THE DEVELOPMENT OF ADMINISTRATORS' COMPETENCY MODEL FOR PROFESSIONAL LEADERS IN HUNAN UNIVERSITY OF SCIENCE AND ENGINEERING UNDER HUNAN PROVINCE

Zhu Xiji

Leadership in Educational Administration Faculty of Education, Bangkokthonburi University

สาขาวิชาภาวะผู้นำทางการบริหารการศึกษา คณะศึกษาศาสตร์ มหาวิทยาลัยกรุงเทพธนบุรี

E-mail: 272738517@qq.com

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ABSTRACT

The objectives of this research were: (1) to determine the components and indicators of administrators' competency required by professional leaders in Hunan University of Science and Engineering under Hunan Province, and (2) to develop the administrators' competency model for professional leaders in Hunan University of Science and Engineering under Hunan Province.

The research was a mixed methodology research. The population of the research consisted of 947 who were administrators, full-time teachers, and laboratory technicians of Hunan University of Science and Engineering. A proportional stratified random sampling method was used to sample, totaling 295 persons. The instruments used for data collection were key event interviews (should be semi-structured interview) and a five-level rating scale questionnaire. The statistics used for data analysis were descriptive statistics and Confirmatory Factor Analysis.

The research findings revealed that; (1) there were 4 components and 15 indicators of administrators' competency required by professional leaders of Hunan University of Science and Engineering, which consisted of professional quality, management ability, professional ability, and communication and coordination ability; and (2) the developed administrators' competency model for professional leaders of Hunan University of Science and Engineering was consistent (fit) with the empirical data. The value of Chi-square = 93.36, Degree of freedom =75, Goodness of Fit Index = 0.961, Tucker-Lewis Index = 0.990, and Root Mean Square Error of Approximation =0.029, all in line with specified criteria.

Keywords: Administrators' Competency Model, Professional Leaders, Hunan University of Science and Engineering

Introduction

The development of information technology has had a significant impact on organizational structures and has led to the development of organizational structures and operating methods towards decentralization, flatter hierarchical structures, collaborative structures, and flexible structures. The focus of management and the source of innovation are increasingly Sinking to the bottom of the organization, the leadership of the organization is also constantly spreading from top to bottom to the grassroots to adapt to the rapidly changing environment. As the main part of the higher education system, local colleges and universities aim to serve regional economic and social development and focus on cultivating high-quality talents for the local area. They are academic organizations with the mission of inheriting and innovating technical knowledge and promoting local economic development, social progress and important role in cultural enrichment. Similarly, the organizational structure of local colleges and universities is also changing under the development of information technology. Hunan University of Science and Engineering is a typical local institution in China.

Guide some local undergraduate colleges and universities to transform into application-oriented (Li Keqiang,2015). On March 5, 2016, the government work report clearly stated "to promote the transformation of qualified general undergraduate colleges and universities into application-oriented ones". Facing the impact of such an era of ever-changing technology and information explosion, local colleges and universities need to respond to the development trend of the times - empowering the grassroots and stimulating teachers' innovative vitality and passion. The primary unit of innovation in local colleges and universities is the major, which means that the role of the professional leader responsible for the professional construction (in this paper, the professional leader specifically refers to the manager responsible for the professional construction) is quietly changing. In the traditional hierarchical organizational structure, the responsibilities of the professional leaders of local colleges and universities are more of the role of "speaker", and their most important responsibility requirement is to "do things correctly". However, with the changes in the internal and external environment of local universities, especially since the outbreak

of the novel coronavirus pneumonia (Corona Virus Disease 2019, COVID-19), the global economy has declined, and China's economy is no exception, and China's education has also been greatly impacted , the school leadership level at the top of the organizational structure pyramid has been difficult to control and process all the information to ensure the correctness of its decision-making and the timeliness of implementation. Empowering the grass-roots innovation units that directly face the challenges of the external environment has become what they have to do Choice, so for professional leaders, "doing the right thing" has become a new responsibility requirement. The change in the role of professional leaders in local colleges and universities means that there are new requirements for their competence and quality, and a new system is also needed to match their new role. For example, professional leaders in local colleges and universities must effectively play What are the key competencies required for its role? How do professional leaders develop and improve their competencies over time? How does the organization identify and assess the competencies of its current and potential leaders? How can local university professional leaders balance the need for technical expertise with the need for broader leadership competencies, such as strategic thinking and communication skills, and the needs of different stakeholders such as students, teachers and local communities? "Where are the basis and standards for hiring, assessing, and motivating professional leaders?" etc., these questions have not been answered well either in the theoretical field or at the practical level, especially for those in remote geographical locations with economic development. Slow local colleges and universities - Hunan University of Science and Engineering. So far, no scholars have conducted systematic and in-depth research on the competence of professional leaders in Hunan University of Science and Engineering, which directly affects the scientific and effectiveness of the management of professional leaders in Hunan University of Science and Engineering. It is precisely because of the lag in theoretical research that Hunan University of Science and Engineering often fails to realize the key role of professional leaders in leading professional construction, and fails to play the leading role that this team should play. Moreover, due to the lack of standards for its competency structure framework, Hunan University of Science and Engineering often selects professional leaders based on some explicit indicators, without fully considering the particularity of the competency requirements of this post, resulting in Not only is the selected person unable to meet the job requirements, which affects professional construction, but also

the lack of authoritative competency standard framework guidance hinders the improvement of the competence of the entire team of professional leaders.

This researches on the components and indicators of administrators' competency required by professional leaders in Hunan University of Science and Engineering under Hunan Province, which has very important theoretical and practical significance for further improving the level of professional leaders. The first is to enrich the theoretical research on the competency of professional leaders in Hunan University of Science and Engineering; the second is to provide a theoretical basis for the scientific selection and training of professional leaders in Hunan University of Science and Engineering the third is to help the professional leaders of Hunan University of Science and Engineering. It has very important practical significance for the growth of professional leaders of Hunan University of Science and Engineering.

Research Questions

1. What are the components and indicators of the administrators' competency required for the professional leaders in Hunan University of Science and Engineering under Hunan Province?

2. What is the administrators' competency model for the professional leaders in Hunan University of Science and Engineering under Hunan Province?

Research Objectives

1. To determine the components and indicators of administrators' competency required by professional leaders in Hunan University of Science and Engineering under Hunan Province.

2. To develop the administrators' competency model for professional leaders in Hunan University of Science and Engineering under Hunan Province.

Research Hypotheses

Administrators' competency model for professional leaders in Hunan University of Science and Engineering under Hunan Province was fit with the empirical data.

Research Method

Phase 1: To determine the components and indicators of administrators' competency required by professional leaders in Hunan University of Science and Engineering under Hunan Province.

5.1 Research Design

This research reviewed the important competency theories and management papers of local universities in China, and examined typical literature on administrators' competency from both international and Chinese perspectives, and identified indicators of administrators' competency suitable for professional leaders in Hunan University of Science and Engineering through expert interviews.

5.2 Key informants

The first research consisted of documents related to administrators' competency indicators, including textbooks, article researches, and relevant research. The second research involves 28 key informants or education experts from Hunan University of Science and Engineering.

5.3 Research Instruments

The data collection instruments involved two main components. Firstly, relevant literature on the administrators' competency indicators of professional leaders was gathered and analyzed from literature reviews, the instrument included data recording forms and electronic databases collected from the internet. Secondly, after conducting content analysis, the instrument used to collect data from experts involved key event interviews.

5.4 Data Collection

All data gathering by researcher under closely advised from the research committees.

5.5 Data Analysis

The collected data were analyzed by content analysis. Code and analyze the literature of the key event interview according to the grounded theory method, extract the competency indicators, and combine the analysis of the post tasks and responsibilities of the professional leaders of Hunan University of Science and Engineering, the theoretical framework of competency model for professional leaders of Hunan University of Science and Engineering is built.

Phase 2: To develop the administrators' competency model for the professional leaders in Hunan University of Science and Engineering under Hunan Province.

5.1 Research Design

Quantitative methods were employed to collect empirical data from respondents through survey questionnaires.

5.2 Population and Sample

Population of the research was consisted of 947 who were adminstrators (dean, secretary, deputy dean), teaching office director, professional leaders, full-time teachers, and laboratory technicians of Hunan University of Science and Engineering. The sample group is used to select respondents by proportional stratified random sampling by using G*Power program. (Set as Chi-square test at: Df = 136, α err prob = .05, Effect size w = 0.4, power = 0.8), totally at least 291 persons.

5.3 Research Instruments

Based on administrators' competency indicators, the researcher developed and compiled the competency evaluation scale for professional leaders of Hunan University of Science and Engineering, and collected data through questionnaires. It consists of the following three parts.

Part I: Demographic variables, general information of the respondents, totaling 6 items, such as gender, position, age, education level, title, working years, corporate work experience, etc.

Part II: Rating scale questionnaire (Five-point rating scale), which asks about the administrators' competency model for the professional leaders of Hunan University of Science and Engineering, totaling 35 items.

Part III: Suggestions and additional comments (Open Ended).

5.4 Data Collection

The steps for data collection will be as follows:

Step 1: Request permission to collect data for research to the Educational Faculty, Bangkoktnonburi university

Step 2: Request a letter of recommendation for the researcher from the Educational Faculty, Bangkoktnonburi university

Step 3: Selection of the coordinating teachers to help assist in coordinating data collection in each institution. Those will be oriented to understand the details of the questionnaire administration and data collection.

Step 4: Carry out data collection with the selected samples by sending questionnaires to the coordinator teacher who will help collect data with the selected samples in each college.

5.5 Data Analysis

Data analysis and statistics used in the research are as follows:

1. Descriptive statistics such as frequencies and percentages were utilized to analyze the gender, age, position, educational background, job title, and work experience of the respondents. This analysis was performed using statistical software packages.

2. Researchers utilized the arithmetic mean, as Best's analysis (John W. Best, 1997: 190), to examine the model for developing administrators' competency among professional leaders. (To interpretation the level of administrators 'competency.) as follow:

Mean score 1.00-1.49 mean the respondent perception was lowest level
1.50-2.49 mean the respondent perception was low level
2.50-3.49 mean the respondent perception was moderate level
3.50-4.49 mean the respondent perception was high level
4.50-5.00 mean the respondent perception was highest level

3. Bartlett's statistical analysis, which is a statistical test of the correlation matrix hypothesis between variables and Identity Matrix, considering the Bartlett's test of Sphericity and the probability that Is there an appropriate correlation to be used for further component analysis. By considering the statistical significance and analysis of the Kaiser-Myers-Allkin index. (Kaiser-Mayer-Olkin Measurers of Sampling Adequacy: MSA) Considering the criterion, a value greater than .80 indicates very good, less than .50 indicates invalid (Kim & Muclle, 1978)

4. Confirmatory Factor Analysis by testing the conformity of the structural correlation model and weighting the sub variables used to generate the empirical data indicators obtained from the weighted analysis of the data from the questionnaire. The sub variables used to generate the indicators and to verify the coherence of the research model are the theoretical models created by the researcher by analyzing second-order confirmation elements with the empirical data. Thereafter, the coherence of the research model with the empirical data was examined. If the results of the first data analysis do not meet the specified criteria,

the researcher must adjust the model to meet the specified criteria. According to the viewpoint of Fornell, & Larcker (1981). Diamantopoulos & Siguaw (2000), Hair, et.al, (2010), Kelloway (2015), the statistical values to be used as the audit criteria are as follows:

(1) Chi-square Statistics is a statistical value used to test the statistical hypothesis that the function Harmony is zero. The lower the Chi-square Statistics, the closer to zero the model is consistent with the empirical data.

(2) Harmony Level Index (Goodness-of- Fit Index: GFI), which is the ratio of the difference between the harmonious functions from the model before and after the model was adjusted to the harmonization functions before the model was adjusted GFI values from 0.90-1.00 indicate that the model was consistent with the empirical data.

(3) Adjusted Goodness-of-Fit Index (AGFI), in which the GFI is adjusted taking into account the size of freedom (df), which includes the number of variables and the sample size if the AGFI values from 0.90-1.00 indicate that the model is consistent with the empirical data.

(4) Root Mean Square Error of Approximation (RMSEA) error indicates the dissonance of the model generated with the population covariance matrix which is A value of RMSEA less than 0.05 indicates that the model is consistent with the empirical data.

(5) Apply the results of the analysis to verify the consistency of the model. The following criteria were selected for indicators showing Factor Loading: 1) equal to or greater than 0.7 for parent component (Farrell & Rudd, 2011), and 2) equal to or greater than 0.30 for sub-element and identifier (Point Tacq,1997).

6. Research Results

From the research objectives, as showed by Figure 1 and Table 1 the major findings were revealed as follows:

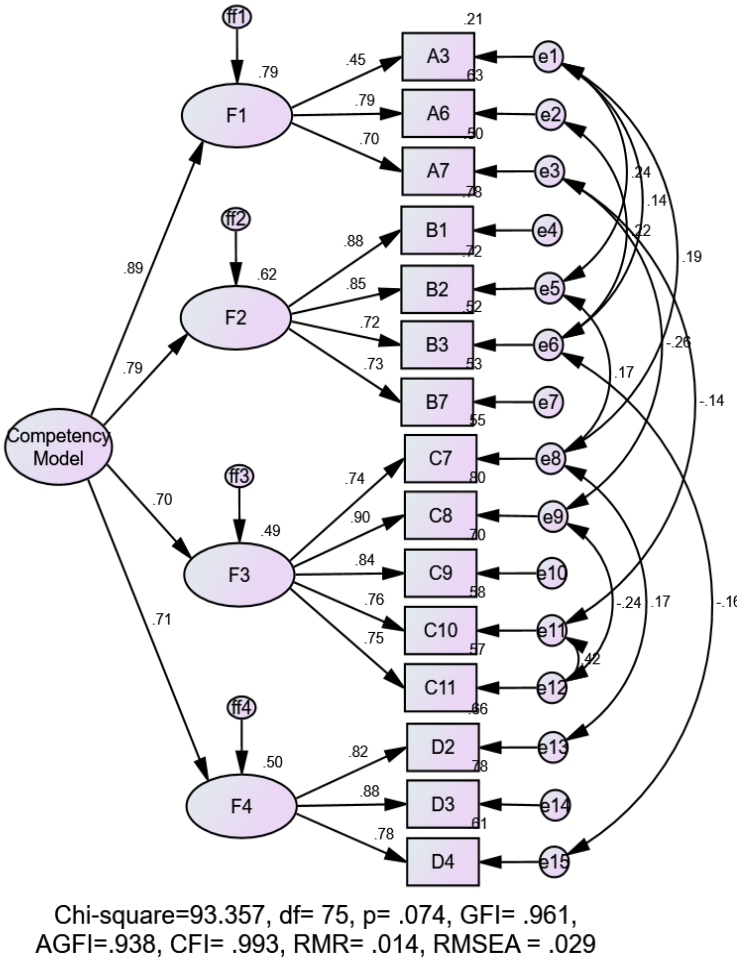

Figure 1 Show the second order of administrators' competency model that consistent with the empirical data

Table 2 Show statistical value of professional leaders' competency model required by professional leaders of Hunan University of Science and Engineering

	Latent and indicator	Standardized Factor loading	C.R.	A.V.E	Z-test	p	R^2
Administrators 'competency model for professional leaders'	Component1	0.89	0.70	0.46	-	0.00	0.79
	- A3	0.46			7.16	0.00	0.21
	- A6	0.79			-	-	0.63
	- A7	0.71			10.70	0.00	0.50
	Component2	0.79	0.88	0.64	9.94	0.00	0.62
	- B1	0.88			-	-	0.74
	- B2	0.85			18.36	0.00	0.72

	Latent and indicator	Standardized Factor loading	C.R.	A.V.E	Z-test	p	R^2
	- B3	0.72			14.33	0.00	0.52
	- B7	0.73			14.47	0.00	0.53
	Component3	0.72	0.87	0.69	9.21	0.00	0.49
	- C7	0.74			15.39	0.00	0.55
	- C8	0.90			-	-	0.80
	- C9	0.84			18.48	0.00	0.70
	- C10	0.76			15.68	0.00	0.58
	- C11	0.76			14.03	0.00	0.57
	Component4	0.71	0.90	0.64	9.18	0.00	0.50
	- D2	0.82			16.29	0.00	0.66
	- D3	0.89			-	-	0.78
	- D4	0.78			15.53	0.00	0.62

6.1 There were 4 components and 15 indicators of administrators' competency model for professional leaders of Hunan University of Science and Engineering under Hunan Province, namely:

Component 1: Professional quality, with the factor loading = 0.89, R^2 = 0.79. It consisted of 3 indicator : A3- As a professional leader, he reminds himself to be a qualified professional leader and requires yourself to ask himself in accordance with the behavioral norms of excellent professional leaders; A6- If professional leaders are dissatisfied with the status quo, he will actively reflect on the shortcomings and defects of the current professional construction; and A7- Professional leaders are to serve teachers and students, so that teachers and students are satisfied

Component 2: Management ability, with the factor loading = 0.79, R^2 = 0.62. It consisted of 4 indicators: B1- Professional leader are able to remain calm and calmly solve problems in the face of challenges, B2- Professional leaders can improve the cohesion of the teaching team through various channels, B3- Professional leaders can help young faculty grow in research and teaching, and B7- Professional leaders have autonomy in matters related to professional construction

Component 3: Professional ability, with the factor loading 0.72, R^2 = 0.49. It consisted of 5 indicators : C7- Professional leaders can carry out top-level planning and design of the curriculum system according to the needs of talents and the diverse needs of students, C8- Professional leaders must have strong professional scientific research capabilities, C9- Professional leaders can actively excavate corporate teaching resources and develop school -based textbooks according to the internal needs of the talent training plan, C10- Professional leaders can grasp the operation of the entire education as a whole, and actively seek reform channels and methods for the hidden dangers of teaching, and C11- Professional leaders should serve local and cultivate talents for local

Component 4: Communication and coordination ability, with the factor loading = 0.71, R^2 = 0.50. It consisted of 3 indicators: D2- Professional leaders can think in other places and think about the problem from the opponent's position, D3- Professional leaders can timely feedback the difficulty of work or existence to relevant leaders in a timely manner, and D4- Professional leaders can handle work-related matters flexibly and correctly.

6.2 The professional leaders' competency model for Hunan University of Science and Engineering that developed was fit with the empirical data. The value of Chi-square = 93.36, Degree of freedom =75, Goodness of Fit Index = 0.96, Tucker-Lewis Index = 0.99, and Root Mean Square Error of Approximation =0.03, all in line with specified criteria. And finally, the model can rank order as follows: 1) Professional quality, 2) Management ability, 3) Professional ability, and 4) Communication and coordination ability. In conclusion the administrators' competency model for professional leaders in Hunan University of Science and Engineering under Hunan Province as showed in Figure 2

Figure 2 administrators' competency model Conceptual Chart for professional leaders in Hunan University of Science and Engineering under Hunan Province

7. Discussion

7.1 Discussion about major findings of objective 1

Based on research objective 1, the discussion was presented as follows:

There were 4 components and 15 indicators of administrators' competency required by professional leaders of Hunan University of Science and Engineering which consisted of: (1) Professional quality, (2) Managerial ability, (3) Professional ability, and (4) Communication and coordination ability.

The major findings were revealed as such because these components and corresponding indicators can improve the administrators' competency for professional leaders of Hunan University of Science and Engineering and even the whole local universities. The administrators' competency of professional leaders can fully leverage the initiative and enthusiasm of professional leaders and team members within an organization, enhancing the organization's self-regulation and adaptability. This has become a development trend in management research in the new century. This research finding was in accordance with the theories or research of Wang Yanan(2018) , Lv Sufang(2016), Zhang Wenjing & Wang Zhongchang(2022), and Wang Jing (2013), which was found that "Composition of Professional Leadership Competencies", "Strategies for Professional Leadership Competency Development", "Factors Influencing Competency Development", "Construction of Professional Leadership Competency Model", "Qualification Requirements for Professional Leaders", "Role Positioning of Professional Leaders", "Paradigms for Competency Model Construction", "Current Status of Professional Leadership Competency Development", "Realistic Challenges in Professional Leadership Competency Development", "Conceptual Connotation of Professional Leaders", "Competency Model and Assessment Research", etc.

7.2 Discussion about major findings of objective 2

Based on the research objectives 2, the discussion was presented as follows:

The questionnaire's reliability and validity are of high quality. For the reliability, it was analyzed by Cronbach's alpha at 0.94. For the validity, it was analyzed by KMO at 0.92. Through Confirmatory factor analysis (CFA), the commonly used model fit indices for an AMOS model include: Chi-Square, CFI, TLI, RMSE, and AGFI. The above values of the model fitting index are above the standard values, indicating that the model fitting is better.

Based on the above discussion, the researcher had proposed a reasonable administrators' competency Model for professional leaders in Hunan University of Science and Engineering under Hunan Province, consisting of 4 components and 15 indicators.

8. Recommendations

8.1 Recommendation for Policies Formulation

1. Improve the salary incentive system for professional leaders of Hunan University of Science and Engineering

2. Improve the performance appraisal system for professional leaders of Hunan University of Science and Engineering

3. Improve the promotion system for professional leaders of Hunan University of Science and Engineering

4. Establish smooth communication channels

5. Create a working environment of mutual trust

6. Create a learning-oriented cultural atmosphere

8.2 Recommendation for Practical Application

1. Use the competency model to reasonably appoint and configure professional leaders.

2. Improve the construction of training system based on competency

3. Gradually spread organizational leadership to grassroots teaching units

8.2 Recommendation for Further Research

This research focuses on the situation and new requirements of professional leaders at Hunan University of Science and Engineering under the background of local university transformation. It addresses the practical need for an administrators' competency model that is currently lacking. The research innovatively constructs an administrators' competency model suitable for professional leaders at Hunan University of Science and Engineering. Based on the current status of administrators' competency among professional leaders at the university, it constructed an administrators' competency model, followed by an application analysis.

Although the research results of the administrators' competency model for professional leaders at Hunan University of Science and Engineering are relatively ideal, there are still some limitations due to time constraints, limited conditions, and the researcher's own

knowledge and capabilities: Firstly, at the theoretical level, this research pays insufficient attention to the internal driving force of professional leaders at Hunan University of Science and Engineering. Secondly, there are limitations in the research sample.

In the future, in practical work and research, further research of administrators' competency and administrators' competency model theories will be conducted. The administrators' competency model scale for professional leaders at Hunan University of Science and Engineering will be further improved. The research scope will be expanded, and a more widely applicable administrators' competency model scale for professional leaders at the university will be constructed to guide practical work. Subsequently, further application-oriented research on the administrators' competency model scale will be conducted, aiming to promote the universally applicable administrators' competency model to relevant universities and develop more targeted and practical administrators' competency models for specific universities.

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