

Information Leadership in the Digital Era of Administrators in Comprehensive Universities under Liaoning Province

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ABSTRACT

The research objectives were: (1) To explore the components of information leadership in the digital era of administrators in Comprehensive University under Liaoning Province; and (2) To develop the managerial guidelines for enhancement of information leadership in the digital era of administrators in comprehensive university under Liaoning Province.

This research was a mixed method research, including quantitative research and qualitative research. The population consisted of 438 comprehensive university leaders and information management personnel from 30 comprehensive universities under Liaoning province. The sample size was determined by Krejci and Morgan's Table (1970) obtained through stratified random sampling technique. There were 205 university leaders and information management personnel in total. 7 experts key informants were gained through purposive sampling methods. The instruments used for data collection are semi-structured interview form and five-point rating scale questionnaire. Statistics used for data analysis included frequency, percentage, mean, Standard Deviation, Exploratory Factor Analysis and Focus group Discussion.

The research findings revealed that: (1) there were 8 components of information leadership in the digital era of administrators in comprehensive universities under Liaoning Province. and (2) there were 24 managerial guidelines for enhancement of information leadership in the digital era of administrators in comprehensive university under Liaoning Province.

Keywords: administrator, Information Leadership, comprehensive university, Liaoning Province

1. Introduction

As the human society has entered the information age. Digital information technology has a profound impact on all fields of the world. It not only impacts people's production and life style, but also profoundly affects the organization and management mode of social organizations and managers. the leadership paradigm is quietly changing in qualitative way, will inevitably give birth to new leadership theory and new demands of leadership practice application under the new theory. In the field of education, digital information technology has produced unprecedented impact and influence on educational ideas, teaching mode, and inevitably leads to the systematic reform and reconstruction of educational management system and organizational structure.

In 2002, the International Educational Technology Association (International Society for Technology in Education, ISTE) issued the programmatic document " Educational Technology Standard for Education Leaders to improve the efficient use of information technology and enhance the national education information (NETS.L). The document emphasizes the leading and transformative role of education leaders in the age of information innovation. (U.S, 2010)

In March 2012, the Chinese Ministry of Education issued the education information ten years development plan (2011-2020), based on the information education the scientific development, clearly put forward the significance of information leadership, fully ensure the management efficiency and quality level. It is emphasized to vigorously promote the education management information in the whole scope, and promote the realization of scientific education decision-making and standardized school management. (ministry of education, 2012, p.92).

The development of educational information in China has gone through three stages:

The first stage, from 1978-1999 to the computer teaching experiment and computer-aided teaching practice exploration of the pre-education information stage;

In the second stage, education information 1.0 stage (2000-2017), strengthened the deployment of information infrastructure and supporting equipment, practiced the application-driven goal, and promoted the integrated development of information and education.

The third stage of education information 2.0 stage, in April 2018, the Ministry of Education issued the "Notice on education Information 30Era", marking the upgrading of education information. stimulate the reform of education system, realize the integration,

innovation and development of education information, and produce the integration effect of technology and education.

The 2017 education information priorities in Liaoning province put forward the current education information construction in Liaoning province area for the whole, rely on the provincial, city and county governments at all levels, play to the education management decisions and leadership to promote education information development.adjust the organization structure, establish match the information development of management system, operation mechanism and management mode, is the managers information leadership development problems to be solved.

Researchers think that the concept of information leadership, structure research analysis,can further enrich the local education information theory, promote the education concept and education mode innovation, but also for the subsequent subject research provides a certain theoretical basis. In a practical sense, conducive to better integrating information technology into the leadership structure of educational managers,clarifying the key elements of information leadership.

2. Research Questions

1. What are the components of information leadership in the digital era of administrators in comprehensive universities under Liaoning Province?
2. What are the managerial guidelines for element of information leadership in the digital era of administrators in comprehensive university under Liaoning Province ?

3. Research Objectives

1. To explore the components of information leadership in the digital era of administrators in Comprehensive University under Liaoning Province .
2. To develop the managerial guidelines for enhancement of information leadership in the digital era of administrators in comprehensive university under Liaoning Province.

4. Research Method

4.1 Research Design

This dissertation mainly adopts the mixed research methods of quantitative research and qualitative research. The phase 1 is Qualitative research:The researchers studied the concept, principle, theory and theory of the literature, and conducted in-depth interviews with 7 key informant .The phase 2 is Quantitative research: Researcher use step (1) Variables

of information leadership of the administrators of Liaoning Comprehensive University to compile a questionnaire to collect data from samples to test the components of information leadership of the managers of Liaoning Comprehensive University. The phase 3 is qualitative research: selected various components of management information leadership from step (2) and adopted the method of focus group discussion by 7 key informants to formulate the information leadership management guide of comprehensive university administrators in Liaoning Province;

4.2 Population and Sample

The phase 1 Qualitative research: In-depth interviews with 7 key informants, the phase 2 Population was the relevant personnel of Liaoning Provincial Comprehensive University involved in the management and organization of educational information. using proportional stratified random sampling Choose 205 peoples from totally 438 members. They came from 30 comprehensive universities in Liaoning province. The investigators determined the sample size using Krejci and Morgan's Table (1970).

4.3 Research Instruments

Phase 1: Collect the relevant literature on the components of information leadership of administrators in Comprehensive University under Liaoning Province. by semi-structured interview format. Phase 2: The instrument for this phase is questionnaire. Phase 3: Note taking, diagram "The components of Information Leadership of administrators in Comprehensive University under Liaoning Province". for focus group discussion.

4.4 Data Collection

Phase 1: Data collection was performed by the researcher, through 21 documents and the interview of 7 experts. Phase 2: The questionnaires were sent by online and mail. Information was collected by filling in the questionnaire of 205 peoples. Phase 3: Checklist will be sent to the panel of experts by mail and online. The data collected in this stage mainly consisted of discussion and surveys conducted by 7 experts.

4.5 Data Analysis

Phase 1: The collected data was analyzed by Content Analysis statistics using frequency and percentage. Phase 2: Data for demographic variables were analyzed by frequency and percentage. Descriptive statistics were used to analyze the variables of information leadership in the digital era of administrators in Comprehensive University under Liaoning Province; mean, standard deviation (S.D.). For interpretation criteria about classifying mean score. information leadership of administrators in Comprehensive University under

Liaoning Province was analyzed by Exploratory Factor Analysis (EFA), reduce unrelated variables. Phase 3: Mode, Median, Inter Quartile Range are used for data analysis.

5. Research Results

5.1 Demographic Information

Data analysis resulted reveal that the summary questionnaire a total of 205 respondents, including 105 women, 51.6%, male 100 people accounted for 48.4%, most respondents from the age in 36 and above, a total of 88 people, 42.7%, university education informational development in Liaoning province in the primary stage, management team members in education qualification was mostly master, followed by PhD degree 63 people, accounting for 30.7%, in terms of work experience, The maximum number of informants was more than 6 years, accounting for 44.9%, and 14.9% were less than 4-6 years. In terms of position level, the largest number of informants was the main person in charge of information construction, with 89 people, accounting for 43.7%. In terms of the size of the college, the largest (400-800), with a total of 101, followed by 61 small (less than 400), accounting for 30.1%, and the smallest was 43 large (more than 800), accounting for 20.6%. Among the types of colleges / universities, the largest number of comprehensive universities was 107 (52.2%), and the least number of public Education Department of Liaoning Province was 39 (19%).

5.2 Reliability analysis of initial measurement

For reliability of questionnaire was a way of assessing the quality of the measurement procedure used to collect data. The researcher had sent out 30 questionnaires to collect data from non-samples in order to consider a result of reliability. Cronbach's alpha coefficient on or above 0.80 means adequate reliability to determines the internal consistency or average correlation of items in a survey instrument to gauge reliability of the questionnaire. As a result, Cronbach's alpha coefficient was at 0.965 which can be used to describe the reliability of questionnaire.

5.3 Exploratory factor analysis

The relationship between variables was tested by statistical values, the Bartlett sphericity test (Bartlett's Sphericity Test). The coefficient matrix of the variables. the obtained information is suitable for further factor analysis.

Table 1 : shows the components of educational IT leadership for administrators

Order	Components	Number of variables	Factor loading
1	Component 1	13	0.646-0.836
2	Component 2	12	0.691-0.855

Order	Components	Number of variables	Factor loading
3	Component 3	10	0.605-0.801
4	Component 4	9	0.565-0.797
5	Component 5	8	0.717-0.815
6	Component 6	8	0.708-0.783
7	Component 7	7	0.657-0.773
8	Component 8	6	0.600-0.756
	total	73	0.600-0.855

According to table 1, there were 8 qualified components as follows;

Component 1 was described by the 13 key variables. After rotating the axis, the variable factor loading in this component is between 0.646 and 0.836, and the maximum variance variable was 45.602, which could explain 36.798% of the total variance. The 13 variables were the best combined with this component which the researcher named "Information literacy".

Component 2 was described by the 12 key variables. After rotating the axis, the variable factor loading in this component was between 0.691 and 0.855, and the maximum variance variable was 45.602, which explained 36.798% of the total variance. All 12 variables was the best combined with this component which the investigator named as "Information knowledge and technical ability".

Component 3 was described by the 10 key variables. After rotating the axis, the variable factor loading in this component was between 0.605 and 0.801, and the maximum variance variable was 45.602, which could explain 36.798% of the total variance, All 10 variables were the best combined with this component which the investigator named as "Information management and evaluation ability".

Component 4 was described by 9 key variables. After rotating the axis, the variable factor loading in this component was between 0.565 and 0.797, and the maximum variance variable was 45.602, which could explain 36.798% of the total variance. All nine variables were the best combined with this component which the investigator named "Information communication and coordination ability".

Component 5 was described by 8 key variables. After rotating the axis, the variable factor loading in this component was between 0.717 and 0.815. The maximum variance variable was 45.602, which explained 36.798% of the total variance. All 8 variables were the best combined with this component which the investigator named "Information planning and design ability".

Component 6 was described by 8 key variables. After rotating the axis, the variable factor loading in this component was between 0.708 and 0.801, and the maximum variance variable was 45.602, which explains 36.798% of the total variance compared with the variance of the other components, meaning that all eight variables are the best combined with this component which the researcher named "Information organization and implementation ability".

Component 7 was described by 7 key variables. After rotating the axis, the variable factor load in this component was between 0.657 and 0.773, and the maximum variance variable was 45.602, which could explain 36.798% of the total variance, Meaning that all seven variables were the best combined with this component. which the researchers named "Information environment and resource construction ability".

Component 8 was described by 6 key variables. After rotating the axis, the variable factor load in this component was between 0.600 and 0.756, and the maximum variance variable was 45.602, which could explain 36.798% of the total variance. All the six variables are the best combined with this component. which the investigator named "Information ethics literacy and professional ethics literacy".

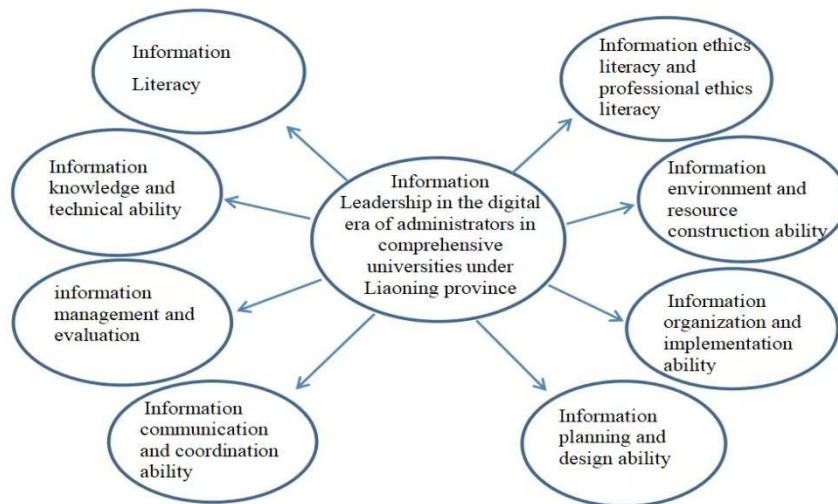


Figure 2 : The component of information leadership consisted of 8 components

5.4 Result of data analysis to develop the managerial guidelines for enhancement of information leadership in the digital era of administrators in comprehensive university under Liaoning Province

According to the results of the study objective Through focus group discussion of 7 experts.1. Investigation he managerial guidelines for enhancement of information leadership in the digital era of administrators in comprehensive university under Liaoning Province. Taking

the comprehensive universities in Liaoning Province as the research object, for the objective 2 .The investigators collated and analyzed the discussions of the 7 experts and reached the following conclusions.

Composition Part1: Information literacy had 2 managerial guidelines; Strengthen the value orientation of information technology and organize the policy study; Set up the clear information awareness. Composition Part 2: Information knowledge and technical ability had 2 managerial guidelines; Organize theoretical study; Strengthen the application of educational information technology. Composition Part 3: Information management and evaluation ability had 4 managerial guidelines; Focus on technology, evaluation, analysis, and interpretation; Formulate professional development plans for teachers; Human resource management; Evaluate the teaching effect of teachers. Composition Part 4: Information communication and coordination ability had 2 managerial guidelines; Build an online communication platform; Focus on the internal and external communication and coordination of the administrative organization. Composition Part 5: Information planning and design ability had 4 managerial guidelines; Develop your goals and visions; Strengthen the information leadership and organization; Strengthen the information technology integration; Implementation of information planning. Composition Part 6: Information organization and implementation ability had 3 managerial guidelines; Formulate the Team informational training plan; Strengthen the informational guidance; Build an information team of teachers. Composition Part 7: Information environment and resource construction had 4 managerial guidelines ; Information resources; Information technology facilities; Strengthen the information platform construction; Strengthen the information management and maintenance. Composition Part 8: Information ethics literacy and professional ethics literacy had 2 managerial guidelines; Strengthen the information management and maintenance; Create a healthy, civilized and harmonious environment for communication; Promotion of information legal ethics.

6. Discussion

The discussion will be presented as follows:

6.1 Discussion about major findings of objective 1

The first objective of the research was To explore the components of information leadership in the digital era of administrators in Comprehensive University under Liaoning Province. The major findings revealed 8 components of information leadership of administrators in Comprehensive University: Information literacy; Information knowledge and

technical ability; Information management and evaluation ability; Information communication and coordination ability; Information planning and design ability; Information organization and implementation ability; Information environment and resource construction; Information ethics literacy and professional ethics literacy.

The Information literacy and Information knowledge and technical ability of information leadership are important guarantees for the development of school informational; Information management and evaluation ability, Communication and coordination ability, Information planning and design ability, Organization and implementation ability, Information environment and resource construction ability, was an important support for the orderly implementation of education informational; Information ethics literacy and professional ethics literacy help to improve the social, moral, and ethical competence, Create a healthy, civilized and harmonious communication environment.

Therefore, the eight components of the research results was the important elements to build the information leadership of the comprehensive university managers, and also an important means to improve the information management. The common development of these 8 components can bring more opportunities for the development of university informational.

These research findings were in accordance with the theories or research of Li xin(2022:18-31) found that The information management team of the university should, according to the requirements of the information development of the university, formulate the corresponding development plans and teacher training programs, and establish a new mode of information technology application ability that meets the needs of the school development of the university.

In addition, The establishment and training of school information management team can be better education information construction and development. managers' deep understanding of goals, tasks, ideas, content and assessment of policy understanding, Liu Meifeng (2009:5-7), Gibson I W. (2002:315-334), Schmeltzer T. (2001:16-20) studied highlights the information knowledge and technical ability and indicates that managers need to successfully integrate technology into the school teaching process. Zhong Xuelian (2020:36-37), Zhang Yanqiu, Kaslin (2016:23) pointed out that the measurement and evaluation of the status quo of information leadership level affects the information leadership level of leaders. Yang Kun (2014:51-54), Hu Quanyu (2013:30-32) found that information communication and coordination ability, that was, internal promotion, external promotion of the school, and mutual assistance between schools. Sun Zhenxiang (2010:3-7), Wang Lu (2010:10-11) pointed

out that Information planning and design ability refers to the ability of managers to plan and construct the vision in the process of promoting the construction of school informational. Chen Qianhua (2015:43), Yang Rong (2007:47-48) pointed out that the management to formulate the information management system and planning suitable for the development of schools. As a leader, can influence the people to use information means to form an information work community. Wang Lu (2010:10-11), Dawson C. (2003:29-49) believed that the information environment and resource construction can influence the teaching and learning of teachers and students and promote the sustainable development of the school, administrators have a responsibility to ensure that schools invest in and install technology infrastructure, hardware and software to meet the needs of teachers and students. Liu Xiaojie (2018:14), Zhang Xian (2009:58-59) proposed that managers should have good information moral literacy and professional ethics, At the same time, managers implement laws and ethics related to the application of information technology and promote the responsible use of technology by teachers and students.

6.2 Discussion about major findings of objective 2

There were 24 managerial guidelines for enhancement of information leadership of administrators in comprehensive university under Liaoning Province. This verification result was slightly different from the components of goal 1, and the guidance puts forward a more comprehensive and practical way to realize the information leadership of managers. On the basis of improving policy understanding, the leadership Information literacy emphasizes the correct value orientation; on the basis of organizational goal planning, the information leadership management policy should gradually promote the education planning, improve the green and healthy information environment, and strengthen the integrated application of information technology; On the basis of improving the information leadership, promote the teaching technology, evaluation, analysis and interpretation ability of teachers' information education, and carry out human resource management; formulate the teacher professional development plan, and evaluate the teaching effect of teachers. On the basis of communication and coordination, it is suggested to build an online communication platform and improve internal and external communication and coordination of administrative organizations. On the basis of the rules and regulations, strengthen the composition of the management team, formulate the information system, ensure that the planning can be implemented; On the basis of improving the construction and management of environmental resources, allocate information resources, carry out teacher training, build the first-class teachers and shape the shared school situation. On the basis of guaranteeing technical facilities, ensure the construction of school information software equipment, hardware equipment;

improve the construction of school information platform and set up professional information technology management and maintenance team. The construction of management policy can serve the development of management personnel informational leadership in an all-round and multi-dimensional way, provide certain theoretical and practical basis for the development of informational in colleges and universities, and also provide corresponding reference for relevant departments to formulate corresponding policies.

These findings were in accordance with the theories or research of Huang Ronghuai, (2012:11-17),Sun Zhenxiang (2010:3-7),Guo Xuling (2010:21-27)which was found that the views proposed are consistent. Zhang Yanqiu, (2015:4-30), found that the Starting from the practical work needs and ability development, we should actively learn all kinds of new technologies and new knowledge, and incorporate them into the knowledge system.Zhao Hongjuan (2018:61-64),Wang Zhong (2019:65), Schoeny, Z. G. (2002:245-251) believed that the new leadership formed by the application of information technology in the expanding field of education and teaching.Yang Xiaohong (2010:7-10) and Zhong Xuelian (2020:36-37),Zhao Leilei (2018:67-71),Wang Jinjun (2014:45-46).found that the management evaluation ability reflected by school administrators directly affects the development of school education.Hao Ning,(2001:24-27) and Wang Huiqing (1998:19-21), Yang Kun (2014:51-54) found that information communication and coordination ability was communicate with administrators through the network platform; communicate with parents; communicate with brother schools, communicate with superior leaders and community leaders.Chen Qianhua (2015:28),Wang Haiying (2009:32-38), Zhang Xian (2009:58-59) emphasizing the formulation of information development goals, development content and safeguard measures,establishment of the information vision and the planning and implementation ability after the establishment of the information vision.Anderson,R.E,&Dexter,S. (2005,p.49-82), Guo Xuling(2010:21-27)found that management Should strengthen the establishment of management mechanism, the construction of school hardware and software environment, information application level, lifelong learning, teacher professional development and teacher level training construction.GuoXuling(2013:63),WangAne(2014:70),Anderson,R.E, & Dexter, S. (2005:49-82) believed that management should be strengthened hardware environment construction and software environment construction; potential environment construction. Zhang Yanqiu (2015:04-20),Zhou Lingyi (2016:11-10)found that management should have good information moral literacy and professional ethics,the ability to handle school affairs, identify information, improve problem processing efficiency, and achieve organizational goals through information technology.

7. Recommendations

7.1 Recommendations for Policy Formulation

The investigators believe that the suggestions for policy making can be discussed based on the following dimensions:

(1) Clearly define the main objectives of the policy, such as strengthening the value positioning of information technology, improving the ability of information management and evaluation, promoting information ethics literacy, etc. Education and training programs to help university administrators and relevant officials acquire the required information leadership.

(2) Adjust the policy in time and ensure that it has the desired effect Monitoring and evaluation mechanism: Establish a monitoring and evaluation mechanism to track the progress and effectiveness of policy implementation. To ensure that all relevant parties understand the objectives, measures and importance of the policy and encourage their participation and support.

(3) Develop or revise regulations to support the recommendations in the study results. Ensure that policies can be supported by adequate resources. Including budget allocation, training resources, technical facilities, and human resources allocation publicity and training activities are carried out to help information managers better understand various aspects of moral laws and regulations, so as to ensure the legality and morality of information management in colleges and universities.

7.2 Recommendations for practical application

Based on the study of Liaoning Province, the results can be applied to the following fields or institutions:

(1) University information management: The research results can provide the consult for Information leadership of the managers, help information management team to improve information literacy, information knowledge and technical ability, information management and evaluation ability, information communication and coordination ability, information planning and design ability, information organization and implementation ability, information environment and resource construction ability, information ethics accomplishment and professional ethics accomplishment, and provide them with targeted management policy.

(2) To provide a theoretical basis for promoting the development of local higher education informatization, The school information management team can develop a more scientific information development strategy according to the research results, To improve the level of school information development, At the same time, it can enrich and improve the

relevant research of school management team information leadership in Liaoning Province, To improve the influence and sustainable development ability of scientific research achievements.

In conclusion, the research on Information leadership in the digital era of administrators in comprehensive university under Liaoning Province is not only of far-reaching significance at the theoretical level, but also has a positive impact on the development of information managers in higher education institutions and practical applications.

7.3 Recommendation for Further Research

After Focus group discussions, through data analysis, from 8 dimensions to determine the 24 managerial guidelines, It provides the following thoughts for the future development of university information managers.

(1) Long-term impact study: Understand the long-term impact of information leadership enhancement policies. Analyze current college policies, especially regarding information technology and information leadership, to identify potential bottlenecks and opportunities for improvement. Focus on the continuous development of managers' information leadership skills, as well as the potential impact of informatization on university performance and innovation. Track the trends in the field of information technology, especially those related to higher education. Timely adjustment of information leadership training and policies to adapt to the development of emerging technologies.

(2) Comparative study: Compare the differences in information leadership level and influencing factors between different universities to identify best practices and replicable strategies. Conduct comparative studies with universities in other countries or regions to understand the information leadership improvement policies and practices of different international university managers, and obtain cross-cultural experience and lessons.

(3) More quantitative studies: Quantifying the different dimensions of information leadership and the effect of policy implementation. Provide more specific data to support policy decisions. Consider the sustainability of information leadership enhancement policies, to provide a more comprehensive understanding of the complexity of information leadership. Better introduce stakeholders such as students, parents, alumni and industry partners to participate in information leadership development and decision making to achieve broader consensus and support.

In short, the future research direction should explore the development of information leadership of administrators in comprehensive universities under Liaoning Province from a deeper and broader perspective. Perform interdisciplinary and interdisciplinary collaborative research that integrates knowledge in the fields of educational management, are also worthy of further research direction.

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