively (Phakamach, 2023; Diniz et al., 2024). The literature and research related to the study of digital leadership, which will be discussed next, demonstrate the role, importance, forms, and processes of developing digital leadership continuously. The primary objective is to develop digital leadership so that educational administrators can prepare for managing education in this era of digital education.

Weber et al. (2019) characterize a digital leader as an individual who generates innovative ideas within a digital context and motivates their team in this environment. Such a leader excels at establishing enduring communication with their employees in a digital milieu, along with the capability to devise effective digital strategies.

Uhl-Bien and Arena (2018) argue that gaining a firm grasp on the role of a digital leader is crucial for truly understanding the essence of digital transformation. At its core, this transformation implies adopting and implementing new, rapidly advancing, and constantly changing digital technology to tackle various challenges. However, why does digital leadership hold such a pivotal position? Primarily, effective digital leadership fosters an organizational workflow and business procedures that allow for the rapid introduction of new technologies, products, and services while concurrently ensuring the smooth operation of existing legacy applications and ICT functions. Nevertheless, what are the specific advantages of this kind of digital leadership? (Ziadlou, 2021; Suksai et al., 2021).

1) It builds a digital climate and culture: Different departments within a business will require different digital tools to improve their work and develop a higher-performance work process. Digital climate and culture can always create valuable innovations. An effective digital leader facilitates this within the organization by equipping the team with the appropriate tools. For instance, companies can leverage Google Drive to generate and access particular documents that encompass specific information. Every modification is instantaneously recorded, enabling individuals to track who has added, deleted, or altered data in real time. Moreover, this platform facilitates real-time collaboration and document sharing for remote employees (Beynon et al., 2021; Phakamach, 2023).

2) Enhances employee productivity and competence: An organization's tools are primarily intended to boost productivity levels. However, without motivating digital leadership, employees might face challenges in effectively implementing these tools and fully exploiting their potential. Digital leadership ensures that the workforce can utilize these tools immediately, fostering competencies and skills development.

3) Bolster's customer satisfaction through effective leadership: A satisfied customer has little reason to switch to a competitor. Conversely, a dissatisfied customer can find multiple grounds to defect and might eventually become loyal to a competitor's products or services. Digital leadership can be instrumental in augmenting and introducing elements of convenience, speed, and customer support, enhancing customer satisfaction with the product or service.

Digital leadership can significantly contribute to revenue growth through various means. These include (1) Improving customer retention: By effectively serving customers with digital tools, their satisfaction levels are enhanced, increasing loyalty, and (2) Expanding their customer base: Using digital tools can help cater to a more significant number of customers at a reduced operational cost.

4) Revenue Growth and Expenditure Reduction: The equation is straightforward; servicing a larger customer base in a shorter timeframe is an efficient strategy for enhancing revenue within the business.

5) Development of growth patterns: Digital leaders often seek ways to operate for organizations to create distinctive and modern identities. Organizations can sustainably exist and thrive in typical environments and transformative change.

Nicolás-Agustín et al. (2022) cite the notable individuals at Dot Everyone, an organization devoted to fostering digital literacy among leaders. They propose that "being a leader in the digital age implies comprehending technology as much as one understands finances, human resources, or the law." Leaders with this digital understanding can make confident, informed, and impactful decisions for their organizations and users.

Leadership skills development is an ongoing process. We can all augment our digital literacy by staying current with digital trends and tools and honing skills that amplify our leadership potential. This does not necessarily entail everyone becoming technologists or coders in the digital realm. Instead, what is vital is a substantial digital acumen to identify gaps in our skills and determine potential collaborators to ensure the success of our projects and organizations. Moreover, proficient digital leadership is crucial for steering our organizations toward adapting to the internet era by constructing new capabilities, structures, and working methodologies (Fotso, 2021).

Ruel et al. (2020) and Jakubik (2021) have noted that most conventional organizations grapple with defining the term "digital," and this ambiguity also extends to the concept of digital leadership. We often encounter difficulties when seeking definitions due to the plethora of fragmented interpretations. Here are a few potential meanings: (1) Leadership that effectively utilizes digital tools and technologies; (2) Leadership centered around guiding digital natives; (3) Leadership active during digital transformation; (4) Leadership engaged with incorporating digital sales channels within traditional businesses; (5) Leadership addressing big data and the digitization of information; (6) Leadership related to human resource management in the digital era; and (7) Leadership involved in innovation for humanity (Srimata et al., 2019).

The complication arises because, within each of the contexts above, the interpretation of leadership itself could vary, necessitating different tools. For example, we could envisage digital leaders holding distinct roles in the first scenario, which could also apply to the fourth scenario. The second point resonates strongly with the leadership seen in start-ups, with abundant literature trying to distill the successful traits of unicorn leaders. The third point is arguably the most intriguing, as it encapsulates the genuine needs of most companies. Lastly, points 6 and 7 are intricately linked to human behavior and needs.

Denning (2021) portrays digital leadership as a trending concept in recent managerial literature and discussions, similar to transformation. The debate oscillates between two extremes: one group endeavors to wholly redefine the concept of leadership in the context of the digital sphere. At the same time, the other downplays its impact, demoting it to merely a new

technological factor that does not fundamentally modify the principles of conventional leadership models.

Suksai et al. (2021) stated that the components of digital leadership have the following aspects: (1) vision leadership, (2) use of digital technology in teaching, (3) use of digital technology in management, (4) digital technology support and management in education, (5) use of digital technology in measurement and evaluation, and (6) ethics in the use of digital technology.

Hizir (2022) advises that amid digital transformation, every organization needs to adapt quickly to all dimensions of its strategy to be aware of the current and future trends in its development. Leaders inevitably play an important role in leading the organization to its goals amidst fierce competition to gain an edge and maintain its longest-lasting existence.

Moreover, a digital leader will: 1) Employ data-driven analysis instead of relying on subjective interpretations; 2) Establish a concrete vision as opposed to merely setting aspirations; 3) Formulate strategies centered around customers or citizens rather than constructing inside-out plans; 4) Define unified action plans instead of disjointed performance programs; and 5) Prioritize achieving outcomes over simply producing outputs.

Phakamach et al. (2023a) assert that an accomplished digital leader appreciates the significance of inbound data and the accompanying business processes that facilitate its use. They assign considerable importance to their communication skills, creative thinking, and open-minded approach toward exploring how emergent technologies and digital information can benefit business projects. Consequently, they define “Digital Leadership” as strategically guiding the successful digital transformation of an enterprise and its business ecosystem.

Above all, a digital leader understands that digital transformation revolves less around technology itself and more around strategy, structure, culture, capabilities, and customer or citizen understanding. New technologies and digital capabilities offer leaders unprecedented access to data, facilitate swift testing, and allow system interrogation like never before. However, technology is a means to an end, not the end itself. A familiar mistake leaders make is to equate introducing new technology and digital capabilities, such as websites, social media, and online activities, with fulfilling the demands of digital leadership. Digital leaders need not understand the intricacies of how technology functions; rather, they should focus on learning how to leverage it to gain a competitive edge (Carvalho et al., 2022; Phakamach, 2023).

Additionally, digital leaders can utilize a variety of digital tools and content in order to achieve the objectives of their organization. Therefore, it can be concluded that digital leaders are proactive in exploring how ICT can help their organizations be more responsive to customer needs, deliver better products and services (or deliver differently), and adapt to rapidly changing environments (Beynon et al., 2021; Maji & Laha, 2022). In essence, digital leadership entails strategically using a company’s digital resources to assert influence and drive the achievement of business objectives.

Research Conceptual Framework

Research concepts can be formulated from the literature review and related research process design. The research conceptual framework is shown in Figure 1.

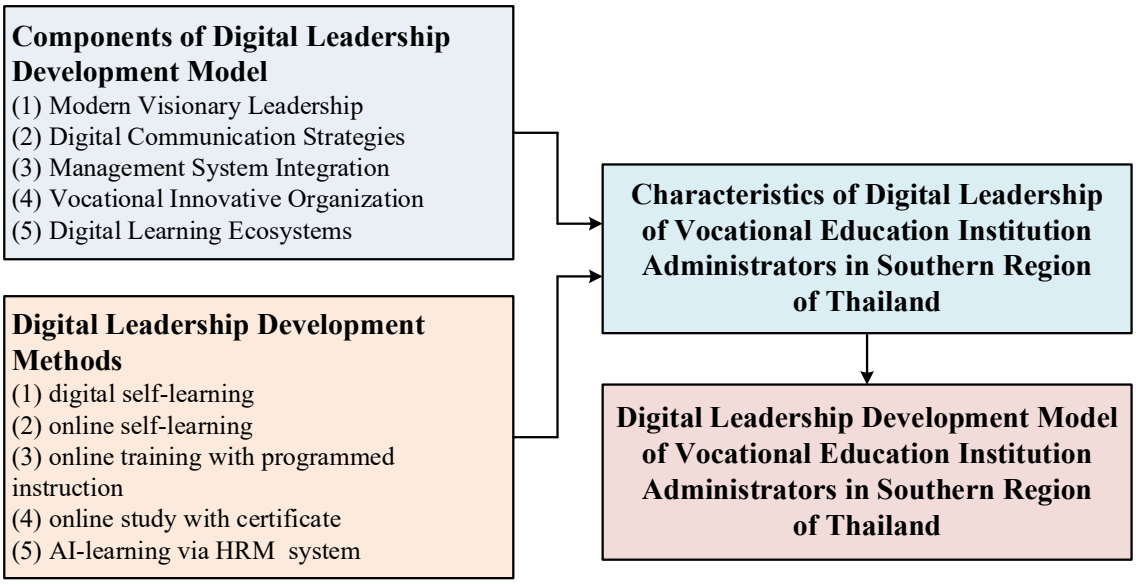

Figure 1 Research conceptual framework

Research Methodology

This research used a mixed methodology with related details as follows.

Population and Samples

The population included teachers and educational personnel of vocational education institutions in Thailand's Southern region. For the academic year 2024, 3,467 from 28 institutions in 14 Southern provinces--Krabi, Chumphon, Trang, Nakhon Si Thammarat Narathiwat, Pattani, Phangnga, Phatthalung, Phuket, Yala, Ranong, Songkhla, Satun and Surat Thani.

The sample included teachers and educational personnel in 28 vocational education institutions. A total of 415 samples were drawn from these 28 institutions' personnel. The first group, 56 executive directors and 84 deputy directors were purposively selected, while the second group, 275 teachers, were selected by multi-stage random sampling. The qualitative sample, 9 experts in digital leadership and vocational education management, was selected according to the specified qualifications.

Procedures for Conducting Research

A mixed research methodology was employed to conduct this research. The procedures were divided into four steps as follows:

Step 1: Study and review concepts, theories, documents, and previous research related to the digital leadership development model to formulate a conceptual framework for the digital leadership development of vocational education institution administrators in the southern region of Thailand.

Step 2: Assessment of the current and desirable conditions for the digital leadership development of vocational education institution administrators in the southern region of Thailand.

Step 3: Develop a hypothetical digital leadership development model for vocational education institution administrators in the southern region of Thailand. Then, confirm the model's results based on expert recommendations, and analyze qualitative research results to draw conclusions from the research results in steps 1 and 2.

Step 4: Assess the accuracy, suitability, feasibility, and usefulness of the hypothesized model and summarize the research findings.

Data Collection

The instrument used in the quantitative research part was an integrated self-rating and open-ended questionnaire containing items designed to solicit perceptions and suggestions concerning the development of digital leadership of vocational education institution administrators in the Southern region of Thailand. The questionnaire was structured into three parts: general information of the respondents, perception of the conditions and development patterns of digital leadership of vocational education institution administrators in the Southern region of Thailand, and suggestions.

A Semi-structured interview guide was developed to collect qualitative data related to meaning and interpretation, the model's origins, development methods, and related problems and obstacles. Issues related to the interview include the main components, sub-components, development methodology, development goals, and other suggestions.

The verification of instrument quality was carried out for both validity and reliability checking. The validity of questionnaire was calculated from the IOC index as assessed by five experts and only items with IOC values of at least 0.60 were included in the questionnaire. As for reliability, the adjusted questionnaires were distributed to a compatible group of 30 respondents, and the data returned was used to calculate Cronbach's Alpha coefficient. The reliability of the whole questionnaire was 0.942.

Data collection was conducted through questionnaires and interviews, both offline and online, between October and December 2024.

Data Analysis

Quantitative data analysis consisted of 2 parts.

Part 1: Respondents' personal data were analyzed using descriptive statistics, such as frequency and percentage, while data on digital leadership development of vocational education institution administrators were analyzed using means, standard deviation, and the Priority Needs Index (PNI Modified). The interpretation criterion of the Likert-type five-scale

Part 2: The accuracy, suitability, possibility, and usefulness of the digital leadership development model of vocational educational institution administrators were analyzed using means and standard deviation. The interpretation criterion of the Likert-type five scale.

Nine experts conducted qualitative data analysis using information obtained from government documents, literature, and related research reviews and interview results through content analysis, data triangulation, and connoisseurship to conclude the digital leadership development model of vocational education institution administrators in the southern region of Thailand.

Research Results

The research results revealed three significant aspects of the digital leadership development model of vocational education institution administrators in the Southern region of Thailand in the overall development model, development methods, and key characteristics, each of which was presented as follows:

Current Condition, Desirable Condition, and Priority Needs Index of Digital Leadership Development of Vocational Education Institution Administrators in the Southern Region of Thailand

The current condition, desirable condition, and priority needs index of digital leadership development of vocational education institution administrators in the southern region of Thailand are shown in Tables 1, 2, and 3, respectively.

Table 1 Current condition, desirable condition and priority needs an index of digital leadership development of vocational education institution administrators in Southern region of Thailand: Overall assessment.

Digital Leadership Components	Current Condition				Desirable Condition				Priority Needs		
	$\bar{x}$	S.D.	Level	Rank	$\bar{x}$	S.D.	Level	Rank	PNI Modified	Group	Rank
1) Modern Visionary Leadership	3.56	0.67	High	5	4.76	0.59	Highest	2	0.267	Weakness	1
2) Digital Communication Strategies	3.66	0.61	High	2	4.80	0.52	Highest	1	0.220	Strength	4
3) Management System Integration	3.59	0.60	High	4	4.54	0.57	Highest	4	0.258	Weakness	3
4) Vocational Innovative Organization	3.64	0.66	High	3	4.61	0.58	Highest	3	0.262	Weakness	2
5) Digital Learning Ecosystems	3.77	0.61	High	1	4.50	0.51	Highest	5	0.218	Strength	5
Total	**3.64**	**0.63**	**High**		**4.64**	**0.55**	**Highest**		**0.245**	**Weakness**	

From Table 1, it was found that the current condition of digital leadership development of vocational education institution administrators in the Southern region of Thailand as a whole was at a high level ($\bar{x}$ = 3.64, S.D. = 0.63), while the desirable condition was at the highest level ($\bar{x}$ = 4.64, S.D. = 0.55). All five components of digital leadership were rated at a high level for the current condition and the highest level for the desirable condition. The value of the total priority needs index (PNI Modified) was at the highest level (0.245), which was classified as a weakness of the organization. Except for digital communication strategies and digital learning atmosphere and culture, the remaining three components, modern visionary leadership, management system integration, and innovative vocational organization, were in the weakness category.

Table 2 Current condition, desirable condition, and priority need an index of digital leadership development of vocational education institution administrators in the Southern region of Thailand: Development methods

Development Methods	Current Condition				Desirable Condition				Priority Needs		
	$\bar{x}$	S.D.	Level	Rank	$\bar{x}$	S.D.	Level	Rank	PNI Modified	Group	Rank
1) Digital Self-Learning	3.68	0.7	High	1	4.66	0.6	Highest	1	0.2	Strength	5
2) Online Self-Learning	3.48	0.65	Moderate	3	4.62	0.59	Highest	2	0.225	Strength	4
3) Online Training with Programmed Instruction	3.65	0.72	High	2	4.6	0.51	Highest	3	0.261	Weakness	3
4) Online Study with Certificate	3.44	0.68	Moderate	4	4.53	0.49	Highest	5	0.304	Weakness	1
5) AI-Learning via HRM System	3.01	0.63	Low	5	4.55	0.55	Highest	4	0.298	Weakness	2
Total	**3.47**	**0.67**	**Moderate**		**4.59**	**0.55**	**Highest**		**0.257**	**Weakness**	

From Table 2, among the five development methods specified for assessment, it was found that the results for the current condition were diverse from low to high levels, making the total assessment at a moderate level ($\bar{x}$ = 3.47, S.D. = 0.67). Digital self-learning and online training methods

were highly favored, followed by online self-learning and online study with a certificate at a moderate level and AI learning through a human resource management system at a low level ($\bar{x}$ = 3.01, S.D. = 0.63). The desirable condition total mean score was at the highest level ($\bar{x}$ = 4.59, S.D. = 0.55). All five development methods were as well rated at the highest levels, with digital self-learning and online self-learning coming first and second in the ranking. In contrast, online study and certificate came last among the five. The value of the total priority needs index (PNI Modified) was 0.257, indicating a weakness of the organization. When considering the development method, it was found that only two development methods, digital self-learning, and online self-learning, were categorized in the strength group. The remaining three methods, online training with programmed instruction, online study and certificate, and AI-learning via HRM system, were in the weak group.

Table 3: Key characteristics of the current condition, desirable condition, and priority needs for an index of digital leadership development of vocational education institution administrators in the southern region of Thailand

Key Characteristics	Current Condition				Desirable Condition				Priority Needs		
	$\bar{x}$	S.D.	Level	Rank	$\bar{x}$	S.D.	Level	Rank	PNI Modified	Group	Rank
1) Diversity Awareness	3.53	0.70	7	High	4.61	0.58	6	Highest	0.300	Weakness	1
2) Influencing Ability	3.60	0.65	6	Moderate	4.57	0.51	7	Highest	0.263	Weakness	4
3) Good Governance	3.74	0.66	4	High	4.66	0.57	5	Highest	0.230	Strength	5
4) Big Information Management	3.88	0.65	1	High	4.73	0.50	3	Highest	0.269	Weakness	3
5) Clear Targeting	3.71	0.63	5	High	4.77	0.54	2	Highest	0.222	Strength	6
6) Aim for Achievement	3.84	0.56	2	High	4.70	0.47	4	Highest	0.198	Strength	7
7) Learning Agility	3.80	0.61	3	High	4.79	0.52	1	Highest	0.278	Weakness	2
Total	**3.71**	**0.63**	**High**		**4.69**	**0.52**	**Highest**		**0.251**	**Weakness**	

From Table 3, the current condition of digital leadership development relating to key characteristics of vocational education institution administrators in the Southern region of Thailand in seven dimensions posed for assessment revealed that except for the moderately rated influencing ability, other remaining six dimensions of key characteristics were highly rated by the respondents, resulting in high level ($\bar{x}$ = 3.71, S.D. = 0.63). Among the high-ranking characteristics, information management skills came first with a mean score of 3.88, followed by aim for achievement ($\bar{x}$ = 3.84, S.D. = 0.56), learning agility ($\bar{x}$ = 3.80, S.D. = 0.61), good governance ($\bar{x}$ = 3.74, S.D. = 0.66), clear targeting ($\bar{x}$ = 3.71, S.D. = 0.63), and diversity awareness ($\bar{x}$ = 3.53, S.D. = 0.70) respectively. For desirable conditions, all seven characteristics were rated at the highest level ($\bar{x}$ = 4.69, S.D. = 0.52), falling under the highest level. In terms of ranking, the first three highest ranked were learning agility ($\bar{x}$ = 4.79, S.D. = 0.52), clear targeting ($\bar{x}$ = 4.77, S.D. = 0.54), and big information management ($\bar{x}$ = 4.73, S.D. = 0.50). The consecutive order of the remaining four characteristics was the aim for achievement ($\bar{x}$ = 4.70, S.D. = 0.47), good governance ($\bar{x}$ = 4.66, S.D. = 0.57), diversity awareness ($\bar{x}$ = 4.61, S.D. = 0.58), and influencing ability ($\bar{x}$ = 4.57, S.D. = 0.51) respectively.

The total priority needs index was 0.251, which is considered an organization's weakness. Four characteristics—diversity awareness, learning agility, big information management, and influencing ability—are considered weaknesses, and three characteristics—good governance, clear targeting, and aim for achievement—are considered strengths.

Results from interviews with nine experts in digital leadership and vocational education management revealed that: 1) The core components of digital leadership included having a broad vision, professional digital skills, agile communication strategies, the ability to learn and apply knowledge, developing innovative educational organizations, and a digital ecosystem. 2) Methods for developing digital leadership included: (1) digital self-learning, (2) online self-learning, (3) online training, (4) online study with certificate, and (5) AI-learning.

Digital Leadership Development Model of Vocational Education Institution Administrators in the Southern Region of Thailand.

From the implementation of the project "Developing Digital Leadership Development Paradigm for Vocational Education Management Towards Excellence" in the 2024 academic year of the Office of the Vocational Education Commission, Ministry of Education. Based on previous review of related literature, content analysis of expert focus groups, government strategies, and policy guidelines regarding the utilization of advanced technology in educational management, especially in providing quality teaching and learning for young talents in particular organizations such as vocational education institutions, coupled with the quantitative information from current empirical study, the research team proposed the model for digital leadership development of vocational education institution administrators in Southern region of Thailand as follows:

1) Components of the digital leadership development model of vocational education institution administrators in the Southern region of Thailand consisted of (1) Modern Visionary Leadership, (2) Digital Communication Strategies, (3) Management System Integration, (4) Vocational Innovative Organization, and (5) Digital Learning Ecosystems, as shown in Figure 2.

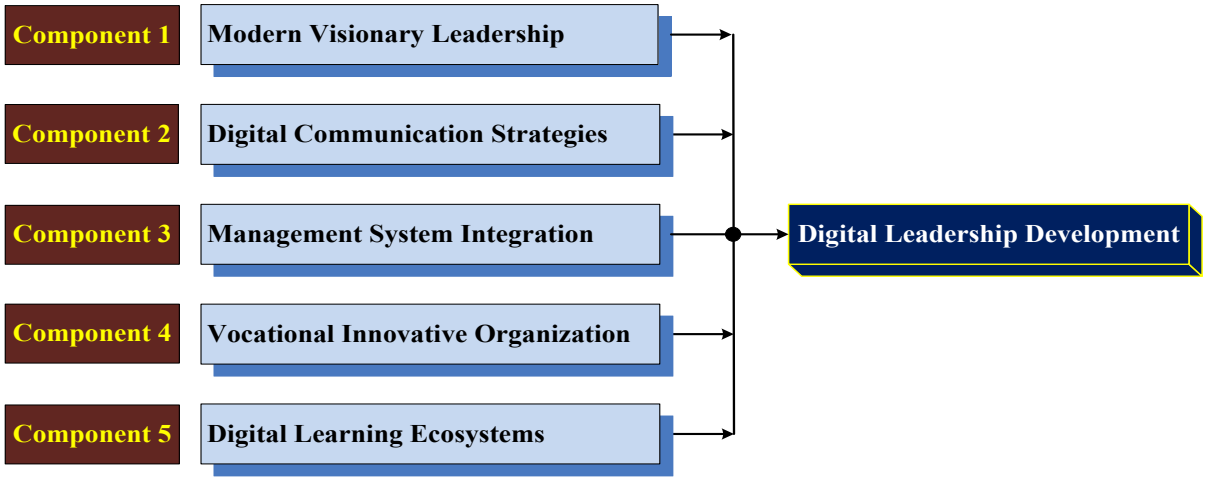

Figure 2 Components of digital leadership development

How to develop digital leadership based on key components and sub-components was related in detail:

(1) Modern Visionary Leadership: (1) determine the organization's goals for digital information infrastructure, (2) pursue contemporary strategies for managerial excellence.

(2) Digital Communication Strategies: (1) defining a culture based on continuous and rapid feedback on the network, (2) defining engagement through engagement, and (3) leveraging digital communication tools to lead teams to take part in virtual.

(3) Management System Integration: (1) database preparation and coding (data collection and coding), (2) Content Management System or CMS, and (3) defining a cohesive and integrated framework of structure, processes, indicators, and documentation.
(4) Vocational Innovative Organization: (1) innovative leadership; (2) innovative climate, innovative behavior for teachers and educators; (3) learning culture and lifelong learning organization.
(5) Digital Learning Ecosystems: (1) establishing vision and goals, (2) designing digital learning experiences, (3) creating a digital learning environment, (4) building a digital learning culture, and (5) evaluation and improvement.
2) The strategic development goals of digital leadership development were aimed to empower the vocational education institution administrators in Southern region of Thailand with (1) Inspiring, referring executive ability to lead participative development and shared vision by integrating comprehensive educational technology to promote excellence in the vocational learners, (2) Building confidence, referring to commitment to continuously develop a digital-based vocational learning model for learners with the confidence, (3) Allocating time for access, referring to managing time of use and access to digital systems to create optimum educational technology integration and professional growth, (4) Leading to change, referring to aim of change to increase the efficiency and achievement of learning goals with appropriate technology and educational resources, and (5) Creating virtual reality, referring to creating awareness and understanding of the digital world with virtual reality and its impacts on social issues, ethics, regulations, and responsibilities bonded to digital culture.
3) Characteristics of digital leadership of vocational education institution administrators in the Southern region of Thailand, as shown in Figure 3, consisted of seven dimensions with the abbreviation of "DIGITAL," where the first "D" stands for Diversity awareness, "I" stands for Influencing ability, "G" stands for Good Governance, "I" stands for big Information management, "T" stands for clear Targeting, "A" stands for aim for Achievement, and "L" stands for sequential Learning agility.

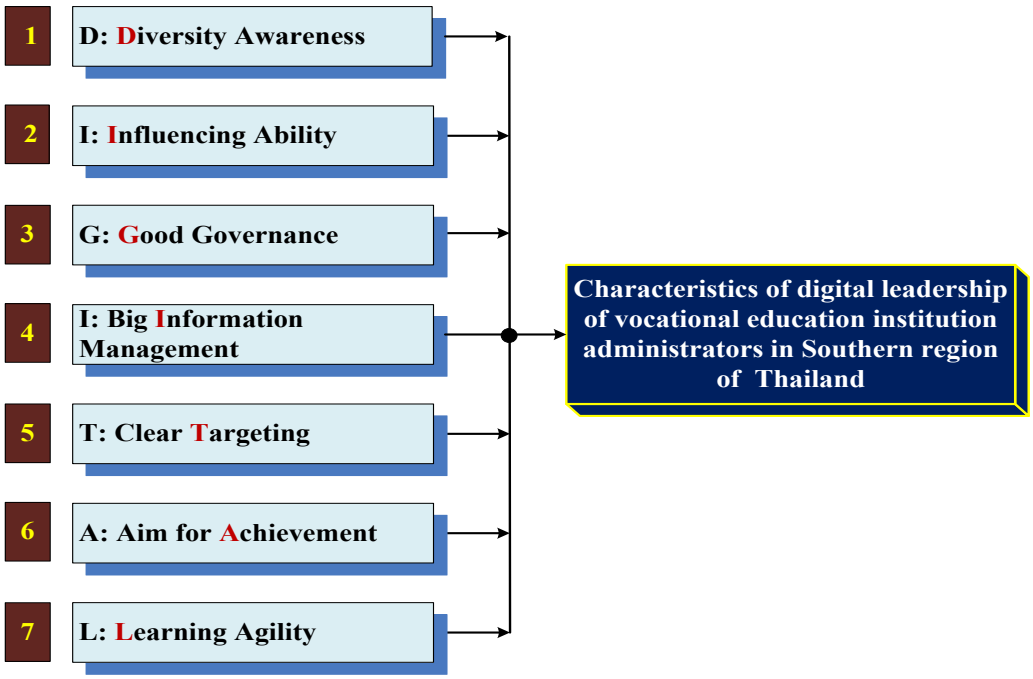

Figure 3 Characteristics of digital leadership of vocational education institution administrators

In addition, from data triangulation technique and connoisseurship by five experts, it was suggested that the main activities of digital leadership development could be done in five ways:

(1) digital self-learning, (2) online self-learning, (3) online training with programmed instruction, (4) online study with certificate, and (5) AI-learning via HRM system. Secondary development activities involve exchanging knowledge using media, technology, and modern educational innovations studied by models and learning through experience. In policy terms, it might be defined as a leadership development process using the PIERI process: (1) Planning (P), (2) Implement (I), (3) Evaluation (E), (4) Reflection (R), and (5) Improvement (I), which could be defined as a clear annual policy and work plan so that all vocational education institution could be used in the further development of administrators at all levels.

3) The assessment results of the digital leadership model for administrators of vocational education institutions in Southern Thailand revealed that the overall accuracy, appropriateness, feasibility, and usefulness of the digital leadership model for administrators of vocational education institutions were at the highest level ($\bar{x}$ = 4.64, S.D. = 0.56). When considering each assessment item, it was found that the assessment item with the highest average was the appropriateness aspect ($\bar{x}$ = 4.72, S.D. = 0.55), followed by the usefulness aspect ($\bar{x}$ = 4.68, S.D. = 0.57), and the feasibility aspect ($\bar{x}$ = 4.61, S.D. = 0.56). The assessment item with the lowest average was the accuracy aspect ($\bar{x}$ = 4.58, S.D. = 0.58), respectively.

From the research process and the results of the analysis of all the above data, the results of the research can be presented as an overview of the digital leadership development model for administrators of vocational education institutions in the southern region of Thailand as shown in Figure 4.

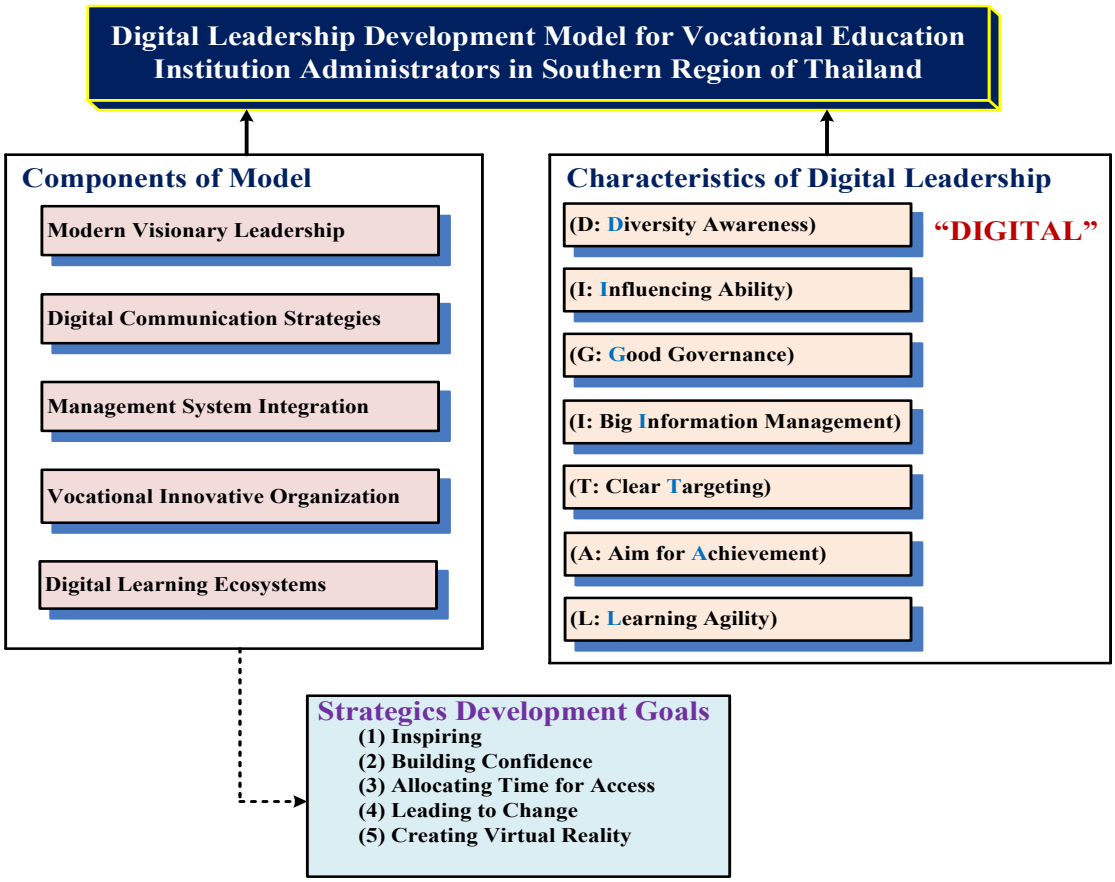

Figure 4 Digital leadership development model of vocational education institution administrators in the Southern region of Thailand

Moreover, administrators of Thai vocational education institutions are administrators in the Southern region and related educational agencies. It should be considered with vocational

education institution administrators to find digital skills for personnel in the organization. This was because the research results showed that the demand index, which was being an active digital user, was the most essential. In order to enable the use of digital technology, data management, data links, and operations through digital communication were more appropriate and effective for the organization. Additionally, vocational education institution administrators and related agencies should consider working with vocational education institution administrators to find digital skills for their personnel because the research results showed that the demand index was the most essential in active digital users. Furthermore, vocational education institution administrators, academics, researchers, or other experts could apply the digital leadership development model from research as a training format to enhance organizational management potential using digital technology because the research results showed that the leadership development model was appropriate, feasible and effective for the developing of modern education administrators in Thailand.

Conclusion and Discussion

As the current condition of digital leadership of vocational education institution administrators was highly rated, and the desirable condition for developing digital leadership of this group was rated at the highest level, it indicated the need for empowerment of vocational education institution administrators to be able to manage vocational education institutions towards excellence by international standards. This was in line with the position of Carvalho et al. (2022), Phakamach et al. (2023b); and Jatuporn (2024), which asserted that administrators of vocational education institutions administrators in the reform era had to possess a vision and innovative leadership to manage education suitable to the time of changes and prepare the learners with quality and competitive learning outcomes. It was also consistent with research by Gil et al. (2018), Chandra et al. (2021), Abbu et al. (2022), and Maji & Laha (2022), who found that educational institutions should focus on transforming educational organizations into innovative organizations in the digital era. They proposed 12 essential factors for consideration, some directly related to digital technology, such as determining the proper hardware, software, and digital platforms. The findings of this study were also consistent with the research works of Lindqvist & Pettersson (2019), Busse & Weidner (2020), Fotso (2021), Suksaen & Trairat (2021), Aboobaker & Ka (2021); and Tulowitzki et al. (2022), which revealed that “digital competences” were the competencies of modern education administrators, especially digital mobility or integration, digital competence, and understanding how technology affects education. Therefore, the development of ICT for education and digital skills of executives and personnel has to be emphasized and practiced in educational organizations, particularly vocational education institutions in the Southern region of Thailand.

The confirmation of experts’ opinions and empirical data analysis in this study reflected the right decision in prioritizing human resource development in vocational education institution administrator’s implementation. Empowering vocational education institution administrators with knowledge and abilities, such as influencing ability, confidence, and time management, enhances organizational agility to initiate and manage institutional change. In addition, digital learning culture was proposed as one component of the development model. To keep pace with the disruption of education and learning technology, institute leaders must be aware of the importance and advancement of digital technology and be able to professionally and practically lead the organization to transform its culture into new technology. This is consistent with the guidelines for Thai education management towards Thailand 4.0 in promoting and developing digital technology for education (Sinlarat, 2020; Suksai et al., 2021; Phakamach et al., 2021a; Abbu et al., 2022; Mooncamp, 2024). The proposed model for developing digital leadership of vocational education institution administrators, if properly implemented, should minimize the weaknesses encountered and, to some extent, add to the strengths of vocational education

institution operations in Thailand through the digital leadership efforts of those vocational institution human resources.

However, in developing digital leadership to create an innovative educational organization for administrators of vocational education institutions in the Southern region of Thailand that is effective, a development model should be established by creating a set of practical training courses separated by functional functions, such as academic administrators and support administrators, or determined according to the level of use by considering the specified competencies, such as the basic level, operational level, and expert level, etc. A follow-up must be to evaluate the overall digital competency periodically or cyclically to improve leadership maturity. Furthermore, the factors for success in developing digital leadership include the existence of a development curriculum, the provision of appropriate development resources, continuous and systematic supervision, monitoring and evaluation, and the creation of a digital leadership development network at both national and international levels (Diniz et al., 2024). This was to enable administrators of vocational education institutions to have high competencies in managing the organization to meet the goals of developing vocational learners for entrepreneurs for national development in the future.

Suggestions for Applying Research Results

1) The research results revealed the gap between total current and desirable conditions, indicating the respondents' perception that vocational education institution administrators need digital leadership development. However, some conditions and priorities need variations among the dimensions under study. Therefore, it is suggested that further investigation should be carried out to set priorities and details of the development.

2) Based on the research findings, the highest necessity index was digital professional skills. Therefore, executives and personnel should develop digital agility or integrate it into their daily work. This could involve learning through modern digital tools appropriate for the current situation.

3) The proposed digital leadership development model should be implemented considering the contextual circumstances of educational institutions, both physically, professionally, and environmentally.

Suggestions for Further Research

1) To test the proposed digital leadership development model's validity and applicability, a similar study is suggested to be applied to a different group of compatible populations and samples. Since digital technology is widely adopted and implemented among general vocational education institutions in the country, the results may help concerned parties understand novel technology.

2) An in-depth case study on the application of the digital leadership development model to vocational education institution administrators is also suggested. This is so that the model can be applied to develop digital leadership appropriate for the institution's context.

3) Further research should be conducted on successful digital leadership development models. This will provide in-depth information for developing vocational education institution administrators with high competencies for managing vocational education institutions effectively, ultimately contributing to Thailand's human resource development.

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