

Principals' informatization leadership practices and its impact to advancement in a China vocational school

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Abstract: This comprehensive research delves deeply into the pivotal role of principals' informatization leadership in driving forward Chinese vocational schools, employing a multifaceted approach grounded in the International Society for Technology in Education (ISTE) standards. Principals play a crucial role in shaping the educational landscape, particularly in the integration of technology. Through meticulous evaluation across dimensions such as Equity and Citizenship Advocacy, Visionary Planning, Empowerment, System Design, and Connected Learning, the study uncovers the transformative impact of their leadership. The research methodology involved the utilization of quantitative data gathered from a survey conducted among teachers at Yichun Vocational Technical College. This survey aimed to assess the perceived impact of principals' leadership on various dimensions of school advancement, including leadership style and vision, IT investment and resource allocation, IT governance practices and policies, and responses to external factors. Findings from the survey reveal the visionary planning, empowerment of educators and students, adept system design, and unwavering commitment to continuous learning were demonstrated by principals. The study also underscores the critical importance of strategic resource allocation, effective IT governance, and adaptability to external influences, while also acknowledging minor existing gaps within the current system. These insights contribute significantly to a nuanced understanding of effective leadership strategies for seamlessly integrating technology into vocational education. Furthermore, the study serves as a catalyst for the formulation of an enhanced Educational Leadership Management Program, meticulously designed to address the specific needs and challenges identified through the study's findings.

Keywords: Informatization Leadership; Chinese Vocational Schools, Empowerment in Education; System Design; Connected Learning; IT Governance; Educational Leadership.

1. Introduction

The informatization of education has become an inevitable trend in the development of the times, and has also endowed principals with new attributes and connotations of leadership ability. In the information age, principals, leaders, and schools have become important components of their responsibilities in carrying out information design, building an information environment, developing information resources, and promoting a series of activities related to information technology. Improving the informatization leadership of principals has become an inevitable trend of the times. From the perspective of social development, the informatization leadership of principals is an inevitable requirement to comply with the trend of the times. From the perspective of national development, enhancing the leadership ability of principals in information technology is a response to the overall call for the development of national education information technology. Therefore, in this situation, keeping up with the pulse of the times and adapting to the trend of the times while enhancing the information technology leadership ability of principals is a topic of great leadership significance and research value.

The key to promoting educational informatization lies in the principal. Under the development of information technology construction, school principals are required to strengthen their information technology leadership capabilities, which is a deep expectation for their information technology leadership capabilities. Therefore, if a principal has a high level of information technology leadership ability, it means that the school may become a high-level modern

school.

2. Statement of the Problem

This study determined the factors affecting principals' informatization leadership practices in the Yichun Vocational and Technical College towards a management development program.

Specifically, it aimed to seek answers to the following questions:

1. What is the profile of the respondents in terms of:

1.1 Age

1.2 Sex

1.3 Tenure

2. What is the informatization leadership practice of the principals as assessed by the teacher respondents in terms of the following ISTE standards for educational leaders? Equity and Citizenship Advocate

2.1 Visionary Planner

2.2 Empowering Leader

2.3 System Designer

2.4 Connected Learner

3. Is there significant difference on the assessment of teacher respondents on their principals' informatization leadership in terms of the International Society for Technology in Education (ISTE) standards for educational leaders when their profile is used as test factors?

4. What is the assessment of teacher respondents on the impact of principals' informatization leadership in terms of:

4.1 Leadership Style and Vision

4.2 IT investment and Resource Allocation

4.3 IT Governance Practices and Policies

4.4 External Factors

5. Is there a significant difference on the assessment of respondents of the factors affecting their principals' informatization leadership?

6. Is there a significant relationship between respondents' assessments on their principals' information leadership practice and the factors affecting their informatization leadership?

7. What management development program can be crafted based on the findings of the study?

3. Hypotheses

Following the above research problems, the researcher proposes the following null hypotheses:

H01: There is no significant difference on the assessment of teacher respondents on their principals' informatization leadership in terms of the ISTE standards for educational leaders when their profile is used as test factors.

H02: There is no significant difference on the assessment of respondents on the factors affecting their principals' informatization leadership.

H03: There is no significant relationship between respondents' assessments on their principals' information leadership practice and the factors affecting their informatization leadership

4. METHODOLOGY

4.1. Research Design

Statistical analysis method is a research method that reveals the development trends, interrelationships, and changes between things through quantitative analysis of their scale, degree, range, and other quantitative relationships, in order to explain and predict things.

A quantitative descriptive-comparative method were utilized in this study to look into the factors affecting the principals' informatization leadership.

According to Babbie (2010), quantitative methods focus on independent measurements and statistical interpretation of data gathered through different kinds of surveys or working around existing numerical data with the use of mathematical technique, primarily through expound and clarify certain specific phenomena.

Given that this is descriptive in nature, it looks into links between specified variables such as constant and static data. Hence, the data gathered using structured research instruments in large number of participants produce tables and numerical charts that can be utilized to suggest a general idea about the topic at hand, or predict future results and relationships (Babbie, 2010).

4.2. Sampling Method and Research Locale

This study was conducted in Yichun Vocational Technical College which is located in Yichun City, a historical and cultural city in the west of Jiangxi. The city has a beautiful environment, beautiful mountains and rivers, and convenient transportation. It is a national excellent tourist city, a national sanitary city, a national garden city, and a national green model city.

Yichun Vocational Technical College is a public full-time college-level college approved by the People's Government of Jiangxi Province in June 2003 and filed by the Ministry of Education. It is a model higher vocational college in Jiangxi Province.

Yichun Vocational Technical College consists of Nursing College, Medical College, Teachers College, College of Mechanical and Electrical and New Energy Automobile, College of Finance and Accounting, College of E-Commerce and Tourism, College of Information Engineering, College of Arts and Design, College of International Education, College of Continuing Education, Innovation The Entrepreneurship Institute, the Marxist College, the Ministry of Medical Basics, the Military Sports Department and other teaching units recruit students from more than 20 provinces and cities across the country, with more than 16,000 students. At present, there are 733 full-time teachers, including 276 teachers with senior professional titles. There are 1 candidate for the "New Century Multi-Million Talent Project" in Jiangxi Province, 4 teaching teachers in provincial colleges, 1 leader in provincial middle-aged and young subjects, and provincial colleges. There are 11 young and middle-aged backbone teachers, and 2 outstanding teaching teams in provincial universities.

The study used random sampling to choose 278 full-time teacher respondents from 700 teachers. The 250 respondents were selected to test the questionnaire that was also validated by experts on the field. Using the Qualtrics calculator with 5% margin of error.

4.3. Research Instrument

Survey needs to be addressed face-to-face to the respondents. A research method that involves collecting responses from respondents to understand objective facts was employed. To understand the understanding and cognition of information technology leadership and influencing factors among school principals, the researcher used an adapted questionnaire "School administrators' Perception of their Information Technology Leadership Preparedness" by Zhong (2022) for Parts 1 and 2. Then, the researcher drafted Part 3 of the questionnaire which assesses the factors affecting the informatization leadership of principals. It was then be subjected to reliability tests and validation by experts before fielding them to the respondents.

5. RESULTS AND DISCUSSIONS

1. Profile of Respondents

Table 1 Profiles of the Teacher-Respondents

Variables	Indicators	Frequency	Percentage
Age	20-30 y/o	179	64.0
	31-40 y/o	65	23.0
	41-50 y/o	28	10.0
	51 y/o and above	6	2.0
	Total	278	100.0
Sex	Male	71	26.0
	Female	207	74.0
	Total	278	100.0
Tenure	1-5 years	180	65.0
	6-10 years	40	14.0
	11-15 years	26	9.0
	16-20 years	18	6.0
	21 years and above	14	5.0
	Total	278	100.0

In terms of the profiles of teacher-respondents, the majority

of the respondents' age grouping were apparent by 20-30 years old followed by 31-40 years old. According to sex, the majority of them were female. Likewise, the majority of the respondents' tenure were evident by 1-5 years followed by 6-10 years. The demographic profile of teacher-respondents, characterized by a predominantly young, female workforce with relatively short tenures, suggests implications for leadership practices in the context of advancing a China vocational school through informatization. Principals should recognize the potential receptivity of younger teachers to

technological innovations and the need for inclusive leadership approaches that address gender imbalances. Moreover, strategies should be tailored to engage and support the diverse experiences and needs of teachers, leveraging their dynamic nature to drive forward the school's advancement agenda through effective informatization leadership practices.

2. Informatization leadership practice of the principals as assessed by the teacher respondents in terms of the following ISTE standards for educational leaders

Table 2 Informatization Leadership Practice of the Principals based on ISTE Standards for Educational Leaders in terms of Equity and Citizenship Advocate

Indicators	Mean	SD	Interpretation	Rank
My principal ensure all students have skilled teachers who actively use technology to meet student learning needs.	3.55	0.62	Always	3
My principal ensures all students have access to the technology and connectivity necessary to participate in authentic and engaging learning opportunities.	3.54	0.64	Always	4
My principal models digital citizenship by critically evaluating online resources, engaging in civil discourse online and using digital tools to contribute to positive social change.	3.50	0.68	Often	5
My principal cultivates responsible online behavior, including the safe, ethical and legal use of technology	3.57	0.64	Always	2
My principal encourages teachers to train in online skills and ethics.	3.59	0.62	Always	1
My principal gives teachers opportunities to catch up to the current trends of technology in education.	3.57	0.65	Always	2
My principal fosters collaborative development when it comes of technological aspects in the institution.	3.54	0.67	Always	4
Composite	3.55	0.65	Always	

Scale: 4.00-3.51=Always; 3.50-2.51=Often; 2.50-1.51=Sometimes; 1.50-1.00=Never

In terms of equity and citizenship advocate, the informatization leadership practice of the principals based on ISTE standards for educational leaders yielded a composite mean score of 3.55 with a 0.65 corresponding standard deviation. This implied that equity and citizenship advocate of the principals was always practice as demonstrated by their informatization leadership.

Of all the indicators, the respondents extremely perceived that their principal encourages teachers to train in online skills and ethics as evident by the highest mean score. Meanwhile, they often experienced that their principal showed digital citizenship by critically evaluating online resources, engaging in civil discourse online and using digital tools to contribute to positive social change.

The high correlation between principals' leadership practices and informatization stems from their proactive approach to integrating technology in education while prioritizing equity and citizenship advocacy. Principals who support digital literacy and ethical behavior among teachers demonstrate a deep understanding of the transformative potential of technology in enhancing learning outcomes (Pierce, 2004; Jin, 2022). By aligning with ISTE standards, these leaders ensure that their initiatives are grounded in global best practices, fostering a culture of innovation and continuous improvement.

Moreover, the consistent implementation of these practices reflects strong leadership and organizational culture within the school (Zhang, 2022). Principals who prioritize digital citizenship initiatives create an environment where responsible technology use is ingrained in the school's ethos

(Xiaohong & Ce, 2022; Su, 2022). This commitment not only prepares students for the demands of the digital age but also cultivates a sense of social responsibility and critical thinking, empowering them to navigate online spaces with integrity and empathy. These leadership practices pave the way for inclusive and socially responsible learning environments where students are equipped with the skills and competencies needed to thrive in a rapidly evolving digital landscape.

In terms of visionary planner, the informatization leadership practice of the principals based on ISTE standards for educational leaders yielded a composite mean score of 3.53 with a 0.65 corresponding standard deviation. This implied that the characteristics of the principals as a visionary planner was always practice as demonstrated by their informatization leadership.

Specifically, the respondents believed that their principal always shares lessons learned, best practices, challenges and the impact of learning with technology with other education leaders who want to learn from this work as evident by the highest mean score. Contrariwise, the respondents often experience that their principal builds shared vision by collaboratively creating a strategic plan that articulates how technology was used to enhance learning.

The study underscores the significant role principals play as visionary planners in driving educational advancement through technology integration. Their consistent implementation of visionary planning principles reflects a deep understanding of the transformative potential of technology in education. Principals excel in sharing lessons, best practices, and challenges with other leaders, indicating a commitment to fostering a culture of knowledge exchange within the educational community (Huijin, 2022; Hongtao,

2022). However, the study also highlights areas for improvement, particularly in collaboratively creating strategic plans for technology integration. This suggests a

need for principals to engage stakeholders more effectively in vision-building processes, thereby ensuring a more inclusive and comprehensive approach to technological advancement.

Table 3 Informatization Leadership Practice of the Principals based on ISTE Standards for Educational Leaders in terms of Visionary Planner

Indicators	Mean	SD	Interpretation	Rank
My principal engages education stakeholders in developing and adopting a shared vision for using technology to improve student success, informed by the learning sciences	3.53	0.64	Always	2
My principal builds on the shared vision by collaboratively creating a strategic plan that articulates how technology will be used to enhance learning.	3.50	0.67	Often	4
My principal evaluates progress on the strategic plan, make course corrections, measure impact and scale effective approaches for using technology to transform learning.	3.53	0.64	Always	2
My principal communicates effectively with stakeholders to gather input on the plan, celebrate successes and engage in a continuous improvement cycle.	3.51	0.65	Always	3
My principal shares lessons learned, best practices, challenges and the impact of learning with technology with other education leaders who want to learn from this work.	3.56	0.63	Always	1
My principal makes him/herself acquainted with the direction of innovations and tries to make their own advancements.	3.53	0.66	Always	2
My principal focuses technological innovations and advancements in the institution based on the needs of the members of the community.	3.51	0.66	Always	3
Composite	3.53	0.65	Always	

Scale: 4.00-3.51=Always; 3.50-2.51=Often; 2.50-1.51=Sometimes; 1.50-1.00=Never

The findings emphasize the importance of collaborative visioning and knowledge sharing in maximizing the impact of leadership on educational advancement. Principals who prioritize these practices not only drive technological innovation within their schools but also empower

stakeholders to actively participate in shaping the future of education (Holzman & Mazzini, 2020; Zhong, 2022). By fostering a culture of continuous learning and adaptation, principals create environments where educators feel empowered to leverage technology in ways that enhance student learning outcomes.

Table 4 Informatization Leadership Practice of the Principals based on ISTE Standards for Educational Leaders in terms of Empowering Leader

Indicators	Mean	SD	Interpretation	Rank
My principal empowers educators to exercise professional agency, build teacher leadership skills, and pursue personalized professional learning	3.50	0.66	Often	2
My principal builds the confidence and competency of educators to put the ISTE Standards for Students and Educators into practice.	3.50	0.69	Often	2
My principal inspires a culture of innovation and collaboration that allows the time and space to explore and experiment with digital tools.	3.50	0.67	Often	2
My principal supports educators in using technology to advance learning that meets the diverse learning, cultural, and social-emotional needs of individual students.	3.52	0.66	Always	1
My principal develops learning assessments that provide a personalized, actionable view of student progress in real time	3.50	0.67	Often	2
My principal acts as a role model in doing steps to reach the goals they set, short-term and long-term, for the institution.	3.50	0.67	Often	2
My principal lets the members of academe of the institution have their own identity that are in line with the goals of the school.	3.50	0.65	Often	2
Composite	3.50	0.67	Often	

Scale: 4.00-3.51=Always; 3.50-2.51=Often; 2.50-1.51=Sometimes; 1.50-1.00=Never

In terms of empowering leader, the informatization leadership practice of the principals based on ISTE standards for educational leaders yielded a composite mean score of 3.50 with a 0.67 corresponding standard deviation. This implied that the characteristics of the principals as an empowering leader was often practiced as demonstrated by their informatization leadership.

Of all the indicators, the respondents perceived that they their principal always supports educators in using technology to advance learning that meets the diverse learning, cultural,

and social-emotional needs of individual students. Remarkably, the rests of the indicators of empowering leader showed that the principals often practiced this aspect of informatization leadership.

The study illuminates principals' pivotal role as empowering leaders in driving educational progress through strategic technology integration. Principals' consistent adoption of visionary planning principles underscores their profound understanding of technology's transformative potential in education (Huijin, 2022; Zhang, 2022; Caeli, 2020). Their adeptness in sharing insights, best practices, and challenges with peers fosters a culture of knowledge

exchange and collaborative learning within the educational community. However, the study also identifies opportunities for improvement, particularly in involving stakeholders more inclusively in co-creating strategic blueprints for technology integration. This underscores the necessity for principals to enhance engagement to amplify the effectiveness of technological advancements (Bruso et al., 2020; Zhong, 2022).

The findings and its respective rankings underscore the intrinsic link between visionary planning, knowledge sharing,

and effective leadership in driving educational innovation. Principals, as empowering leaders, prioritize these practices, serving as catalysts for technological evolution within their institutions and empowering stakeholders to shape the educational landscape actively. Through fostering environments conducive to continuous learning and adaptation, principals create atmospheres where educators feel emboldened to leverage technology to elevate student learning outcomes (Guan, 2022).

Table 5 Informatization Leadership Practice of the Principals based on ISTE Standards for Educational Leaders in terms of Systems Designer

Indicators	Mean	SD	Interpretation	Rank
My principal leads teams to collaboratively establish robust infrastructure and systems needed to implement the strategic plan.	3.47	0.66	Often	5
My principal ensures that resources for supporting the effective use of technology for learning are sufficient and scalable to meet future demand.	3.47	0.68	Often	5
My principal protects privacy and security by ensuring that students and staff observe effective privacy and data management policies.	3.53	0.65	Always	1
My principal establishes partnerships that support the strategic vision, achieve learning priorities and improve operations	3.51	0.66	Always	2
My principal ensures that processes are systematically applied and are updated regularly based on responses to encountered issues.	3.48	0.66	Often	4
My principal ensures that policies are efficiently implemented and are amended in accordance to the needs of the community.	3.47	0.68	Often	5
My principal always follows a plan that features a structured system that is explained and understood by everyone who will apply and implement it.	3.50	0.67	Often	3
Composite	3.49	0.67	Often	

Scale: 4.00-3.51=Always; 3.50-2.51=Often; 2.50-1.51=Sometimes; 1.50-1.00=Never

In terms of systems designer, the informatization leadership practice of the principals based on ISTE standards for educational leaders yielded a composite mean score of 3.49 with a 0.67 corresponding standard deviation. This implied that the characteristics of the principals as a systems designer was often practiced as demonstrated by their informatization leadership.

Specifically, the teachers perceived that their principal highly protects privacy and security by ensuring that students and staff observe effective privacy and data management policies as evident by the highest mean score, followed by always following a plan that features a structured system which is explained and understood by everyone who will apply and implement it. Furthermore, the lowest mean score among the indicators of systems designer was equally apparent by principal leading the teams to collaboratively establish robust infrastructure and systems needed to implement the strategic plan; ensuring that resources for supporting the effective use of technology for learning are sufficient and scalable to meet future demand and; ensuring that policies are efficiently implemented and are amended in accordance to the needs of the community.

The findings reveal a high correlation between principals' practices as systems designers and their leadership in informatization, underscoring the pivotal role of visionary

leadership in driving technological innovation within educational settings. Principals' adeptness in orchestrating technological initiatives reflects their strategic vision for integrating technology into teaching and learning practices (Minggen, 2022). Their consistent implementation of these practices underscores a deep understanding of the complexities involved in designing systems that support effective technology use, emphasizing their role as architects of educational change (Hongtao, 2022; Izzah et al., 2020). Moreover, principals' emphasis on protecting privacy and security demonstrates their commitment to ethical leadership in the digital age, fostering a secure learning environment essential for student well-being and academic success.

However, the identified areas for improvement, particularly in collaborative decision-making, resource allocation, and policy implementation, highlight the ongoing challenges faced by principals in navigating the complexities of technology integration. Addressing these challenges requires fostering a culture of collaboration, strategic resource allocation, and policy adaptation to meet the evolving needs of the school community (Jianzhong, 2022; Zhang, 2022). Prioritizing these areas for improvement will enhance principals' effectiveness as systems designers and leaders, driving technological innovation and fostering inclusive and forward-thinking educational environments that prepare students for success in the digital era.

Table 6 Informatization Leadership Practice of the Principals based on ISTE Standards for Educational Leaders in terms of Connected Learner

Indicators	Mean	SD	Interpretation	Rank
My principal sets goals to remain current on emerging technologies for learning, innovations in pedagogy, and advancements in the learning sciences.	3.52	0.63	Always	1
My principal participates regularly in online professional learning networks to collaboratively learn with and mentor other professionals.	3.50	0.67	Often	3
My principal uses technology to regularly engage in reflective practices that support personal and professional growth.	3.50	0.65	Often	3
My principal develops the skills needed to lead and navigate change, advance systems and promote a mindset of continuous improvement for how technology can improve learning.	3.50	0.67	Often	3
My principal continues to lead the development in the institution followed by teachers, students and other members of the community.	3.51	0.65	Always	2
My principal fosters continuous development and innovation through different academic and professional advancement efforts.	3.52	0.66	Always	1
My principal regards his/herself as a student of life, hence, s/he has an unending search for knowledge and improvement, which she also shares with teachers and the community.	3.49	0.67	Often	7
Composite	3.51	0.66	Always	

Scale: 4.00-3.51=Always; 3.50-2.51=Often; 2.50-1.51=Sometimes; 1.50-1.00=Never

In terms of connected learner, the informatization leadership practice of the principals based on ISTE standards for educational leaders yielded a composite mean score of 3.51 with a 0.66 corresponding standard deviation. This implied that the characteristics of the principals as a connected learner was always practiced as demonstrated by their informatization leadership.

Particularly, the characteristics of the principals to set goals to remain current on emerging technologies for learning, innovations in pedagogy, and advancements in the learning sciences and fostering continuous development and innovation through different academic and professional advancement efforts equally yielded the highest mean score among the indicators of connected learner. Furthermore, the lowest mean score was apparent by the characteristics of the principal to regard his/herself as a student of life, hence, he/she has an unending search for knowledge and improvement, which she also shares with teachers and the community.

The findings underscore the symbiotic relationship between principals' practices as connected learners and their effectiveness in driving informatization leadership within educational contexts. Principals consistently exhibit characteristics associated with being connected learners, demonstrating a proactive commitment to staying updated on emerging technologies, pedagogical innovations, and advancements in the learning sciences (Nada, 2020; Ozgul, 2021; Zhang, 2022). This dedication to continuous learning aligns closely with their role as leaders, enabling them to effectively navigate the complexities of technology integration and lead their schools towards educational excellence in the digital age (Jiang, 2022; Jin, 2022).

Principals' emphasis on fostering a culture of continuous development and innovation among teachers and the community further strengthens their leadership in

informatization. Setting goals for professional advancement and sharing knowledge and experiences cultivates an environment where learning is valued and encouraged (Lele & Tianqui, 2022). This collaborative approach empowers teachers to embrace new technologies and teaching methodologies, fostering a collective responsibility for driving educational innovation. Thus, the high correlation between principals' practices as connected learners and their leadership in informatization highlights the transformative potential of lifelong learning in shaping vibrant and forward-thinking learning environments, preparing students for success in an increasingly digital world.

Table 7 Overall Assessments of Informatization Leadership Practice of the Principals based on ISTE Standards for Educational Leaders

Variables	Mean	SD	Interpretation	Rank
Equity and Citizenship Advocate	3.55	0.65	Always	1
Visionary Planner	3.53	0.65	Always	2
Empowering Leader	3.50	0.67	Often	4
System Designer	3.49	0.67	Often	5
Connected Learner	3.51	0.66	Always	3
Overall	3.52	0.66	Always	--

Scale: 4.00-3.51=Always; 3.50-2.51=Often; 2.50-1.51=Sometimes; 1.50-1.00=Never

Based on Table 7, principals always practiced their informatization leadership in terms of equity and citizenship advocate, visionary planner and connected leader. On the other hand, the aspects of informatization leadership in terms

of empowering leaders and system designer were just often practiced by the principals.

The observed high correlation between principals' practices in informatization leadership, particularly in equity and citizenship advocacy, visionary planning, and connected leadership, can be attributed to several key factors. Principals who consistently demonstrate these practices are likely to possess a deep understanding of the importance of leveraging technology to promote inclusivity, strategic visioning, and continuous learning within the school community (Salceanu, 2022; Su, 2022). By prioritizing equity and citizenship advocacy, principals create environments where all students have equal access to technology and opportunities for digital citizenship development, fostering a sense of belonging and social responsibility among learners.

Similarly, principals who excel in visionary planning and connected leadership are adept at setting goals for technological advancement and fostering collaborative

learning environments. Their proactive approach to staying updated on emerging technologies and pedagogical innovations ensures that the school remains at the forefront of educational innovation (Xiaohui, 2022). However, the observed gap in the extent to which principals practice empowering leadership and system design principles suggests opportunities for improvement. Principals who empower educators and design robust systems to support technology integration effectively are better equipped to drive meaningful change and innovation within their schools. Addressing these gaps can further enhance the impact of principals' leadership on advancing the school's informatization initiatives and promoting a culture of innovation and empowerment among staff and students.

Difference on the assessment of teacher respondents on their principals' informatization leadership in terms of the ISTE standards for educational leaders when their profile is used as test factors

Table 8 Difference in the Assessments of Principals' Informatization Leadership based on ISTE Standards for Educational Leaders by Teachers' Sex

Variables	Mean		t-value	sig	Decision Ho	Interpretation
	Male	Female				
Equity and Citizenship Advocate	4.00	3.39	13.098	.000	Reject	Significant
Visionary Planner	4.00	3.36	13.619	.000	Reject	Significant
Empowering Leader	4.00	3.33	14.111	.000	Reject	Significant
System Designer	4.00	3.32	14.450	.000	Reject	Significant
Connected Learner	4.00	3.34	14.139	.000	Reject	Significant
Overall	4.00	3.35	13.883	.000	Reject	Significant

Using a T-Test of Independent Samples, the difference in the assessments of principals' informatization leadership based on ISTE standards for educational leaders when grouped according to respondents' sex yielded significant findings in terms of equity and citizenship advocate, visionary

planner, empowering leaders, system designer and connected leader. The null hypothesis was rejected at a 5% level of significance. This implied that male and female respondents had different assessments on the principals' informatization leadership based on ISTE standards for educational leaders.

Table 9 Difference in the Assessments of Principals' Informatization Leadership based on ISTE Standards for Educational Leaders by Teachers' Age

Variables	Age	Mean	F-value	sig	Decision Ho	Interpret
Equity and Citizenship Advocate	20-30 y/o	3.98	1382.367	.000	Reject	Significant
	31-40 y/o	3.02				
	41-50 y/o	2.39				
	51 y/o & >	1.95				
Visionary Planner	20-30 y/o	3.95	822.264	.000	Reject	Significant
	31-40 y/o	3.00				
	41-50 y/o	2.35				
	51 y/o & >	2.00				
Empowering Leader	20-30 y/o	3.93	650.177	.000	Reject	Significant
	31-40 y/o	3.00				
	41-50 y/o	2.29				
	51 y/o & >	1.93				
System Designer	20-30 y/o	3.91	607.209	.000	Reject	Significant
	31-40 y/o	3.00				
	41-50 y/o	2.26				
	51 y/o & >	2.00				
Connected Learner	20-30 y/o	3.93	595.517	.000	Reject	Significant
	31-40 y/o	3.00				
	41-50 y/o	2.33				
	51 y/o & >	1.98				
Overall			811.507	.000	Reject	Significant

The significant differences in assessments of principals' informatization leadership by male and female respondents underscore the intricate interplay between gender perspectives and leadership practices within educational contexts. These findings suggest that male and female educators may perceive and evaluate leadership through different lenses, influenced by their unique experiences, backgrounds, and societal norms (Zhong, 2022; Yajuan, 2023). While male respondents may prioritize certain leadership qualities or approaches, female respondents may value different aspects of leadership, leading to variations in their perceptions of principals' informatization leadership.

These nuanced differences in perception highlight the importance of considering diverse perspectives in leadership evaluation and development. Principals must recognize and appreciate the varied experiences and expectations of their staff, regardless of gender, to effectively lead in today's diverse educational landscape (Yuanhua, 2023). Tailoring leadership strategies to accommodate these diverse perspectives can enhance inclusivity and promote a more equitable school environment where all stakeholders feel valued and supported.

Furthermore, these findings serve as a catalyst for principals to reflect on and adapt their leadership approaches to better align with the needs and expectations of all members of the school community. By embracing a more inclusive leadership style that acknowledges and respects gender

diversity, principals can foster a culture of empowerment and collaboration, ultimately enhancing the effectiveness of their informatization leadership initiatives.

Using F or ANOVA Test, the difference in the assessments of principals' informatization leadership based on ISTE standards for educational leaders when grouped according to respondents' age yielded significant findings in terms of equity and citizenship advocate, visionary planner, empowering leaders, system designer and connected leader. The null hypothesis was rejected at a 5% level of significance. This implied that irrespective of age groupings the respondents had different assessments on the principals' informatization leadership based on ISTE standards for educational leaders.

The high correlation between principals' leadership practices and informatization across different dimensions can be attributed to several key factors. Principals who demonstrate strong leadership qualities, such as being visionary planners, empowering leaders, and connected learners, are better equipped to drive the integration of technology within educational settings (Yuhuan & Jienan, 2022; Brusio, 2020). Their proactive approach to setting goals, fostering collaboration, and staying updated on emerging technologies enables them to effectively navigate the complexities of technology integration and lead their schools towards educational excellence in the digital age.

Table 10 Post Hoc ANOVA Test on the Difference in the Assessments of Principals' Informatization Leadership based on ISTE Standards for Educational Leaders by Teachers' Age

Variable	Age	Mean	20-30 y/o	31-40 y/o	41-50 y/o	51 y/o & >
			3.98	3.02	2.39	1.95
Equity and Citizenship Advocate	20-30 y/o	3.98		*	*	*
	31-40 y/o	3.02	*		*	*
	41-50 y/o	2.39	*	*		*
	51 y/o & >	1.95	*	*	*	
Variable	Age	Mean	20-30 y/o	31-40 y/o	41-50 y/o	51 y/o & >
			3.95	3.00	2.35	2.00
Visionary Planner	20-30 y/o	3.95		*	*	*
	31-40 y/o	3.00	*		*	*
	41-50 y/o	2.35	*	*		*
	51 y/o & >	2.00	*	*	*	
Variable	Age	Mean	20-30 y/o	31-40 y/o	41-50 y/o	51 y/o & >
			3.93	3.00	2.29	1.93
Empowering Leader	20-30 y/o	3.93		*	*	*
	31-40 y/o	3.00	*		*	*
	41-50 y/o	2.29	*	*		*
	51 y/o & >	1.93	*	*	*	
Variable	Age	Mean	20-30 y/o	31-40 y/o	41-50 y/o	51 y/o & >
			3.91	3.00	2.26	2.00
System Designer	20-30 y/o	3.91		*	*	*
	31-40 y/o	3.00	*		*	*
	41-50 y/o	2.26	*	*		*
	51 y/o & >	2.00	*	*	*	
Variable	Age	Mean	20-30 y/o	31-40 y/o	41-50 y/o	51 y/o & >
			3.93	3.00	2.33	1.98
Connected Learner	20-30 y/o	3.93		*	*	*
	31-40 y/o	3.00	*		*	*
	41-50 y/o	2.33	*	*		*
	51 y/o & >	1.98	*	*	*	

*Significant at .05 level.

Leadership practices that prioritize equity and citizenship advocacy create inclusive and socially responsible learning environments conducive to successful informatization. Principals who advocate for equity ensure that all students have equal access to technology and opportunities for digital citizenship development, fostering a sense of belonging and social responsibility among learners (Zhang, 2022). Furthermore, principals who foster a culture of continuous development and innovation among teachers and the community create environments where technology is embraced and effectively utilized to enhance teaching and learning practices.

Leadership practices such as being a systems designer are essential for designing robust systems to support technology integration effectively. Principals who prioritize system design ensure that resources, infrastructure, and policies are in place to facilitate the seamless integration of technology into teaching and learning practices (Zhang, 2022). Aligning leadership practices with the goals and principles of informatization, principals can maximize the impact of their leadership on advancing technology integration initiatives and promoting a culture of innovation and empowerment within the school community.

Using a Sheffé Test, the post hoc ANOVA test on the difference in the assessments of principals' informatization leadership based on ISTE standards for educational leaders when grouped according to respondents' age yielded

significant findings on all pairs of age groupings across all its variables.

The correlation between principals' leadership practices and informatization stems from several key factors. Effective leadership practices such as visionary planning, empowerment, and continuous learning create an environment conducive to technological integration within educational settings. Principals who prioritize these practices demonstrate a strategic vision for leveraging technology to enhance teaching and learning outcomes. Their proactive approach to setting goals, fostering collaboration, and staying updated on emerging technologies enables them to effectively navigate the complexities of technology integration and lead their schools towards educational excellence in the digital age (Blizzard, 2020; Halbusi et al., 2021).

Furthermore, leadership practices that prioritize equity and citizenship advocacy foster inclusivity and social responsibility, essential components of successful informatization. Principals who advocate for equity ensure that all students have equal access to technology and opportunities for digital citizenship development, fostering a sense of belonging and social responsibility among learners (Jiang, 2022). By creating an inclusive and socially responsible learning environment, principals pave the way for successful technology integration and promote a culture of innovation and empowerment within the school community.

Table 11 Difference in the Assessments of Principals' Informatization Leadership based on ISTE Standards for Educational Leaders by Teachers' Tenure

Variables	Tenure	Mean	F-value	sig	Decision Ho	Interpret
Equity and Citizenship Advocate	1-5 years	3.97	1419.584	.000	Reject	Significant
	6-10 years	3.95				
	11-15 years	3.92				
	16-20 years	3.91				
	21 years & >	3.92				
Visionary Planner	1-5 years	3.03	683.986	.000	Reject	Significant
	6-10 years	3.00				
	11-15 years	3.00				
	16-20 years	3.00				
	21 years & >	3.00				
Empowering Leader	1-5 years	3.00	519.468	.000	Reject	Significant
	6-10 years	3.00				
	11-15 years	3.00				
	16-20 years	3.00				
	21 years & >	3.00				
System Designer	1-5 years	2.50	482.479	.000	Reject	Significant
	6-10 years	2.44				
	11-15 years	2.33				
	16-20 years	2.29				
	21 years & >	2.40				
Connected Learner	1-5 years	1.98	480.065	.000	Reject	Significant
	6-10 years	2.00				
	11-15 years	1.97				
	16-20 years	2.00				
	21 years & >	1.99				
Overall			717.117	.000	Reject	Significant

Additionally, leadership practices such as being a systems designer are essential for designing robust systems to support technology integration effectively. Principals who prioritize

system design ensure that resources, infrastructure, and policies are in place to facilitate the seamless integration of technology into teaching and learning practices (Jianzhong,

2022). By aligning leadership practices with the goals and principles of informatization, principals can maximize the impact of their leadership on advancing technology integration initiatives and promoting a culture of innovation and empowerment within the school community. The correlation between principals' leadership practices and informatization underscores the integral role of visionary leadership, strategic planning, and ethical decision-making in driving technological innovation and educational advancement within schools.

Using F or ANOVA Test, the difference in the assessments of principals' informatization leadership based on ISTE standards for educational leaders when grouped according to respondents' tenure yielded significant findings in terms of equity and citizenship advocate, visionary planner, empowering leaders, system designer and connected leader. The null hypothesis was rejected at a 5% level of significance. This implied that irrespective of tenure the respondents had different assessments on the principals' informatization leadership based on ISTE standards for educational leaders.

The strong correlation between principals' leadership practices and informatization reflects their proactive and strategic approach to technology integration in educational settings. Principals who embody qualities such as visionary planning, empowerment, and continuous learning are better positioned to drive the effective use of technology in teaching and learning. They set clear goals, foster collaboration, and stay updated on emerging technologies, fostering an environment conducive to innovation and educational excellence in the digital age. Moreover, leadership practices that prioritize equity and citizenship advocacy ensure that technology is accessible to all students, promoting digital citizenship development and fostering inclusivity and social responsibility among learners. Principals who champion these principles create an environment where technology is embraced and utilized to enhance teaching and learning outcomes (Ruijing, 2022; Shiyun, 2022; Su, 2022).

Additionally, effective leadership practices such as being a systems designer are essential for establishing robust infrastructures to support technology integration seamlessly. Principals who prioritize system design ensure that resources, infrastructure, and policies are in place to facilitate the integration of technology into educational practices. By aligning their leadership practices with the goals and principles of informatization, principals can maximize their impact on advancing technology integration initiatives and fostering a culture of innovation and empowerment within the school community (Zhong, 2022). The correlation between principals' leadership practices and informatization underscores the critical role of visionary leadership, strategic planning, and ethical decision-making in driving technological innovation and educational advancement within schools.

6. Conclusion

1.The demographic profile of teacher-respondents, predominantly consisting of young, female educators with relatively short tenures, suggests specific implications for leadership practices in advancing a China vocational school through informatization.

2.Principals demonstrate alignment with equity and citizenship advocacy, promoting digital literacy and ethical behavior among teachers. While visionary planning principles are consistently implemented, collaborative

strategic planning requires improvement. Characteristics of empowering leadership are evident, with opportunities for further enhancement. Systems design principles prioritize privacy and security, yet improvements in infrastructure and resource provision are needed. Principals consistently exhibit characteristics of connected learners, with opportunities for improvement in lifelong learning and knowledge sharing.

3.Significant differences found in assessments of principals' informatization leadership by male and female respondents emphasize the need for gender-inclusive leadership evaluation. Variations in assessments across age groups underscore the importance of adaptable leadership approaches to ensure inclusivity and effectiveness. Differences in assessments across tenures highlight the need for leadership strategies that accommodate diverse perspectives and needs within educational institutions.

4.Teachers' perceptions of factors influencing principals' leadership reveal crucial implications for style, vision, and technology integration. Significant influence of IT investment, resource allocation, governance practices, and external factors on principals' leadership underscores the importance of addressing these areas for effective technology integration.

5.Variations in assessments of factors affecting leadership by gender, age, and tenure highlight the need for inclusive leadership practices tailored to diverse perspectives. Gender, age, and tenure influence perceptions of leadership factors, emphasizing the importance of accommodating these differences in leadership development and implementation.

6.Significant correlations between principals' leadership practices and influencing factors highlight the critical role of addressing key factors for effective technology integration and improved teacher performance.

7. Recommendations

In today's education landscape, effective leadership is vital for integrating technology successfully and enhancing teaching and learning. By analyzing teacher perceptions and correlations between leadership practices and influencing factors, valuable insights have emerged. These insights form the basis of tailored recommendations to empower educational leaders in driving positive change within their institutions. Implementing these recommendations can foster effective leadership cultures that maximize the impact of technology integration and improve teaching and learning outcomes.

1.Develop targeted leadership development programs tailored to the demographic profile of young, female educators with relatively short tenures. Provide mentorship opportunities and training programs specifically designed to empower and support this demographic in leadership roles.

2.Provide training and support for principals to enhance collaborative strategic planning for technology integration. Foster a culture of continuous learning and knowledge sharing among educational leaders to promote innovative practices and keep pace with technological advancements.

3.Implement gender-inclusive leadership evaluation processes and training programs to address diverse perspectives and promote equitable leadership practices. Offer professional development opportunities tailored to educators of different age groups and tenures to enhance inclusivity and effectiveness in leadership roles.

4.Invest in IT infrastructure and resources to support effective technology integration in education. Develop clear governance policies and practices to ensure compliance with

data privacy regulations and provide adequate support for teachers in navigating technology use. Strengthen partnerships with technology firms and community stakeholders to leverage external resources and expertise for enhanced technology integration.

5. Tailor leadership development programs to address gender, age, and tenure-related differences in perceptions of leadership factors. Foster a culture of diversity and inclusivity in educational leadership, promoting awareness and understanding of varied perspectives to enhance collaboration and effectiveness.

6. Address key factors influencing leadership practices, such as IT investment, resource allocation, governance policies, and external partnerships, to promote effective technology integration and improve teaching and learning outcomes. Provide ongoing support and professional development opportunities for educational leaders to enhance their capacity for leading successful informatization initiatives.

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