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Factors Influencing the Leadership of College Presidents in the Informationization Era

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Abstract

Background: Chinese universities have established information technology infrastructure. However, the transformative impact of IT on education requires further exploration. With the development of information technology in Chinese universities, there are challenges in leveraging IT to transform education effectively. Efforts such as expanding online learning spaces and promoting information technology in education management have been emphasized in government plans. The focus for university leaders is now shifting towards promoting specific IT applications in teaching and campus governance. University headmasters need to integrate information technology into classroom teaching and school management to drive impactful changes in education and administration. The research objectives are as follows: 1) To identify and analyze the effect of IT literacy on school principals' leadership. 2) To examine the effect of informatization planning ability on the informatization leadership of principals 3) To assess the effect of informatization management ability on the informatization leadership of principals. 4) To examine the effect of informatization assessment ability on the informatization leadership of principals.

Method: The researcher chose a quantitative study to generate numerical data for analysis, focusing on the descriptive relationship between variables. Questionnaires were distributed to headmasters across various regions in China via https://www.wjx.cn/login.aspx. Subsequently, 201 valid questionnaires were collected and screened for analysis.

Results: The impact of principal informational literacy on principal informational leadership is a very important and complex topic. From the final path coefficient, the principal informatization literacy path coefficient is 0.495, which is relatively high compared to the path coefficients of several other factors. This indicates that the principal's informatization literacy ability has a greater impact on the principal's informatization leadership. According to the path coefficient analysis results, the path coefficient of the principal's informational planning competence is 0.234, which is low compared to the path coefficients of the other influencing factors. This may mean that the respondents do not have a positive view of the principal's informational planning competence in influencing the principal's informational leadership. According to the path coefficient analysis results, the path coefficient of the principal's informatization management ability is 0.532, and it is significantly positively affecting the principal's informatization leadership, the highest path coefficient among the four influencing factors. This indicates that the principal's informatization management competence has a greater influence on the principal's informatization leadership. The path coefficient of principal informatization assessment competence is 0.172 indicates that principal informatization assessment competence has some influence on principal informatization leadership, but the influence is relatively weak. In other words, principal informatization assessment competence's role in principal informatization leadership is relatively small.

Conclusions: The following four conclusions were drawn by analyzing the path coefficients. Information technology literacy is positive for the informationization leadership of principals. Informationization planning capability is positive for the informationization leadership of principals. Informationization management capability is positive for the informationization leadership of principals. Informationization assessment capability is positive for the informationization leadership of principals.

Keywords: Informatization Era; Influencing Factors; Leadership of College Presidents

Introduction

With the gradual development of information technology in education, the information technology infrastructure of Chinese universities has taken shape (Bass, 1995) (Collinson & Grint, 2005) Information technology has become the norm for use regularly and universally in education and teaching. However, as an endogenous variable that transforms the education system, the revolutionary impact of IT on education and teaching has yet to be further deepened. Specifically, there are two main problems. Firstly, the effect of information technology in changing teaching and learning styles is not yet obvious; secondly, there is still much room for improvement in relying on information technology

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to enhance education teaching and management (Jr, (2011) As for the former, the 13th Five-Year Plan for Education Informatization requires that "innovative application models for the construction of online learning spaces for all be expanded from serving classroom learning to support ubiquitous learning based on the Internet"; through "The Ministry of Education (MOE) has formulated and issued a series of guidelines for the development of information technology and education (Bai et al, 2014). For the latter, the Ten-Year Development Plan for Education Informatization (2011-2020) issued by the Ministry of Education once again emphasizes the need to "vigorously promote the informatization of education management and promote the scientificization of educational decision-making and the standardization of school management" across the board (Benard, 2012) With the deep integration of information technology and education teaching in China, today's headmasters need to focus not only on the construction of information technology infrastructure in schools but also on the existing information technology infrastructure in schools, adjusting their focus from the construction of hardware equipment to the promotion of specific applications of information technology in education teaching and campus governance in due course. It is, therefore, incumbent upon university headmasters to consider how to integrate information technology into classroom teaching and school management and to systematically promote changes in education, teaching, and school management.

Theory of educational change is any meaningful transformation of the current state of education, and the essence of information technology in education is to innovate and facilitate educational change (Erdia, 2018) The current construction of information technology in education is reflected in large-scale comprehensive educational change, and the process of educational change and information technology in education is advancing in parallel (Deng, 2012) While current informatization shows a bright future for education, it is also important to recognize that the social role played by any technology depends on the user and that the application of information technology in education cannot naturally create miracles. Education is a dynamic and non-linear development (Duan, Chunyu., 2020) The development of information technology has triggered a wave of information technology in education, bringing about a major shift in the human teaching model and forcing educational leaders to recognize the general direction of educational reform and learn how to apply information technology to promote educational development and reform. Although education departments, schools, and other subjects have gradually recognized the role of information technology in education, there are still obstacles at the management level to promote overall educational change fully, as information technology in education involves many elements such as resource allocation, cross-sectoral communication, and integration. The speed and effectiveness of the education informatization process depend to a large extent on the school headmaster's understanding of education informatization and is also influenced by the decisions of school-level leaders, which requires the headmaster to recognize the importance of promoting education informatization and enhance informatization leadership (Friedel, 2010) In the increasingly digital world, the role of school principals is evolving, and their leadership skills must adapt to guide schools through the information age effectively. This study examines the influence of various information technology competencies on the informationization leadership abilities of school principals. The proposed conceptual framework consists of four independent variables (IT literacy, informatization planning capability, informationization management capability, and informationization assessment capability) and one dependent variable (informationization leadership of principals).

Educational change is any meaningful transformation of the current state of education, and the essence of IT in education is to innovate and facilitate educational change. The current construction of IT in education is reflected in large-scale comprehensive educational change, and the process of educational change and IT in education is advancing in parallel. While current informatization shows a bright future for education, it is also important to recognize that the social role played by any technology depends on the user and that the application of IT in education cannot naturally create miracles. Education is a dynamic and non-linear evolution (Tyssen et al, 2013). volution of IT has triggered a wave of IT in education, bringing about a major shift in the human teaching model and forcing educational leaders to recognize the general direction of educational reform and learn how to apply IT to promote educational evolution and reform. Although education departments, schools, and other subjects have gradually recognized the role of IT in education, there are still obstacles at the management level to fully promote overall educational change, as IT in education involves several

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elements such as resource allocation, cross-sectoral communication, and integration. The speed and effectiveness of the education informatization process largely depend on the school Therefore, a research study was conducted on Factors Influencing the Leadership of College Presidents in the Informationization Era to further develop and improve the Leadership of College Presidents.

Research Objectives

The research objectives of this study include the following aspects.

Objective 1: To identify and analyze the effect of IT literacy on school principals' leadership.

Objective 2: To examine the effect of informatization planning ability on informatization leadership of principals

Objective 3: To assess the effect of informatization management ability on the informatization leadership of principals.

Objective 4: To examine the effect of informatization assessment ability on the informatization leadership of principals.

Literature Review

This thesis review is a study of the research problem, concepts, and theories on leadership of university administration, including leadership for university presidents, information leadership, and IT leadership for administrators from documents, textbooks, books, dissertations, dissertations, articles, online journals, newspapers, electronic media, websites to analyze and synthesize all data on factors that influence various aspects of leadership of college presidents to obtain conclusions and recommendations of this research.

Conceptual Framework

The proposed conceptual framework consists of four independent variables (IT literacy, informatization planning capability, informationization management capability, and information assessment capability) and one dependent variable (informationization leadership of principals). The relationships between these variables are represented by the four research hypotheses: IT Literacy: The first variable, IT literacy, refers to a principal' ability to understand, use, and evaluate various information technologies for educational purposes. It is hypothesized that IT Literacy is positive for Informationization Leadership of Principals (H1).

Informationization Planning Capability: This variable encompasses a principal' s ability to develop strategic plans and goals for implementing IT resources in their schools. The conceptual framework posits that Informationization Planning Capability is a positive
to Informationization Leadership of Principals (H2).

Informationization Management Capability: The third independent variable refers to a principal' s ability to effectively allocate, control, and supervise IT resources in their schools. It is hypothesized that Informationization Management Capability is positive to Informationization Leadership of Principals (H3).

Informationization Assessment Capability: The fourth variable focuses on a principal' s ability to evaluate the efficiency and effectiveness of IT initiatives in their schools. The proposed framework suggests that Informationization Assessment Capacity is positive for Informationization Leadership of Principals (H4).

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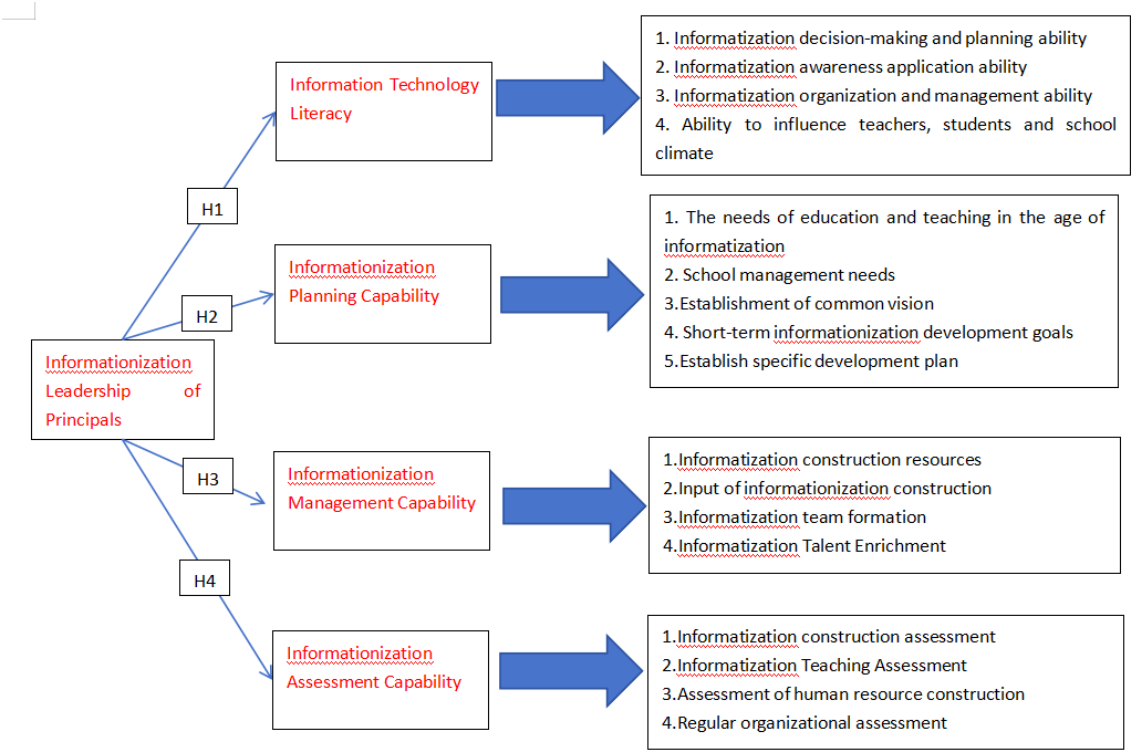

Figure 1 Conceptual Framework

Methods

In the increasingly digital world, the role of school principals is evolving, and their leadership skills must adapt to effectively guide schools through the information age [8,12]. This study examines the influence of various information technology competencies on the informationization leadership abilities of school principals. So, making the following assumptions,

H1: Information Technology Literacy is Positive to Informationization Leadership of Principals.

H2: Informationization Planning Capability is positive to Informationization Leadership of Principals.

H3: Informationization Management Capability is positive to Informationization Leadership of Principals.

H4: Informationization Assessment Capability is positive to Informationization Leadership of Principals.

Population and Sample Size

The target population refers to a collection of objects or elements related to this study According to Garver and Mentzer (1999) and Sekaran (2013), the sample size should be more than 200 to avoid any non-convergence and inappropriate solutions under normal and non-normal circumstances. Thus, the sample size for this research will be 201 Headmasters from different universities and cities in China to ensure the data is reliable and effective.

Data Collection and Analysis

Data Analysis refers to how researchers go from mass data to meaningful insights primary data will be analyzed using SPSS (Statistical Package for Social Science). In this study, the questionnaire data were analyzed using descriptive statistics, Pearson's Correlation, and test-of-measurement modeling and shown through a combination of descriptions, tables, or graphs.

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Results

Descriptive statistical analysis of the questionnaire

Age In terms of the age of the principals surveyed, principals between 45 and 50 years old accounted for the majority of the principals surveyed, which is the main force of the principal team, followed by principals between 40 and 45 years old who accounted for 21.69% of the principals surveyed, with relatively fewer principals in the age group of 35 to 40 years old, and fewer principals aged over 50 years old, who accounted for 3.7% of the principals surveyed, which shows that the middle-aged and young principals have become the backbone of the higher education. This also shows that young and middle-aged principals have become the backbone of higher education.

Gender

In terms of gender, there are 28 males (54.9%). Women accounted for 23, or 45.1%. The proportion of men and women working as head teachers is more or less equal, which is in line with the basic situation of the teaching profession in the country.

Table 1 Rate of Gender

Options	Number	Percentage
Male	127	63.18%
Female	74	36.82%
Total	201	

Educational accomplishment Among the respondents, 23 individuals (11.44%) held a Bachelor's degree, 120 individuals (59.7%) held a Master's degree, 56 individuals (27.86%) held a Doctorate, and 2 individuals (1%) had other types of degrees. In total, there were 201 respondents.

Table 2 Educational accomplishment

Options	Number	Percentage
A. Bachelor's degree	23	11.44%
B. Master’s degree	120	59.7%
C. Doctorate	56	27.86%
D.Others	2	1%
Total	201	

Work years

Among the respondents, 124 individuals (61.69%) had 2 years of experience or less, 44 individuals (21.89%) had 3 to 5 years of experience, 23 individuals (11.44%) had 6 to 10 years of experience, and 10 individuals (4.98%) had 11 years of experience or more. In total, there were 201 respondents. This suggests that some college presidents are in the middle or slightly above the middle range of tenure, possibly because they have effectively led their schools and achieved some success within this time frame. Principals with 11 or more years of tenure comprise 5.88%. This low percentage may mean that relatively few college and university presidents have long tenures or fewer presidents are replaced in periods of 20 years or more.

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Table 3 Work years

Options	Number	Percentage
A.2 years and below	124	61.69%
B.3 to 5 years	44	21.89%
C.6-10 years	23	11.44%
D.11 years and above	10	4.98%
Total	201	

Table 4 Major

Options	Number	Percentage
A. computer or information technology-related major	48	23.88%
B. non-computer or information technology-related major	153	76.12%
Total	201	

Among the respondents, 48 individuals (23.88%) had a computer or information technology-related major, while 153 individuals (76.12%) had a non-computer or information technology-related major. In total, there were 201 respondents.

This analysis suggests that most respondents did not have a computer or information technology-related major. It could indicate that individuals from various academic backgrounds are interested in or pursuing careers in computer or information technology. This diversity of backgrounds could contribute to a more interdisciplinary and dynamic workforce in the industry.

Table 5 Region

Options	Number	Percentage
A.Eastern region	29	14.43%
B.Central region	39	19.4%
C.Western region	125	62.19%
D.Northeastern region	8	3.98%
Total	201	

Among the respondents, 29 individuals (14.43%) were from the Eastern region, 39 individuals (19.4%) were from the Central region, 125 individuals (62.19%) were from the Western region, and 8 individuals (3.98%) were from the Northeastern region. In total, there were 201 respondents.

This analysis suggests that most respondents were from the Western region, with a significant percentage from the Central region as well. On the other hand, the Eastern region had the lowest number

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of respondents. This distribution could indicate regional differences in computer or information technology education and job opportunities. It would be interesting to investigate further the reasons behind these regional disparities and their impact on the industry in each region.

Table 6 Training

Options	Number	Percentage
A. Yes	131	65.17%
B. No	70	34.83%
Total	201	

Among the respondents, 131 individuals (65.17%) answered "Yes" and 70 individuals (34.83%) answered "No".

This analysis suggests that most respondents (around two-thirds) have a positive viewpoint or answered affirmatively. It is important to note that the question or context for this analysis is not provided, so it is difficult to determine the exact meaning or implications of the respondents' answers. Without further context, it is unclear whether the "Yes" or "No" response relates to a specific question or topic. Therefore, gathering more information to understand the reasons behind these responses and their significance would be beneficial.

Test of measurement modeling

As we can see from the above study, the reliability and validity of the questionnaire were tested by SPSS 22.0. Although the measured values achieved the desired results, there may be some differences in the specific measurements of the structural equation modeling software AMOS24.0, and further tests are needed to determine whether the validity, goodness of fit, and fitness of the constructed model have achieved the desired results. To ensure the validity and usability of the measurement model, the validity, discriminant validity, and fitness of the measurement model were examined in this study, and the results are as follows.

The validity of the measurement model is divided into two main aspects: discriminant validity and convergent validity, where discriminant validity means that the correlations between the potential traits represented by the different dimensions are low or significantly different. Convergent validity refers to the fact that items measuring the same underlying trait fall within the same factor dimension, and the correlation between the results of the items is high. Generally, in AMOS, discriminant validity is determined by whether the square root of a latent variable's average variance extracted (AVE) is greater than its correlation coefficient with other variables. As seen below, the square root of the AVE of each latent variable is greater than the correlation coefficients of the other variables, indicating that the latent traits represented by the different dimensions are less correlated and significantly different. Therefore, the discriminant validity of the measurement model Therefore, the discriminant validity of the measurement model is good.

Table 7 Measurement of model differentiation validity

Variables	ITL	IPC	IMC	IAC
ITL	0.786			
IPC	0.38	0.794		
IMC	0.32	0.44	0.740	
IAC	0.36	0.45	0.31	0.835

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To determine whether the convergent validity is satisfactory, it is usually considered that, under the premise that the reliability has reached the satisfactory value, a factor loading value above 0.7 indicates that the model has good convergent validity. In the analysis of structural equation modeling, the CR (Composite Reliability) and Average Variance Extracted are used as the reliability coefficients of latent variables, and it is usually considered that a value of 0.7 or above for the CR of latent variables and 0.5 or above for the Average Variance Extracted indicates good reliability of the model. It is generally believed that a value of 0.7 or above for the reliability of the combination of potential variables and a value of 0.5 or above for the mean-variance

extracted indicate that the model reliability is good. As can be seen from Table 2, the combined reliability of all latent variables is above 0.7, and the mean-variance extracted is above 0.5, which indicates that the reliability of the measurement model is good. According to Table 3, the factor loadings are all above 0.7, indicating that the convergent validity of the measurement model is satisfactory.

Table 8 Convergent validity

Item Code	Factor Load Quantity Normalization Parameter	CR	AVE
1	0.913	0.935	0.783
2	0.876		
3	0.897		
4	0.852		
5	0.844	0.907	0.709
6	0.797		
7	0.866		
8	0.869		
9	0.834	0.922	0.747
10	0.805		
11	0.925		
12	0.896		
13	0.799		
14	0.832	0.923	0.749
15	0.743		
16	0.853		
17	0.885		

The assessment of model fit mainly includes the reasonableness of the parameter estimates, the appropriate standard errors, the significance of the parameter estimates, and the judgment of the overall model fit, and the measurement of model fit mainly refers to the seven indexes given by Wu Minglong in his book "Structural Equation Modeling - Operation and Application of AMOS", as shown in Table 4. Comparing the actual measured values with the reference standards, all the measured values meet the reference standards, which means that the hypothesized model and the sample data can be well compared. This means that the hypothesized model fits well with the sample data, and thus, the model is considered a good fit.

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Table 9 Model Fitness Indicators

Fitting term	Reference Measurement Value	Measurement value
chi-squared degree of freedom	<3.0	2.17
GFI	>0.9	0.912
RMSEA	<0.05	0.034
AGFI	>0.9	0.922
NFI	The closer to 1, the better.	0.96
CFI	The closer to 1, the better.	0.94
IFI	The closer to 1, the better.	0.98

Correlation analysis of dimensions

The correlation analysis of the dimensions of principals' informatization leadership shows that all the dimensions after dimensionality reduction have significant correlations, with p-values less than 0.001. Specifically, principals' informatization literacy has a strong positive correlation with informatization planning, management, and assessment, with correlation coefficients exceeding 0.6. The correlation coefficients of informatization planning, management, and assessment are all over 0.6. In addition, the correlation coefficient between informatization management and informatization assessment reaches 0.794, showing a strong positive correlation.

Table 10 Correlation analysis of dimensions

Variables	Information Technology Literacy	Informationization Planning Capability	Informationization Management Capability	Informationization Assessment Capability
Information Technology Literacy	1			
Informationization Planning Capability	.665**	1		
Informationization Management Capability	.734**	.697**	1	
Informationization Assessment Capability	.718**	.740**	.794**	1

**. The correlation is significant at the 0.01 level (two-tailed).

The information technology informational leadership of college presidents was taken as the dependent variable, and information literacy of presidents, information technology planning, information technology management, and information technology assessment were taken as the independent variables for the analysis. As shown in the following regression analysis.

Table 11 Validation results and path coefficients

Hypothesis	Path coefficient	Significant or not	The hypothesis is valid or not.
H1	0.495***	Significant	Accepted

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Hypothesis	Path coefficient	Significant or not	The hypothesis is valid or not.
H2	0.234***	Significant	Accepted
H3	0.532***	Significant	Accepted
H4	0.172***	Significant	Accepted

The path coefficient of the principal's information literacy is 0.495, and the hypothesis test result is significant, so the proposed hypothesis is valid, that is, the principal's information literacy has a positive influence on the principal's informatization leadership; the path coefficient of the principal's informatization planning is 0.234, and the hypothesis test result is significant, so the proposed hypothesis is valid, and the principal's informatization planning ability has a positive influence on the principal's informatization leadership; the principal's informatization planning ability has a positive influence on the principal's informatization leadership; the principal's informatization management has a positive influence on the principal's informatization leadership. The path coefficient of the principal's informatization planning is 0.234, and the hypothesis test result is significant, so the proposed hypothesis is valid, that is, the principal's informatization planning ability has a positive influence on the principal's informatization leadership; the path coefficient of the principal's informatization evaluation is 0.172, and the hypothesis test result is significant, so the proposed hypothesis is valid, that is, the principal's informatization evaluation has a positive influence on the principal's informatization leadership. The path coefficient of the principal informatization assessment is 0.172, and the hypothesis test result is significant.

Discussion

The principal's informatization literacy ability has a greater impact on the principal's informatization leadership. A principal with higher informatization literacy can better understand and apply informatization technology and has a stronger ability to promote the development of school informatization. Therefore, cultivating principals' literacy skills and enhancing their informatization leadership are crucial to promoting school informatization construction and development. This requires schools to adopt appropriate cultivation measures to strengthen the informatization training for principals, establish an assessment mechanism for informatization literacy, encourage principals to participate in informatization projects and activities, and set up a team of informatization expert advisors (Prusha, 2006) Through the effective implementation of these measures, principals can be helped to enhance their informatization literacy and informatization leadership and make greater contributions to the development of school informatization.

Although the path coefficient of principals' informatization planning ability is relatively low, we cannot simply assume that principals' informatization planning ability plays a lesser role in influencing principals' informatization leadership. We need to consider the respondents' subjective views, the path coefficient's limitations, and other relevant factors on the impact of principals' informational planning ability Further research and practice need to explore in depth the relationship between principals' informatization planning ability and informatization leadership, as well as how to enhance principals' informatization planning

ability to promote school informatization.

The principal's informatization management ability has a greater impact on the principal's informatization leadership. By improving the principal's informatization Management ability can better promote the school's informatization development, optimize the school management and service, and improve the school's overall competitiveness and development level (Southworth, 1999) Therefore, schools should focus on improving principals' informatization management ability and provide them with training and support to build schools with a high level of informatization leadership.

Although principals' informatization assessment competence significantly affects principals' informatization leadership, it performs the lowest among the four dimensions, indicating that the development of this competence still needs to be strengthened 12. Principals should be able to better informational leadership and decision-making and more effectively promote school informatization by

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improving their informational assessment competencies (Gibson et al, 2011) This can be done through learning and training to improve their knowledge and skills in informatization assessment.

In addition, principals can draw on the support and cooperation of professionals to work together on informatization assessment and use professional assessment methods and tools to obtain more accurate and useful assessment results (Wang et al, 2007) By continuously improving principals' informatization assessment skills, they can better lead the development of school informatization and improve education teaching and management.

Conclusion

This study compiled a questionnaire on principals' informational leadership and surveyed principals of universities in different regions. The data were collected and statistically analyzed by the data analysis software SPSS, then the model was analyzed by the AMOS structural equation modeling software, and the corresponding conclusions were drawn by analyzing the path coefficients, the following four conclusions were drawn. Information technology literacy is positive for the informationization leadership of principals. Informationization planning capability is positive for the informationization leadership of principals. Informationization management capability is positive for the informationization leadership of principals. Informationization assessment capability is positive for the informationization leadership of principals.

Limitations

Despite its contributions, this study has several limitations that should be acknowledged.

Firstly, the findings are based on a specific sample of educational organizations and may not be generalized to all types of schools or educational contexts. Further research with a more diverse sample would be needed to validate the findings across different settings and populations.

Secondly, the study relied on self-report measures and participants' subjective perceptions, which may introduce bias and response errors. Future research could utilize objective measures and incorporate multiple data sources, such as observations and interviews, to provide a more comprehensive and accurate understanding of informationization leadership in educational organizations.

Moreover, this study focused primarily on the perspective of principals and their leadership practices. Future research could consider the viewpoints of other stakeholders such as teachers, students, and parents to gain a more holistic understanding of the impact of informationization leadership on multiple levels within educational organizations. Additionally, the study primarily examined the role of informationization leadership in improving the adoption and integration of technology in educational settings. However, other factors influencing informationization outcomes that were not explored in this study, such as institutional culture, resource availability, and external influences, may influence informationization outcomes. Future research could investigate these factors and their interactions with informationization leadership to provide a more comprehensive understanding of the dynamics at play.

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