THE ADMINISTRATORS' INFORMATIONAL LEADERSHIP MODEL
FOR UNIVERSITIES IN DALIAN CITY

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ABSTRACT

The objectives of this research were: (1) To study the components and indicators of administrators' informational leadership. (2) To develop administrators' informational leadership model for universities in Dalian.

The population consists of 13,910 administrators and teachers within 12 undergraduate public universities in Dalian. A stratified random sampling method was used for sampling, totaling 392 person which calculated from G*Power program. The instrument for collecting data was a questionnaire. Descriptive statistics and inferential statistics were used to perform data analysis by using statistical computer software.

The findings revealed that 1) administrators' informational leadership in universities in Dalian consisted of four components: (1) informational technology literacy, (2) informational planning capability, (3) informational management capability, and (4) informational assessment capability. These components were supported by 14 indicators. The developed informational leadership model demonstrated a good fit with the empirical data, with Relative Chi-square (χ^2/df) = 1.98, Degree of Freedom (df) = 43, Goodness of Fit Index (GFI) = 0.968, Tucker-Lewis Index (TLI) = 0.988, and Root Mean Square Error of Approximation (RMSEA) = 0.05, meeting the specified criteria. 2) The key components of the model had weights ranging from 0.726 to 1, indicating their significant contribution to informational leadership.

Keywords: Administrators of Universities, Universities in Dalian, Model Development

1. Introduction

The 21st century has witnessed the transformative impact of informational technology on various aspects of human society, including politics, economy, military, culture, and education. As societies enter the informational age, leaders across all domains must adapt to the new informational leadership environment. However, research on informational leadership has not kept pace with the rapid changes, and there is a lack of systematic understanding and practical application in this area. This paper aims to address this gap by focusing on the informational leadership of university administrators in the context of educational informatization.

In the era of "Internet +," the advancement of intelligent technology has propelled education information into its 2.0 stage. The COVID-19 pandemic has further accelerated the shift from traditional face-to-face teaching to a hybrid model that combines online and offline approaches. This presents both challenges and opportunities for education, and the need for effective informational leadership has grown stronger. University administrators play a crucial role in driving the construction and application of information technology in higher education （Ji, M. 2020). Their leadership in strategic planning, environmental construction, promoting application, talent cultivation, and evaluation and promotion is essential for the development and quality improvement of universities.

The construction and evaluation of information leadership for university administrators is crucial to the advancement of information technology application in schools (Bo, M. 2019). However, despite the accumulation of some research findings in this field, there is still a lack of comprehensive and systematic research on the structure, essence, and influencing factors of information leadership. This study aims to fill this gap by conducting an in-depth investigation into the influencing factors of information leadership, focusing on university administrators as research subjects.

The study begins by recognizing the increasing significance of information leadership in the information age and its impact on educational institutions (United Nations Educational, Scientific and Cultural Organization. 2021). It highlights the responsibilities of university administrators in top-level design, environmental construction, promoting application, talent cultivation, and evaluation and promotion. The paper acknowledges the existing room for improvement in the level of information leadership among university administrators in China. To address these challenges and meet the demands of the country and society, it is essential to enhance the information leadership of university administrators (Ministry of Education of

the People's Republic of China. 2021). By closely examining the influencing factors of information leadership, targeted improvement strategies can be developed. While external factors such as policies, economy, region, and demographic variables have an impact, this study emphasizes the importance of focusing on the factors that administrators can actively change to improve their own level of information leadership.

In conclusion, enhancing the information leadership of university administrators is not only a theoretical necessity but also a practical requirement in the context of educational informatization. By closely following the societal trend, meeting the needs of the country and society, and promoting effective improvement of information leadership, this research aims to contribute to the advancement of educational informatization and the development of modern, high-level universities.

2. Research Questions

This study sought to answer the following research questions:

(1) What are the components and indicators of administrators' informational leadership?

(2) What should administrators' informational leadership model for universities in Dalian be?

3. Research Objectives

(1) To study the components and indicators of administrators' informational leadership.

(2) To develop and verify administrators' informational leadership model for universities in Dalian.

4. Research hypotheses

H1: The informational leadership model for administrators of universities in Dalian is fitted well with the empirical data.

This hypothesis proposes that the developed model of informational leadership for administrators in Dalian's universities is expected to demonstrate alignment with the actual data obtained through empirical research.

5. Research Method

(1) Research Design

This study adopts a mixed-methods research design, combining both quantitative and qualitative research methods. The quantitative data was collected through a survey questionnaire distributed to administrators and teachers of universities in Dalian. Statistical analysis techniques, such as descriptive statistics and regression analysis, will be used to analyze the quantitative data. The qualitative data will be collected through semi-structured interviews with a purposive sampling of administrators from different departments of the university. Content analysis techniques will be employed to analyze the qualitative data. The findings from both data analyses will be integrated to develop an informational leadership model for administrators of universities in Dalian.

(2) Population and Sample

The population for this study includes 13,910 administrators and teachers from 12 universities in Dalian. A sample size of 392 was determined using the G*Power program, considering the research methodology that utilizes confirmatory factor analysis (CFA) statistics (Hair et al., 2016).

(3) Research Instruments

The main instruments used in this research was a 5-level rating scale questionnaire that the researcher created from the review of literature and the validity checked by 5 experts, included the reliability the alpha coefficient was 0.988.

(4) Data Collection

The steps for data collection will be as follow: Request permission to collect data for research from Bangkokthonburi University and from 12 universities in Dalian, then carry out data collection with the selected samples by sending questionnaires to the coordinator teachers who will help for collecting data with the selected samples in each school/college/department.

(5) Data Analysis

The data collected for this study undergo from both content analysis and statistical analysis. Content analysis was utilized to identify patterns, themes, and categories within the qualitative data obtained from interviews the experts of universities in Dalian. Statistical analysis was employed to manipulate and assess various statistical values. The statistics used analysis to determine the sample group's characteristics, such as gender, age, educational background, and management experience. Means and standard deviations were calculated to

evaluate indicator suitability for inclusion in the model, considering mean values equal to or greater than 3.00 as appropriate. Item reliability, composite reliability (CR), and Average Variance Extracted (AVE) were assessed. Confirmatory Factor Analysis (CFA) was performed to test the structural correlation model's conformity.

6. Research Results

The research procedures involved three phases. In phase (1), the components and indicators of informational leadership required by administrators of universities in Dalian were determined through a qualitative research approach. The researcher reviewed 23 relevant documents and conducted in-depth interviews with 9 key informants who held positions in administration at universities in Dalian. The data collected were analyzed using content analysis.

Phase (2) aimed to develop a model of informational leadership for administrators of universities in Dalian. A quantitative research approach was utilized, and a questionnaire was administered to a sample of participants from 12 public undergraduate universities in Dalian. The sample size was determined to be approximately 392 participants using proportional stratified random sampling. The questionnaire consisted of three parts: general information, a rating scale questionnaire on the informational leadership model, and an open-ended section for suggestions. The content validity and reliability of the questionnaire were assessed.

Data collection involved online platforms, email communication, and physical delivery of questionnaires. Descriptive statistics were used to analyze demographic variables, while descriptive and inferential statistics were employed to analyze the components and indicators of administrators' informational leadership. Confirmatory factor analysis (CFA) was conducted to refine the indicators, and the SPSS and AMOS programs were used for analysis. Model fit was evaluated using various criteria.
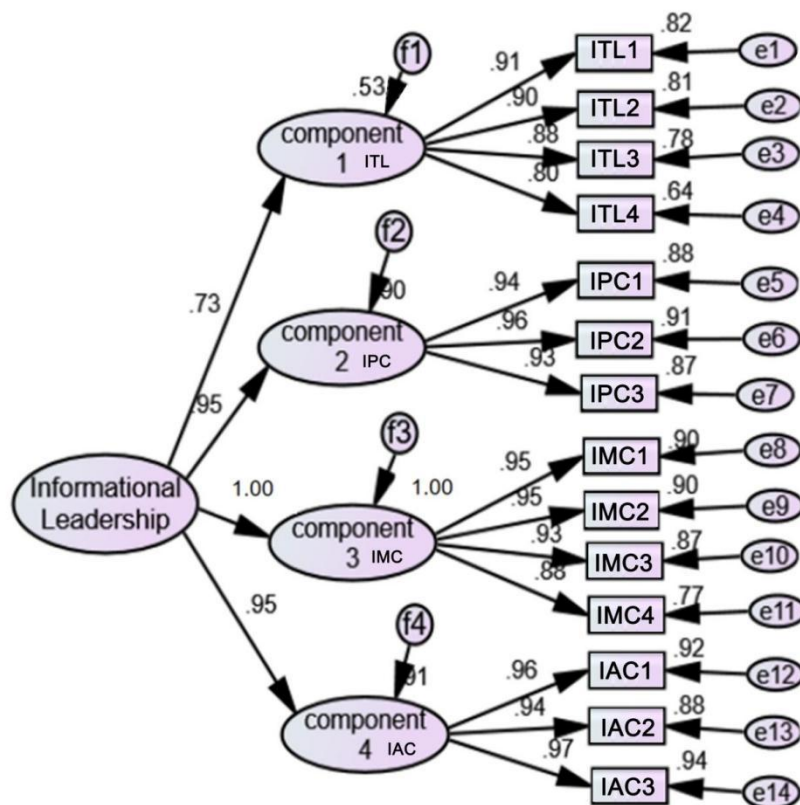
Chi-square =85.313; df = 43; p = .000; GFI = .968;
AGFI =.922; TLI = .988; RMSEA = .052

Figure 1 Show the second order of informational leadership model that was consistent with the empirical data

Table1 Show statistical value of administrators' informational leadership model of Dalian Universities

	Latent and observable	Standardized Factor loading	Error	S.E.	C.R.	A.V.E.	p	R²
Informational	Component1	.726	.474	.029	.928	.764	0.00	0.527
	ITL1	.908	.175	.039			0.00	0.824
	ITL2	.901	.188	.040			0.00	0.812
	ITL3	.882	.223	-			0.00	0.778
	ITL4	.801	.359	.038			0.00	0.642
Administrators'	Component2	.947	.103	.027	.959	.887	0.00	0.897
	IPC1	.939	.118	.024			0.00	0.882
	IPC2	.956	.087	-			0.00	0.914
	IPC3	.931	.129	.024			0.00	0.867

Component3	1.000	-	-	.961	.861	0.00	1.000
IMC1	.950	.097	.023			0.00	0.903
IMC2	.949	.099				0.00	0.901
IMC3	.931	.133	.024			0.00	0.867
IMC4	.879	.227	.027			0.00	0.773
Component4	.955	.089	.022	.969	.912	0.00	0.912
IAC1	.957	.084	.024			0.00	0.916
IAC2	.937	.122	.022			0.00	0.878
IAC3	.970	.059	-			0.00	0.941

From Figure 1 and Table 1 above the results of the second order by CFA With the AMOS program, the following confirmative index values were obtained: Relative Chi-square (χ^2/df) = 1.98, Degree of Freedom (df) = 43, p-value = 0.000, Goodness of Fit Index (GFI) = 0.968, Tucker-Lewis Index (TLI) = 0.988, Root Mean Square Error of Approximation (RMSEA) =0.05. By this evaluate index meet the specified criteria, Relative Chi-square (χ^2/df) < 2 (Diamantopoulos, A. et al.,2000; Schumacker, R. E. and Lomax, R. G.,2010), p > 0.05, GFI, TLI, CFI ≥ 0.95 and RMSEA ≤ 0.05 (Jöreskog and Sörbom,1996; Diamantopoulos, A. et al., 2000; Fan and Sivo, 2009; Hair et al, 2010, Poonpong Suksawang, 2020).

The major findings of the research include the identification of four components of administrators' informational leadership in universities in Dalian: 1) Informational Technology Literacy, 2) Informational Planning Capability, 3) Informational Management Capability, and 4) Informational Assessment Capability. Each component consisted of several indicators to measure the specific aspects of informational leadership.

The research also presented a visual representation of the informational leadership model in Figure2: the Informational Leadership Model Mind Map. These figures provide a comprehensive overview and detailed representation of the key components, interrelationships, and conceptual framework of the model.

Overall, the research contributes to the understanding and application of informational leadership among administrators in universities in Dalian. The findings provide insights into the components and indicators of informational leadership and offer a model that can guide

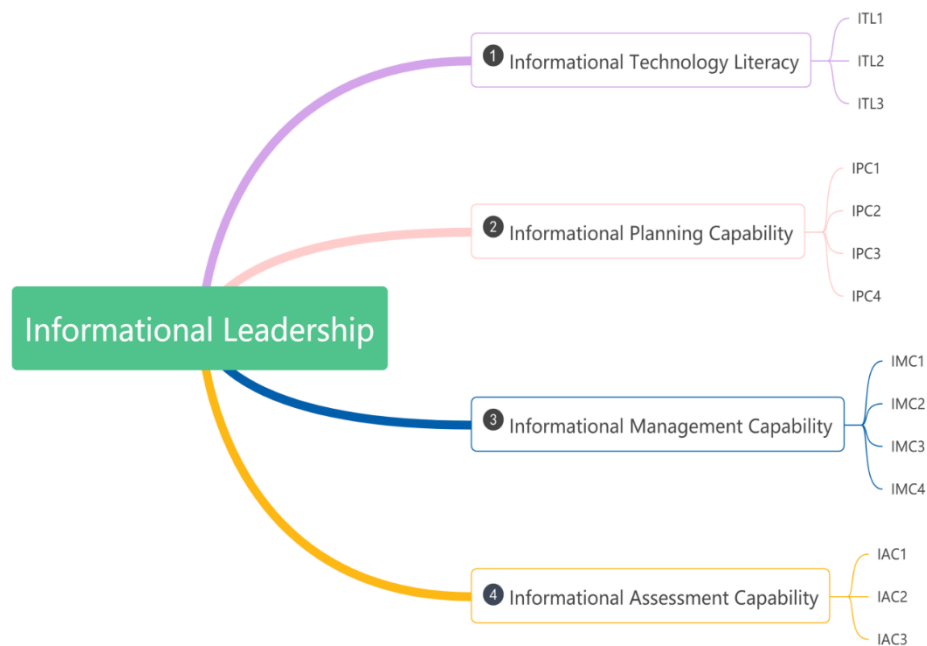administrators in developing effective strategies for implementing informational leadership in their institutions.

Figure 2 Informational Leadership Model Mind Map for Administrators of Universities in Dalian

7. Discussion

The discussion will be presented as follows:

7.1 Discussion about major findings of objective 1

The first objective of the study was to identify the components and indicators of informational leadership required by administrators in universities in Dalian. The major findings revealed four components of informational leadership: Informational Technology Literacy, Informational Planning Capability, Informational Management Capability, and Informational Assessment Capability. These components and corresponding indicators are crucial for improving the informational leadership of administrators in universities in Dalian and beyond. The effective implementation of informational leadership in higher education institutions is essential for guiding the strategic use of information to enhance educational quality, foster innovation, and improve overall institutional effectiveness.

These findings are consistent with previous studies conducted by Xie Zhongxin et al. (2009), which decomposed the dimensions of principals' informational leadership into four aspects: information awareness and IT competence, decision-making and planning competence, organization and management competence, and evaluation and development

competence. Zhu Z. and Gu X. (2006) also emphasize the dimensions of educational leadership for information, including planning educational information systems, leadership in instructional and curriculum reform through information, leadership in teacher professional development, and regulatory construction for educational information. Similarly, Sun Z. (2016) found that administrators' informational leadership in schools encompasses planning ability, guiding ability, executing ability, communicating ability, and evaluating ability. These findings support the notion that administrators' informational leadership plays a vital role in educational institutions and should be cultivated among various stakeholders.

However, it is important to consider the distributed leadership theory proposed by Huang R. et al. (2012), which argues that leadership is an interactive process among leaders, followers, and the context. In the context of schools, informational leadership is dynamically distributed among various organizational members, including administrators, middle managers, grassroots staff, and opinion leaders. This perspective emphasizes that informational leadership is not solely the responsibility of individual principals but should be a collective capability possessed by all teachers, students, and staff. School informational leadership, in this view, is a form of distributed leadership manifested in collective leadership across different levels of stakeholders. This perspective adds a new dimension to the understanding of informational leadership and its implications for educational institutions.

7.2 Discussion about major findings of objective 2

The second objective of the study was to develop an informational leadership model specifically tailored for administrators in universities in Dalian. The major findings of this objective highlight the recognition of the importance of managerial informational leadership in China's higher education context. President Xi Jinping's emphasis on responding to the development of information technology and promoting educational reform underscores the significance of informational leadership. The Ministry of Education's "Ten-Year Development Plan for Educational Informationization" further emphasizes the role of school leaders' informational leadership and calls for training programs to enhance administrators' skills in educational technology and informationization leadership. These findings acknowledge that administrators play a vital role in driving informationization efforts in universities.

The importance of principals' utilization of information technology in promoting educational and instructional reforms within schools is supported by Zhao, Leilei, & Dai (2016). Principals are seen as symbols and representatives of informationization in higher education,

and their informational leadership is considered essential for advancing the informationization process in universities.

These findings align with previous research conducted by Shamir (1999), Glick (2014), and Avolio et al. (2014). Shamir discusses the impact of IT/IS on leadership, highlighting the transformation of knowledge and the nature of leadership in the digital age. Glick emphasizes the rising trend of informational leadership in response to technological development and its societal impact. Avolio et al. provide a comprehensive review of theories, research, and practices on informational leadership, exploring how emerging information technologies influence leadership, effective responses to these technologies, and their impact on organizations. These studies collectively contribute to the understanding of the importance of informational leadership in the context of educational institutions and the need for administrators to adapt to technological advancements and foster educational and instructional reforms through effective leadership practices.

In conclusion, the major findings of this study highlight the significance of informational leadership in driving the integration of information technology in educational contexts. The identified components and indicators provide valuable insights into the specific requirements of administrators' informational leadership in universities in Dalian. These findings contribute to the existing body of research and support the need for training programs and enhanced skills in educational technology and leadership among administrators.

By aligning with previous research and acknowledging the importance of administrators' role in driving informationization efforts, this study provides valuable insights for policymakers, educational institutions, and administrators seeking to enhance their informational leadership practices and leverage information technology for improved educational outcomes.

8. Recommendations

Based on the research findings, the following recommendations are proposed in three key aspects:

8.1 Recommendation for Policies Formulation:

Develop comprehensive policies: Formulate policies that prioritize the integration of information technology in educational settings. These policies should provide clear guidelines and support for administrators to enhance their capabilities in utilizing information effectively.

Establish training programs: Create regular training programs for educational administrative departments, professional institutions, and school administrators. Focus on

enhancing educational technology skills and developing leadership in educational informationization.

Incorporate informational leadership in performance assessments: Include an evaluation of administrators' informational leadership capabilities in performance assessments. This will motivate administrators to prioritize and improve their skills in utilizing information for educational purposes.

8.2 Recommendation for Practical Application:

To facilitate the development of informational leadership among higher education administrators, the following strategies can be explored:

Training programs: Design tailored training courses to enhance informational leadership among higher education administrators. Focus on individual skill development, socialization of organizational vision and values, strategic development planning, and action learning plans.

Leveraging existing experiences: Learn from successful cases and best practices in managing informationization processes within the higher education context. Share and disseminate these experiences to provide valuable insights and inspire innovative approaches to digital leadership.

Certification of competencies: Introduce optional certification programs to evaluate and validate administrators' competencies in informational leadership. This can provide a standardized framework for assessing leadership capabilities and identifying areas for improvement.

Future research should build upon both domestic and international experiences to explore the development models and pathways suitable for Chinese higher education institutions. Emphasis should be placed on developing localized and regionalized approaches, fostering experience exchange and training opportunities, and utilizing action research methods to develop models that align with local practice conditions.

To effectively implement these recommendations for practical application, it is crucial to foster a culture of information utilization within educational institutions. This can be achieved through awareness campaigns, training programs, and creating incentives that encourage administrators and staff to embrace information technology and leverage its potential to improve educational outcomes. Additionally, providing the necessary resources and support, including access to relevant technologies, professional development opportunities, and ongoing technical assistance, will empower administrators to implement information practices effectively.

By adopting these practical strategies and recommendations, higher education institutions can cultivate effective informational leadership, facilitate digital transformation, and ultimately enhance the quality of education in the digital age.

8.3 Recommendation for Further Research:

In order to enhance informational leadership in educational settings and promote the development of digitalization in higher education, future research should focus on three key areas:

1) Evaluation Framework for Informational Leadership

To enhance informational leadership in higher education, it is important to develop a comprehensive evaluation framework that includes specific and applicable indicators. This framework should enable higher education institutions to assess leaders' capabilities in driving digitalization and identify areas for improvement.

2) Impact of Emerging Technologies on Leadership

As emerging technologies, such as artificial intelligence, virtual reality, and augmented reality, continue to advance, it is crucial to investigate their implications for informational leadership in higher education.

3) Collaboration and Implementation of Findings

To promote effective information utilization and enhance leadership practices in educational settings, it is essential for policymakers, educational institutions, and administrators to collaborate in implementing research findings.

By collectively embracing research recommendations, stakeholders in the education sector can work together to create a supportive ecosystem that fosters effective informational leadership and drives the successful implementation of digitalization strategies in higher education.

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