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The Study of Components Technology Leadership of Teachers in Public Art Education Management Take Nanning, Guangxi

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Abstract

The objectives of this article were: 1) to investigate the components and indicators of Technology Leadership of Teachers in Public Art Education Management in Nanning; 2) to examine the current conditions, desired conditions, and the necessity for developing Technology Leadership of Teachers in Public Art Education Management in Nanning; and 3) to explore guidelines for fostering Technology Leadership of Teachers in Public Art Education Management in Nanning, Guangxi. The research sample comprised 7 participants. The study was divided into three steps: Step 1 involved examining the components and indicators, with qualified individuals evaluating their suitability. Step 2 entailed investigating the current situation using a multi-stage sampling method, with a sample group of 263 individuals. Step 3 focused on exploring guidelines for developing technology leadership among teachers, utilizing data from 6 individuals. Research tools included questionnaires, interviews, and assessments. Statistical analysis methods such as mean, standard deviation, and the analysis of necessary conditions (PNI modified) were employed for data interpretation. The research findings revealed that: 1) the components and indicators of technology leadership among teachers in educational management comprised 4 components and 40 indicators, namely: Technological vision with 10 indicators, Technological competence with 10 indicators, Technology professional development with 10 indicators, and Technology integration with 10 indicators, rated as highly appropriate overall. 2) The necessary requirements for developing technology leadership among teachers in educational management suggested the need for development across all components. 3) The guidelines for fostering technology leadership among teachers in educational management encompassed a total of 13 development strategies. The assessment of these strategies indicated a high level of appropriateness and feasibility.

Keywords: teacher technology leadership, Public Art Education Management

1. Introduction

Public art embodies contemporary urban ideas and cultural forms. It involves the creation and design of works specifically for public spaces, representing the development and maturity of a city. It contributes to the spiritual essence of the city, showcasing the cultural values of urban development. Additionally, it fosters citizens' sense of pride and identity within the city and is integral to art and cultural education. Public art has the power to inspire people's thoughts and evoke unique feelings about the city. By utilizing landscape changes, it prompts reflection on issues, enhances cognition, and fosters appreciation for the city's value and historical significance. Therefore, public art not only alters the city's appearance but also influences public perception and contributes to the city's distinctiveness (Zhang, 2021).

The basic courses of the Public Art major include theoretical knowledge, practical research, etc., of Public Art, and involve various art forms, phenomena, creation concepts, creation forms, aesthetic awareness, skills, etc., which belong to the discipline of literature and art. Public Art education serves as an elective course for non-art students in Chinese universities. It aims to enhance students' humanistic quality and aesthetic experience, promote their comprehensive development, and also serve as a measure of the overall strength of Chinese universities. Concurrently, China has released a series of documents supporting Public Art education in colleges and universities, which has facilitated its development within the Chinese higher education system. The National Public Art Curriculum Guidance Plan for Ordinary Colleges and Universities asserts that the cultivation of high-quality talents for socialist modernization cannot disregard Public Art curriculum. By incorporating it as an elective course, universities can foster the development of sound personalities and enhance students' innovative

practical abilities. Public Art education courses encompass art theory learning, artwork appreciation, and art activity practice. These courses aim to help college students refine their aesthetic taste, cultivate proper humanistic literacy concepts, comprehend Chinese and foreign multiculturalism alongside exceptional artistic achievements, and nurture their image thinking and appreciation abilities (Liu, 2022).

The development of Public Art education in Chinese universities can significantly enhance the overall quality of college students. As a humanistic discipline, Public Art education contributes to improving students' aesthetic ability and artistic understanding, broadening their aesthetic interests and perspectives, and enriching their aesthetic experiences. The Public Art education major is grounded in emotional engagement to achieve emotional integration among students. It facilitates the cultivation of students' ideal personalities, reinforces the shaping of their characters, and motivates them to enhance their self-development and planning skills, while also fostering an understanding of the value and significance of life. Regarding the current situation of the development of Public Art education teachers (Wei, 2022).

At present, most Chinese colleges and universities lack independent institutions or departments dedicated to managing Public Art education. Instead, Public Art education programs are primarily affiliated with art colleges, youth league committees, student offices, humanities colleges, and other departments within Chinese universities. Consequently, their autonomy is limited. Issues related to faculty, curriculum, funding, and student management pose significant challenges, thereby potentially impacting the overall quality of Public Art education. Specifically, the inadequacies in teacher recruitment, insufficient quantity, and low-quality hamper the development of Public Art education within Chinese universities (Hu, 2022).

Firstly, the managerial proficiency of Public Art teachers is not robust. Currently, there exists a significant imbalance in the ratio of teachers specializing in Public Art education in Chinese universities. Specifically, some professional instructors exhibit inadequate grasp of theoretical foundations, outdated concepts, weak research capabilities, and a lack of professionalism, hindering the enhancement of Public Art education quality. Both teachers and administrators must adapt to the profound changes brought about by technological advancements. Teachers are provided with 21st-century tools, thanks to the technological expertise of administrators and their own; however, the intensity of integration remains a potentiality awaiting realization. Positive technology integration skills are essential for administrators and teachers alike to materialize and synchronize their respective domains. The findings suggest that administrators demonstrate a high level of technological leadership, indicating readiness and comprehensive knowledge and practical experience in technology utilization and application. Similarly, teachers exhibit a high level of technological proficiency, showcasing their adeptness in leveraging technology to facilitate the teaching and learning processes (Yuan, 2021).

To advance society, governments, and universities, particularly university leaders, recognize the paramount importance of fostering the technological leadership of college teachers. They fully grasp the positive significance of implementing teachers' technological leadership within colleges and universities. Concurrently, effective measures are taken to address adverse factors that impede the development of teachers' technological leadership. Necessary support is provided, and a school culture conducive to the cultivation of teachers' technological leadership is cultivated. The concept of teacher technological leadership is integrated into the overall management framework of the school. The realization of teachers' technological leadership provides fertile ground for encouraging educators to leverage their professional expertise and role characteristics. This facilitates their active participation in joint decision-making processes within the school, enabling them to effectively contribute to daily activities and thrive in this environment.

2. Research Objectives

1) to investigate the components and indicators of Technology Leadership of Teachers in Public Art Education Management in Nanning, Guangxi.

2) to examine the current conditions, desired conditions, and the necessity for developing Technology Leadership of Teachers in Public Art Education Management in Nanning, Guangxi.

3) to explore guidelines for fostering Technology Leadership of Teachers in Public Art Education Management in Nanning, Guangxi.

3. Scopes of Research

The study is conducted to develop the guidelines for fostering Technology Leadership of Teachers in Public Art Education Management in Nanning, Guangxi. The scope of the study revealed the following:

In The Study of Components Technology Leadership of Teachers in Public Art Education Management Take Nanning, Guangxi, the researcher has studied related literature and research as follows:

3.1 The Content Scope of the Research

The data providers consisted of 7 highly qualified individuals, selected through targeted selection to assess the suitability of the components and indicators of Technology Leadership of Teachers in Public Art Education Management in Nanning, Guangxi. The researcher established criteria for identifying qualified individuals as follows: 1) Expertise in educational management or relevant disciplines, with a minimum of 3 academic publications or research works related to educational management. 2) Holders of a doctoral degree in educational management or related fields, or individuals holding positions with specialized expertise and over 10 years of experience in the field. 3) School principals with a doctoral degree in educational management or related fields, or holding positions as specialized experts with over 10 years of experience.

The sample group consisted of 263 participants, who were Teachers in Public Art Education, obtained through Multi-stage Random Sampling. The minimum sample size was determined using Yamane's (1967) formula, which calculates a sample size proportional to one group, assuming a proportion equal to 0.5, and at a confidence level of 95%.

The data providers consisted of 3 schools, each comprising 2 academic teachers and 2 instructional teachers, totaling 6 individuals. They were selected through targeted selection, with specific criteria set by the researcher regarding the qualifications as follows: 1) experience in technology leadership, with qualifications including at least 5 years of experience in teaching roles or holding academic positions with advanced professional expertise and 2) received at least 3 national-level awards or recognitions.

3.2 The Research Conceptual Framework

Components of Technology Leadership of Teachers in Public Art Education Management in Nanning, Guangxi were synthesized by the researcher from documents and research related to the concepts of (Brown & Jacobsen, 2016; Chang, 2002; Ertmer & Ottenbreit-Leftwich, 2010; Flanagan & Jacobsen, 2003; Fulton et al., 2005; Miller, 2008; Mirra, 2004; Mu et al., 2019; Persaud, 2006; Raman & Thannimalai, 2019; Reinke, 1997; Ringstaff & Kelley, 2002; Rogers, 2000; Scanga, 2004; Scott, 2005; Seay, 2004; Wenglinsky, 1997), comprising 4 components and 40 indicators.

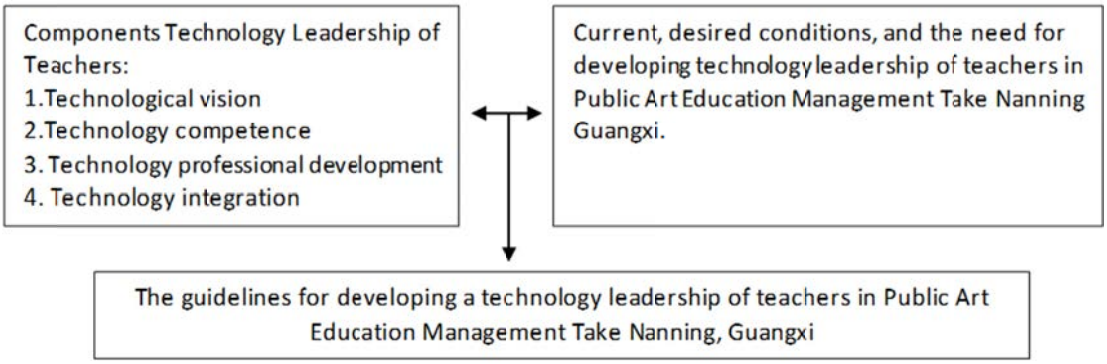

Figure 1. The research conceptual framework

4. Research Methodology

The study is conducted through the use of research and development methods (R & D). The study is divided into four phases as follows:

Step 1: Examining of the Components and Indicators of Technology Leadership of Teachers in Public Art Education Management Take Nanning, Guangxi:

In Step 1, nine experts were selected through purposive sampling. The criteria for selecting experts to participate in this stage considered three distinct groups:

1) Three professors from either public or private universities, possessing a doctoral degree and specializing in educational administration or related disciplines. They were required to have a minimum of three academic publications or research works relevant to educational management.

2) Three education administrators with a doctoral degree in educational administration or related fields, or individuals holding positions of specialized expertise with over 10 years of experience in the field.

3) Three public school directors, either holding a doctoral degree in educational administration or related fields or occupying positions of specialized expertise with over 10 years of experience.

Step 2: Investigating the current and desired situation and the need for developing a Technology Leadership of Teachers in Public Art Education Management Take Nanning, Guangxi.

1) The sample consisted of 263 elementary school teachers in public art education management in Nanning, Guangxi, obtained through Multi-stage Random Sampling. The minimum sample size was determined using Yamane's formula (Yamane, 1973) at a confidence level of 95%.

2) The research tools included questionnaires on current and desirable conditions for developing technology leadership among teachers in public art education management in Nanning, Guangxi. The Likert scale was divided into two parts: Part 1 included information about the respondents' status as a checklist, while Part 2 comprised the questionnaire on current and desirable conditions for developing teachers in public art education management in Nanning, Guangxi.

3) Data collection involved the researcher distributing questionnaires on current and desirable conditions regarding teachers in public art education management in Nanning, Guangxi. Additionally, a letter was sent to the Faculty of Education, Mahasarakham University, requesting cooperation in answering the questionnaires and seeking permission to use the questionnaires for research purposes, along with clarification of the objectives and related details.

4) Data analysis was conducted by evaluating the mean and standard deviation of the sample questionnaire data. The criteria for interpretation followed the guidelines provided by Srisa-ard (2010) as follows:

4.51–5.00 means current/desirable condition at the highest level.

3.51–4.50 means current/desirable condition at a high level.

2.51–2.50 means current/desirable condition at a moderate.

1.51–2.50 means current/desirable condition at a low level.

1.00–1.50 means current/desirable condition at least level.

To utilize the data obtained from the analysis of the current condition to develop teachers in public art education management in Nanning, Guangxi, the Modified Priority Needs Index ($PNI_{Modified}$) data priority sorting model by Wongwanit (2015) is employed. The $PNI_{Modified}$ is calculated using the formula: $PNI_{Modified} = (I - D)/D$, where:

PNIModified refers to Modified Priority Need Index

I denotes the importance

D denotes the degree of success

Step 3: Exploring guidelines for developing Technology Leadership of Teachers in Public Art Education Management Take Nanning, Guangxi.

1) Studying on the development guidelines of Growth Mindset to enhance learning management in elementary school teachers through synthesizing research and studies related to practice development.

2) Drafting development guidelines through in-depth interviews with qualified individuals, as follows: the data providers were teachers, totaling 6 individuals, selected through purposive sampling using the Best Practice study method. This method involved a semi-structured interview divided into 3 sections: ① General information, ② Developing a Technology Leadership of Teachers in Public Art Education Management in Nanning, and ③ Methods for developing Technology Leadership of Teachers in Public Art Education Management in Nanning.

Data collection involved coordinating with the data providers using the best practice guidelines for information and telephone interviews. Coordination includes scheduling appointments for interviews with relevant individuals using prepared documents and interview forms. The interviews are recorded through note-taking, audio recordings, and video recordings. Data analysis employs content analysis techniques to categorize and interpret the data for presentation and analysis.

5. Research Results

The researcher has divided the data analysis into two parts based on the objectives as follows:

Step 1: Examining of the Components and Indicators of Technology Leadership of Teachers in Public Art Education Management Take Nanning, Guangxi

Table 1. The components and indicators of technology leadership of teacher in Public Art Education Management take Nanning, Guangxi

Components (4 components)	Indicators (40 Indicators)
1. Technological vision	1.1 Demonstrates accurate understanding of technology leadership.
	1.2 Possesses a clear understanding of the importance of technology.
	1.3 Acknowledges technology as a future educational development trend.
	1.4 Maintains a strong teaching ethic towards educational development.
	1.5 Understands the correct relationship between technology and educational development.
	1.6 Technology leadership impacts teaching work.
	1.7 Understands technology leadership at some level.
	1.8 Understands the theoretical principles of technology leadership.
	1.9 Has a strong desire to learn about technology leadership.
	1.10 Maintains a positive attitude towards technology.
2. Technology competence	2.1 Demonstrates clear ability to search for desired information.
	2.2 Possesses full ability to search for necessary teaching resources.
	2.3 Utilizes teachers' technology leadership to create a professional atmosphere.
	2.4 Expertise in processing and sharing tools, such as visual presentations and PowerPoint.
	2.5 Applies technology expertise to develop teacher resources effectively.
	2.6 Expertise in using assessment systems to record and evaluate teachers' technology practices.
	2.7 Ability to assess educational effectiveness.
	2.8 Expertise in using internet communication tools.
	2.9 Utilizes technology skills expertly to improve educational goals.
	2.10 Easily designs comprehensive educational plans.
3. Technology professional development	3.1 Ability to use teaching requirements to set clear teaching objectives.
	3.2 Expertise in using tools to develop education.
	3.3 Ability to explain the learning process according to educational objectives.
	3.4 Conducts classroom teaching activities easily.
	3.5 Ability to predict outcomes after completing the action plan.
	3.6 Able to plan educational activities and present knowledge effectively.
	3.7 Uses technology leadership to assess educational outcomes.
	3.8 Can accurately assess teachers' technology learning status.
	3.9 Can reflect on and improve educational problems.
	3.10 Professional attitude is dedicated to developing teachers' technology leadership.
4. Technology integration	4.1 Understands the school development goals and education management standards.
	4.2 The educational plan will be aligned with the development vision.
	4.3 Provides own opinions on equipment procurement.
	4.4 If there is a lack of teaching software and hardware, the school can resolve it promptly.
	4.5 Be able to manage the school library resources in collaboration with colleagues.
	4.6 Has full ability to search for necessary teaching resources.
	4.7 Is aware of the integration of education and life.
	4.8 Interested in improving teachers' abilities with the assistance of technology leadership.
	4.9 Actively participates in and follows school policies.
	4.10 Be able to use teachers' technology leadership to guide the teaching process.

Table 2. The results of the level of the technology leadership of teacher in Public Art Education Management in Nanning, Guangxi

Components Technology Leadership of Teachers	$\bar{x}$	S.D.	Level of Appropriateness
1.Technological vision	4.57	0.53	Highest
2.Technology competence	4.57	0.53	Highest
3.Technology professional development	4.43	0.79	High
4.Technology integration	4.86	0.38	Highest
Overall	**4.61**	**0.56**	**Highest**

According to Table 2, the overall level of Technology Leadership of Teachers in Public Art Education Management in Nanning, Guangxi was observed to be at the highest level ($\bar{X}$ = 4.61). Upon consideration of each factor, the top three factors with the highest average scores are: Technology integration ($\bar{X}$ = 4.86), Technology competence ($\bar{X}$ = 4.57), and Technological vision ($\bar{X}$ = 4.57), respectively. Conversely, the factor with the lowest average performance was Technology professional development ($\bar{X}$ = 4.43).

Step 2: Investigating the current and desired situation and the need for developing a Technology Leadership of Teachers in Public Art Education Management Take Nanning, Guangxi.

Table 3. The analysis results of current & desirable conditions for developing Technology Leadership of Teachers in Public Art Education Management Take Nanning, Guangxi (n = 263)

Components/indicators	Degree of success (D)			Important (I)			$PNI_{modified}$	Order of
	$\bar{x}$	S.D.	Results	$\bar{x}$	S.D.	Results		importance
1.Technological vision	**3.14**	**0.70**	**Moderate**	**4.11**	**0.47**	**High**	**0.308**	**(2)**
1.1 Demonstrates accurate understanding of technology leadership.	3.10	0.69	Moderate	4.01	0.31	High	0.292	8
1.2 Possesses a clear understanding of the importance of technology.	3.48	0.62	Moderate	4.56	0.50	Highest	0.311	5
1.3 Acknowledges technology as a future educational development trend.	3.04	0.62	Moderate	4.00	0.70	High	0.314	3
1.4 Maintains a strong teaching ethic towards educational development.	3.29	0.74	Moderate	4.62	0.51	Highest	0.403	1
1.5 Understands the correct relationship between technology and educational development.	3.15	0.64	Moderate	3.94	0.28	High	0.252	10
1.6 Technology leadership impacts teaching work.	3.07	0.65	Moderate	4.08	0.29	High	0.329	2
1.7 Understands technology leadership at some level.	3.07	0.67	Moderate	3.97	0.18	High	0.293	7
1.8 Understands the theoretical principles of technology leadership.	3.08	0.78	Moderate	4.00	0.40	High	0.296	6
1.9 Has a strong desire to learn about technology leadership.	3.01	0.62	Moderate	3.95	0.35	High	0.312	4
1.10 Maintains a positive attitude towards technology.	3.12	0.71	Moderate	3.98	0.35	High	0.277	9
2.Technology competence	**3.05**	**0.78**	**Moderate**	**4.11**	**0.42**	**High**	**0.348**	**(1)**
2.1 Demonstrates clear ability to search for desired information.	3.08	0.67	Moderate	4.00	0.22	High	0.296	8
2.2 Possesses full ability to search for necessary teaching resources.	3.01	0.63	Moderate	3.95	0.43	High	0.313	5
2.3 Utilizes teachers' technology leadership to create a professional atmosphere.	2.99	0.63	Moderate	3.98	0.31	High	0.331	3
2.4 Expertise in processing and sharing tools, such as visual presentations and PowerPoint.	3.11	0.72	Moderate	3.98	0.25	High	0.278	10
2.5 Applies technology expertise to develop teacher resources effectively.	2.97	0.55	Moderate	4.45	0.54	High	0.497	2
2.6 Expertise in using assessment systems to record and evaluate teachers' technology practices.	3.09	0.70	Moderate	4.05	0.29	High	0.310	6
2.7 Ability to assess educational effectiveness.	3.05	0.93	Moderate	4.06	0.27	High	0.330	4
2.8 Expertise in using internet communication tools.	3.13	0.95	Moderate	4.06	0.31	High	0.296	9
2.9 Utilizes technology skills expertly to improve educational goals.	3.06	0.99	Moderate	4.00	0.27	High	0.304	7
2.10 Easily designs comprehensive educational plans.	2.95	0.88	Moderate	4.53	0.52	High	0.538	1
3.Technology professional development	3.12	0.79	Moderate	4.05	0.38	High	0.297	(4)
3.1 Ability to use teaching requirements to set clear teaching objectives.	3.10	0.84	Moderate	4.06	0.27	High	0.309	5
3.2 Expertise in using tools to develop	3.11	0.79	Moderate	4.10	0.31	High	0.316	3
3.3 Ability to explain the learning process according to educational objectives.	3.10	0.80	Moderate	3.97	0.33	High	0.278	9
3.4 Conducts classroom teaching activities easily.	3.08	0.80	Moderate	4.07	0.27	High	0.321	2
3.5 Ability to predict outcomes after completing the action plan.	3.08	0.79	Moderate	3.94	0.29	High	0.279	7
3.6 Able to plan educational activities and	3.04	0.71	Moderate	3.99	0.27	High	0.311	4

present knowledge effectively.								
3.7 Uses technology leadership to assess educational outcomes.	3.10	0.55	Moderate	3.99	0.11	High	0.286	6
3.8 Can accurately assess teachers' technology learning status.	3.12	0.75	Moderate	3.96	0.37	High	0.268	10
3.9 Can reflect on and improve educational problems.	3.14	0.82	Moderate	4.02	0.59	High	0.279	8
3.10 Professional attitude is dedicated to developing teachers' technology leadership.	3.34	0.98	Moderate	4.42	0.52	High	0.325	1
4.Technology integration	3.07	0.92	Moderate	3.99	0.28	High	0.299	(3)
4.1 Understands the school development goals and education management standards.	3.09	0.81	Moderate	4.03	0.17	High	0.304	5
4.2 The educational plan will be aligned with the development vision.	3.14	0.97	Moderate	4.02	0.21	High	0.279	7
4.3 Provides own opinions on equipment procurement.	3.11	0.98	Moderate	4.03	0.29	High	0.295	6
4.4 If there is a lack of teaching software and hardware, the school can resolve it promptly.	3.09	0.87	Moderate	3.91	0.29	High	0.266	10
4.5 Be able to manage the school library resources in collaboration with colleagues.	3.05	0.96	Moderate	4.03	0.34	High	0.323	4
4.6 Has full ability to search for necessary teaching resources.	3.00	0.93	Moderate	4.00	0.19	High	0.334	2
4.7 Is aware of the integration of education and life.	3.02	0.96	Moderate	4.03	0.30	High	0.335	1
4.8 Interested in improving teachers' abilities with the assistance of technology leadership.	3.07	0.96	Moderate	3.90	0.34	High	0.269	8
4.9 Actively participates in and follows school policies.	3.05	0.84	Moderate	4.04	0.32	High	0.324	3
4.10 Be able to use teachers' technology leadership to guide the teaching process.	3.09	0.93	Moderate	3.92	0.28	High	0.267	9
Overall	3.10	0.80	Moderate	4.07	0.40	High	0.312	

According to Table 3, the overall current condition is moderate. The aspect with the highest average was Technological vision, followed by Technology professional development, while the aspect with the lowest average was Technology competence. When considering the desirable condition, it was found that:

The overall desirable condition is at a high level. The aspects with the highest average were Technological vision and Technology competence, followed by Technology professional development, while the aspect with the lowest average was Technology integration. The essential need for the development of Technology Leadership of Teachers in Public Art Education Management in Nanning, Guangxi, is at the level of need for development (PNImodified = 0.312) when prioritizing the need for development based on PNImodified. The most common development needs are felt (PNImodified = 0.384), followed by Technology competence (PNImodified = 0.308), Technology integration (PNImodified = 0.424), challenges in learning management (PNImodified = 0.299), and the lowest in Technology professional development (PNImodified = 0.297), respectively.

Step 3: Exploring guidelines for developing Technology Leadership of Teachers in Public Art Education Management Take Nanning, Guangxi.

Table 4. The guidelines for developing Technology Leadership of Teachers in Public Art Education Management Take Nanning, Guangxi

Components	Guidelines
1.Technological vision	1) Self-development to keep up with technological changes, analyzing trends in progressive technology, and identifying visionary applications for educational management vision-setting. 2) Developing competency in technology usage, such as utilizing digital technology devices like tablets, smartphones, computers, and AI technology to foster collaborative online work, and creating educational platforms for learners. 3) Embracing innovative technology leadership in practice to inspire and encourage students to utilize technology effectively for enhanced outcomes. 4) Strategizing technology-integrated missions and aligning technology with educational management tasks, while adapting and showcasing a digital management vision to transform the image of the digital-era educational institution.
2.Technology competence	1) Studying the policies of affiliated organizations and emerging management practices to formulate comprehensive strategies and action plans for information technology in schools systematically. 2) Self and organizational development to utilize statistical data processing and information technology for measurement and evaluation, with guiding principles and directives for monitoring information technology usage in management, as well as budget allocation for procuring information technology materials and equipment. 3) Promoting the establishment of learning centers and fostering collaborative networks in information technology education. 4) Encouraging the use of information technology for self-development and professional advancement, leveraging diverse information technology resources.
3.Technology professional development	1) Becoming a technology leader by engaging in continuous learning of appropriate technology usage through training, workshops, seminars, and effective educational management practices utilizing technology. This fosters familiarity, skills, and proficiency in information technology usage. 2) Emphasizing the importance and benefits of technology, actively participating in communication through suitable and up-to-date technological devices, such as conducting parent meetings via video conferencing, communicating through messaging applications like Line, Facebook, Zoom, or Google Meet. 3) Listening to and analyzing various educational management issues, devising solutions by promoting student research and utilizing educational research processes related to new technologies to enhance student abilities.
4.Technology integration	1) Utilizing technology to promote and support the educational environment. 2) Integrating technology in the classroom also supports teaching by providing opportunities for students to complete assignments using computers instead of traditional pen and paper.

According to Table 4, The overall assessment of the guidelines for developing the technological leadership of art education management teachers indicates a high level of suitability and feasibility.

6. Discussion

The components and indicators of Technology Leadership of Teachers in Public Art Education Management consist of 4 dimensions. 1) Technological Vision: This involves setting a vision for the future that others can understand and accept. Behaviors indicating leadership include communicating with others through speech and actions to demonstrate the desired outcomes. Leaders build trust and prioritize others over themselves. 2) Technology Competence: This pertains to the teacher's behavior demonstrating technological abilities, leadership in technology, memorization and understanding of technology leadership, proficiency in using technology, and attitudes towards technology that reflect thoughts, beliefs, feelings, and behavioral tendencies towards technology. 3) Technology Professional Development: This involves demonstrating progress in the technology profession, technology curriculum aligned with educational objectives, methods for self-development planning in technology for leadership progress, and evaluation of teaching using technology. And 4) Technology Integration: This dimension refers to teacher behaviors demonstrating the ability to apply technology in management and teaching, acceptance, promotion, assistance, and prioritization of technology use. It is crucial for development. Overall, these areas require development and improvement. This aligns with Li Xiaotian (2023) proposition that a teacher's technology leadership is associated with both the teacher's abilities and technological leadership skills. Furthermore, this is consistent with Kozloski (2006) assertion that technology leadership involves using technology in administrative work, emphasizing its daily use, continuous practical training, establishing teams and learning groups within organizations to utilize technology for work development, enhancing work productivity, and providing opportunities for professional advancement for technology leaders to use in teaching and learning. Additionally, this aligns with Yao et al. (Jihai et al., 2022) proposition that

teachers' technology leadership encompasses research abilities, teamwork skills, and teaching abilities. The technology leadership of teachers serves as a leadership role for schools, teaching, and students, considering teachers' ethical consciousness, professional abilities, teaching philosophy, and collaborative spirit. It promotes student development, improves the quality of education and teaching, and fosters educational reform and development. Furthermore, Jiang Yuanyuan (2020) has proposed that teachers' technology leadership depends on the influence we exert on others through our own influence. The technology leadership of teachers is a force manifested in the form of teaching and learning goals that involve specialized teaching activities and influence teachers in various schools. It is an impact resulting from the application of skills, knowledge, personality, and ethics through teachers, aimed at the remaining population in schools. Song Lei (2020) conducted a study that found alignment with the notion that teachers' technology leadership is manifested as technology leadership behaviors for students in schools under capacity-building efforts. This primarily focuses on higher-positioned teachers as the main influencers in others' education, which is characterized by practical behaviors. It necessitates incorporating the role of teachers, improving their willingness to participate in school management and curriculum development, and enhancing students' learning efficiency with the assistance of teachers' authority. Overall, teachers' technology leadership falls into the categories of ability, influence, and behaviors that may have positive impacts, which are related to various factors such as emotions and the ability of teachers to engage in organizational activities. The research in this study raises several points for discussion, including:

1) The assessment results of the components and indicators of Technology Leadership of Teachers in Public Art Education Management Take Nanning, Guangxi, comprising 4dimensions, are considered to be at the highest level. This conclusion stems from studying the socio-global context, which has undergone significant technological changes, impacting education management in the digital era and schools. Therefore, school administrators and teachers must possess a deep understanding of technology. This technology fosters effective educational management and learning. The vision and leadership in promoting students are interrelated and influence one another. Students can integrate technology into various aspects of education and learning, improving educational quality and teaching based on student contexts. Additionally, the judicious use of technology, technological literacy, and adherence to ethical principles, morality, and regulations in technology use, contribute to the highest level of overall assessment. When considering the summary of each component, it is noted that the aspect with the lowest average score is Technology professional development. This is because professional development of teachers in technology demonstrates the advancement of the technology profession. Technology courses are aligned with educational objectives, and there are methods for teachers to develop their own technology advancement plans. Evaluation of teaching and learning using technology indicates a transformative learning experience. The findings are consistent with Mu et al. (2019), who propose that the theory of teacher professional development suggests that the varying professional needs and levels of teachers at each stage of professional development necessitate continuous learning, fostering knowledge circulation, and identifying key factors at each stage. Teachers should be aware of individual differences, enhance their abilities in exploration and research, allocate resources rationally, improve the effectiveness of group teaching, and pursue multidimensional development and progress. Teachers should be attentive to their experiences and growth challenges, understand the genuine nature of different development stages, propose goal-oriented and comprehensive theoretical foundations, and improve the level of professional development. Teacher professional development should be based on information technology, promote continuous data development, technological education and teaching, and enhance teachers' technology leadership and professional technology levels in teaching.

2) The current state, desired state and the needs of Technology Leadership of Teachers in Public Art Education Management in Nanning, Guangxi, are as follows: ① Current state: overall research findings and specific aspects indicate a moderate level. The area with the lowest average score is technology competence. This is due to teachers' behaviors reflecting their technology competence, leadership in technology, ability to memorize and internalize technology leadership, proficiency in using technology, and attitudes toward technology. The concept emphasizes the transferability of skills and leadership qualities to new situations involving technology usage with caution, thoroughness, and ethical considerations. It also promotes awareness and understanding of technology among educational personnel to ensure responsible and proper technology usage. ② Desired State: the desired state aligns with the research findings, indicating a high level overall. Teachers in Nanning, Guangxi, are expected to demonstrate leadership qualities and vision in their work, with clear development plans and a vision for incorporating various educational information technologies. This involves promoting awareness and understanding of proper technology usage among educational staff to ensure responsible technology implementation. And ③ The needs: to achieve the desired state, cultivating technology leadership among educators is essential. This involves comprehensive development plans, clear vision, and strategies for

integrating educational information technology effectively. Additionally, fostering awareness and understanding of technology among educational staff to ensure its proper and responsible use, with ethical considerations in mind, is crucial. The research indicates that developing ethical technology leaders or new-age managers requires significant knowledge and expertise, leading to successful academic contributions or achievements in guiding educational institutions toward their goals. Aligned with the study of Raman (Raman & Thannimalai, 2019) on the technological leadership qualities of educational administrators impacting the technological integration of teachers in 21st-century classrooms, which found that overall technological leadership was high, with each aspect also rated high. As for the necessary development of Technology Leadership of Teachers in Public Art Education Management in Nanning, Guangxi, the aspect with the highest index of necessity is Technology Competence. This is because art teachers in Nanning, Guangxi, need to support the use of technology tailored to the individual needs of each student, advocate for the appropriate application of technology in instructional management, and promote learning management focused on students' technological skills and access in educational settings.

3) The development of Technology Leadership among teachers in Public Art Education Management in Nanning, Guangxi can be summarized into 13 developmental directions across 4 dimensions. The most significant dimension is visionary leadership, where teachers should develop themselves to adapt to technological changes, analyzing trends in contemporary technology and utilizing them appropriately for educational management to set a vision. They should enhance their competencies in technology utilization, such as using digital technology devices like tablets, smartphones, computers, and leveraging AI technology to promote collaborative online work practices, creating educational platforms for both teachers and students. They should also lead by example in adopting new technology formats in their work to inspire and stimulate teachers and staff to use technology for more effective outcomes. It's essential to formulate a strategic plan that links technology with the educational mission, while also adapting and demonstrating the digital-era educational management vision to transform the image of the digital-era school. This aligns with the research conducted by Waree (2017) on the development of indicators for technology leadership of educational administrators under the Basic Education Commission, which found that administrators must create, disseminate, and integrate visions into policies, objectives, and daily activities of the school. They must define roles and responsibilities, inspiring members to wholeheartedly follow the vision. Furthermore, this aligns with Zhu et al. (2019), who assert that the development of teachers' technological leadership qualities requires active participation in formal learning activities, training through official channels, and gaining acknowledgment to enhance their technology absorption. The role of teachers' technological leadership can offer guidance in refining and improving teaching practices. The standards delineating technological leadership among teachers can serve as a reference point for the advancement and refinement of educational practices at the tertiary level.

7. Suggestion

7.1 General Suggestions

1) Teachers should support the use of technology with caution, diligence, and ethical considerations, emphasizing social responsibility and adhering to legal, ethical, and safety standards. Teachers serve as role models for ethical technology use and should undergo training and seminars on ethical technology usage. They should instill ethical values in students' technology usage to contribute to the ongoing development of educational quality.

2) Educators should establish policies to promote the use of technology in assessment and evaluation, including monitoring and evaluating the use of information technology in teaching management. This is essential for enhancing efficiency and continuing to improve educational quality.

3) There should be causal studies to explore alternative leadership styles that may impact teachers' technology integration in schools, providing clearer and more suitable information.

4) Qualitative research should be conducted to guide the development of teachers' technological leadership towards enhancing students' learning skills for the 21st century.

7.2 Suggestions for Further Study

1) It is essential to study the factors influencing the development guidelines of teachers' technological leadership in using technology for learning management.

2) Best practices in developing teachers' technological leadership in using technology for learning management should be investigated.

3) Examining models, strategies, or programs for teachers' technological leadership is necessary.

4) There should be an expansion of research scope to encompass a broader target audience. Additionally, exploring other independent variables that may influence the acceptance of information systems and technology is crucial, as there are several variables expected to impact technology adoption.

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