THE COMPETENCY MODEL FOR HEAD DEPARTMENT
OF ZHENGZHOU UNIVERSITY OF INDUSTRAIL TECHNOLOGY

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Abstract

The objectives of this research were (1) to determine the components and indicators of competency for head departments at Zhengzhou University of Industrial Technology (ZUIT); and (2) to propose and verify the head department's competency model for ZUIT in Henan city. This research utilized a mixed-method approach, including both qualitative and quantitative research. The population consisted of 1,250 individuals, including head departments, full-time teachers, and staff of ZUIT. A proportional stratified random sampling method was used, resulting in a sample of 320 individuals. Data collection instruments included semi-structured interviews and a five-level rating scale questionnaire. The statistics used for data analysis were descriptive statistics, Exploratory Factor Analysis (EFA), and Confirmatory Factor Analysis (CFA). The research results revealed that (1) there were six components and 37 indicators of head department competencies for ZUIT in Henan city, consisting of: leadership competency, directing subordinate competency, personal competency, professional competency, managerial competency, and analyzing and deciding competency; and (2) the competency model for ZUIT's head departments was consistent with the empirical data. The value of Relative Chi-square (χ^2/df) = 1.91, Degree of Freedom (df) = 155, Goodness of Fit Index (GFI) = 0.95, Tucker-Lewis Index (TLI) = 0.98, and Root Mean Square Error of Approximation (RMSEA) = 0.05, all meeting specified criteria. The key components had weights between 0.91 and 0.97, higher than 0.70.

บทคัดย่อ

วัตถุประสงค์ของการวิจัยนี้คือ (1) เพื่อกำหนดองค์ประกอบและตัวชี้วัดความสามารถสำหรับ หัวหน้าภาควิชาที่มหาวิทยาลัยเทคโนโลยีอุตสาหกรรมเจิ้งโจว (ZUIT); และ (2) เพื่อเสนอและตรวจสอบ รูปแบบความสามารถของหัวหน้าภาควิชาสำหรับ ZUIT ในเมืองเหอหนาน การวิจัยนี้ใช้วิธีการผสมผสานทั้ง การวิจัยเชิงคุณภาพและเชิงปริมาณ ประชากรประกอบด้วยบุคคลจำนวน 1,250 คน ซึ่งเป็นหัวหน้า ภาควิชา ครูประจำ และเจ้าหน้าที่ของ ZUIT วิธีการสุ่มตัวอย่างแบบสัดส่วนถูกใช้สำหรับการสุ่มตัวอย่าง รวมทั้งสิ้น 320 คน เครื่องมือที่ใช้ในการเก็บข้อมูลได้แก่ แบบสัมภาษณ์กึ่งโครงสร้างและแบบสอบถาม ระดับการให้คะแนนห้าระดับ สถิติที่ใช้ในการวิเคราะห์ข้อมูลได้แก่ สถิติเชิงพรรณนา การวิเคราะห์ปัจจัยเชิง สำรวจ (EFA) และการวิเคราะห์องค์ประกอบเชิงยืนยัน (CFA) ผลการวิจัยเปิดเผยว่า (1) มีองค์ประกอบ 6 องค์ประกอบและตัวชี้วัด 37 ตัวของความสามารถของหัวหน้าภาควิชาสำหรับ ZUIT ในเมืองเหอหนาน ประกอบด้วย: ความสามารถในการเป็นผู้นำ ความสามารถในการสั่งการผู้ใต้บังคับบัญชา ความสามารถส่วน บุคคล ความสามารถทางวิชาชีพ ความสามารถในการจัดการ และความสามารถในการวิเคราะห์และ ตัดสินใจ; และ (2) รูปแบบความสามารถของหัวหน้าภาควิชาสำหรับ ZUIT ที่พัฒนาขึ้นนั้นสอดคล้องกับ ข้อมูลเชิงประจักษ์ ค่าความสอดคล้องสัมพัทธ์ไค-สแควร์ (χ^2/df) = 1.91 องศาอิสระ (df) = 155 ดัชนี ความสอดคล้องดี (GFI) = 0.95 ดัชนีทักเกอร์-ลูวิส (TLI) = 0.98 และค่ารากกำลังสองเฉลี่ยของความ คลาดเคลื่อนโดยประมาณ (RMSEA) = 0.05 ทั้งหมดตรงตามเกณฑ์ที่กำหนด และองค์ประกอบสำคัญมีค่า น้ำหนักระหว่าง 0.91-0.97 สูงกว่า 0.70

คำสำคัญ: ความสามารถของผู้บริหาร, มหาวิทยาลัยเทคโนโลยีอุตสาหกรรมเจิ้งโจว, เมืองเหอหนาน

Introduction

Since the implementation of the college enrollment expansion policy in China, the employment problem of college graduates has gradually become a significant social issue. In 1999, the state implemented this policy, and the number of college graduates that year was 848,000. The number of graduates has continued to increase since then, with China's higher education transforming from elite education to mass education (Zeng, 2004). By 2020, the number of college graduates reached 8.74 million, 10.3 times the number in the first year of the enrollment expansion. This substantial increase underscores the urgent need

for effective educational management to ensure the employability of graduates and the overall quality of education provided.

Colleges play a crucial role in providing educational services and achieving societal development goals. As institutions responsible for shaping the future workforce, colleges must be well-managed to foster development and maintain high standards of education. Therefore, college administrators are key to successful educational management (Chanchai, 1997). Effective administration directly influences the institution's ability to meet its goals and objectives, impacting the quality and relevance of education delivered to students.

The rapid expansion of higher education has resulted in various challenges, including the need for competent management to ensure quality education and the employability of graduates. This shift requires college administrators to possess a high level of competency in various areas to manage educational institutions effectively. Competency in administration not only supports the vision, mission, and strategy of the organization but also serves as a framework for creating corporate culture and managing human resources, including selection, training, promotion, and position adjustments (Narongwit Saenthong, 2004).

Research indicates that human development requires more extended periods than technology development, emphasizing the importance of developing competencies (Narongwit Saenthong, 2004). Competency is defined as the knowledge, abilities, skills, characteristics, values, and personality traits that drive individuals to perform successfully according to required standards (Spencer & Spencer, 1993). Competencies are critical for achieving the vision, mission, and goals of educational institutions effectively (McClelland, 1999; Boyatzis, 1982).

Recognizing the importance of competencies for school and college heads, this research aims to identify the key competencies required for head departments at Zhengzhou University of Industrial Technology (ZUIT) in Henan province. This research addresses a gap in existing studies by focusing on ZUIT, an institution in a rapidly developing region of China. The study seeks to identify and develop the necessary competencies for ZUIT's head departments to enhance their effectiveness in educational management. In addition to administrative skills, the modern educational landscape demands that administrators be adaptable, innovative, and capable of leading change. This includes fostering an environment that encourages critical thinking, creativity, and continuous

learning among staff and students (Goleman, Boyatzis, & McKee, 2002). Effective administrators must also be able to navigate complex social and political landscapes, manage resources efficiently, and build strong relationships with stakeholders (Hellriegel, Jackson, & Slocum, 2005).

A robust competency model is essential for preparing educational leaders who can meet these demands. Such a model provides a clear framework for self-assessment and professional development, helping administrators understand their strengths and areas for improvement. It also aids in the selection and training of future leaders, ensuring they possess the necessary skills to lead effectively in a dynamic educational environment. This study not only aims to benefit ZUIT by providing a tailored competency model for its head departments but also contributes to the broader field of educational administration by offering insights into the competencies needed for effective leadership in higher education institutions. By developing and validating a competency model, this research ensures that educational leaders are equipped to meet the challenges of the 21st century, driving their institutions towards success and sustainability.

Research Questions

1. What are the components and indicators of competencies required by heads of departments?

2. What is the competency model for heads of departments at ZUIT in Henan city?

Research Objectives

1. To determine the components and indicators of competencies for heads of departments at ZUIT in Henan city.

2. To develop the competency model for heads of departments at ZUIT in Henan city.

Research Hypothesis

The competency model for heads of departments at ZUIT is fit with the empirical data.

Research Method

1. Research Design

A mixed-method approach was used, incorporating both qualitative and quantitative methods. Initially, qualitative methods were employed to identify the components and indicators of the competency model through content analysis of relevant documents and research, including interviews with nine key informants. Subsequently, quantitative methods were used to collect empirical data from respondents through a survey questionnaire.

2. Population and Sample

The population included 1,250 heads of departments, teachers, and staff at ZUIT. Stratified random sampling was used to select a sample of 320 individuals.

3. Research Instruments

Data collection instruments included semi-structured interview forms, data record notes, and a three-part questionnaire:

Part I: Demographic variables (e.g., gender, age, education level, position, working years)

Part II: Five-point rating scale questionnaire on administrator competencies for ZUIT in Henan city

Part III: Open-ended questions for respondent comments

Validity and Reliability of the Instrument:

The questionnaire design yielded 80 items. After the Item-Objective Congruence (IOC) conducted by five experts, items with an overall score greater than 0.60 were retained. Scale reliability was measured using Cronbach's alpha coefficient, with all items scoring higher than 0.80 and an overall coefficient of 0.91, indicating high reliability.

4. Data Collection

Data collection followed these steps:

1. Request permission to collect data from the Faculty of Education, Bangkokthonburi University.

2. Obtain a letter of recommendation from the Faculty of Education, Bangkokthonburi University.

3. Coordinate with school administrators to assist in data collection.

4. Distribute questionnaires to selected samples through coordinators.

5. Data Analysis

1. Descriptive statistics (frequency, percentage, mean, standard deviation, skewness, kurtosis) were used to describe the variables. The mean score interpretation criteria were as follows:

1.00 – 1.49: Very low	3.50 – 4.49: High
1.50 – 2.49: Low	4.50 – 5.00: Very high
2.50 – 3.49: Moderate	

2. Exploratory Factor Analysis (EFA) determined the components and indicators of administrator competencies. The Bartlett's Test of Sphericity and the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) indicated the data was suitable for factor analysis.

3. Composite Reliability (CR) and Average Variance Extracted (AVE) assessed the convergent validity of the CFA measurement model.

4. Confirmatory Factor Analysis (CFA) verified the competency model. The analysis included Pearson correlation coefficients and statistical measures such as the model fit indices namely:

Chi-square (χ^2): This statistic tests the overall fit of the model. A lower Chi-square value indicates a better fit. However, Chi-square is sensitive to sample size, so other fit indices are also considered (Hu & Bentler, 1999).

Relative Chi-square (χ^2/df): This is the ratio of Chi-square to the degrees of freedom. A value of 2 or below indicates a good fit (Schumacker & Lomax, 2010).

Goodness of Fit Index (GFI): GFI measures the fit of the model to the observed data. Values between 0.90 and 1.00 indicate a good fit (Jöreskog & Sörbom, 2012).

Adjusted Goodness of Fit Index (AGFI): AGFI adjusts the GFI for the number of degrees of freedom. Values between 0.90 and 1.00 indicate a good fit (Byrne, 2013).

Comparative Fit Index (CFI): CFI compares the fit of the target model to an independent model. Values above 0.90 indicate a good fit (Bentler, 1990).

Tucker-Lewis Index (TLI): TLI compares the fit of the model to a baseline model. Values above 0.90 indicate a good fit (Tucker & Lewis, 1973).

Root Mean Square Error of Approximation (RMSEA): RMSEA measures the approximate fit of the model to the population covariance matrix. Values below 0.05 indicate a close fit, and values up to 0.08 represent reasonable errors of approximation (Browne & Cudeck, 1993).

Research Results

1. The research revealed six components and 49 indicators of head department competencies at ZUIT, including: Personal competency, Professional competency, Managerial competency, Directing subordinate competency, Leadership competency, Analyzing and deciding competency.

Personal competency refers to the individual's ability to manage themselves effectively and continuously seek personal and professional growth. The indicators include:

- Continuous education and research
- Maintaining a strict work schedule
- Focusing on progress and seeking good opportunities
- Exhibiting enthusiasm for the job
- Acting as a role model
- Supporting personnel development
- Providing advice and solving problems
- Demonstrating integrity and ethical behavior
- Showing resilience and adaptability
- Commitment to lifelong learning

Professional competency involves the ability to manage organizational structures, support community cooperation, and utilize analytical data for decision-making. The indicators include:

- Using analytical data to research the needs of teachers, learners, and communities
- Managing organizational structures effectively
- Promoting community cooperation and participation
- Adapting work styles to suit different groups
- Communicating effectively with stakeholders
- Analyzing and synthesizing educational management knowledge
- Mobilizing resources and local wisdom
- Applying principles and theories of educational administration
- Encouraging professional development among staff

Managerial competency encompasses the ability to apply knowledge to work development, policy implementation, and understanding organizational management principles. The indicators include:

- Implementing policies and creating understanding among colleague
- Applying knowledge continuously to develop work
- Understanding principles of organizational management
- Managing budgeting and resource utilization
- Using technology effectively in management
- Formulating strategies related to business, religion, and politics
- Supervising new personnel
- Encouraging creativity and innovation

Directing subordinate competency involves the ability to provide clear instructions, supervise and evaluate performance, and manage team dynamics. The indicators include:

- Using assessment criteria to judge performance
- Participating in conflict resolution negotiations
- Supervising and observing personnel work
- Providing effective assignments with an emphasis on teamwork
- Motivating and persuading subordinates to work together
- Specifying duties and responsibilities clearly
- Communicating the need for organizational change
- Ensuring compliance with organizational policies

Leadership competency refers to the ability to inspire and motivate staff, create a shared vision, and build trust within the institution. The indicators include:

- Building faith among personnel both inside and outside the institution
- Making appropriate decisions and exercising leadership
- Demonstrating fairness, commitment, and respect for individual differences
- Leading the community towards sustainable development

Analyzing and deciding competency involves the ability to analyze complex situations, make informed decisions, and integrate technology in teaching and management. The indicators include:

- Setting policies and planning operations effectively
- Allocating financial resources to support activities and development

- Encouraging the search for new resources and innovations
- Assessing the quality of education management

2. The competency model was consistent with empirical data, with key component weights between 0.91 and 0.97. The model fit with the empirical data, the staistics detail as shows in Figure 1, Table 1 and Table 2
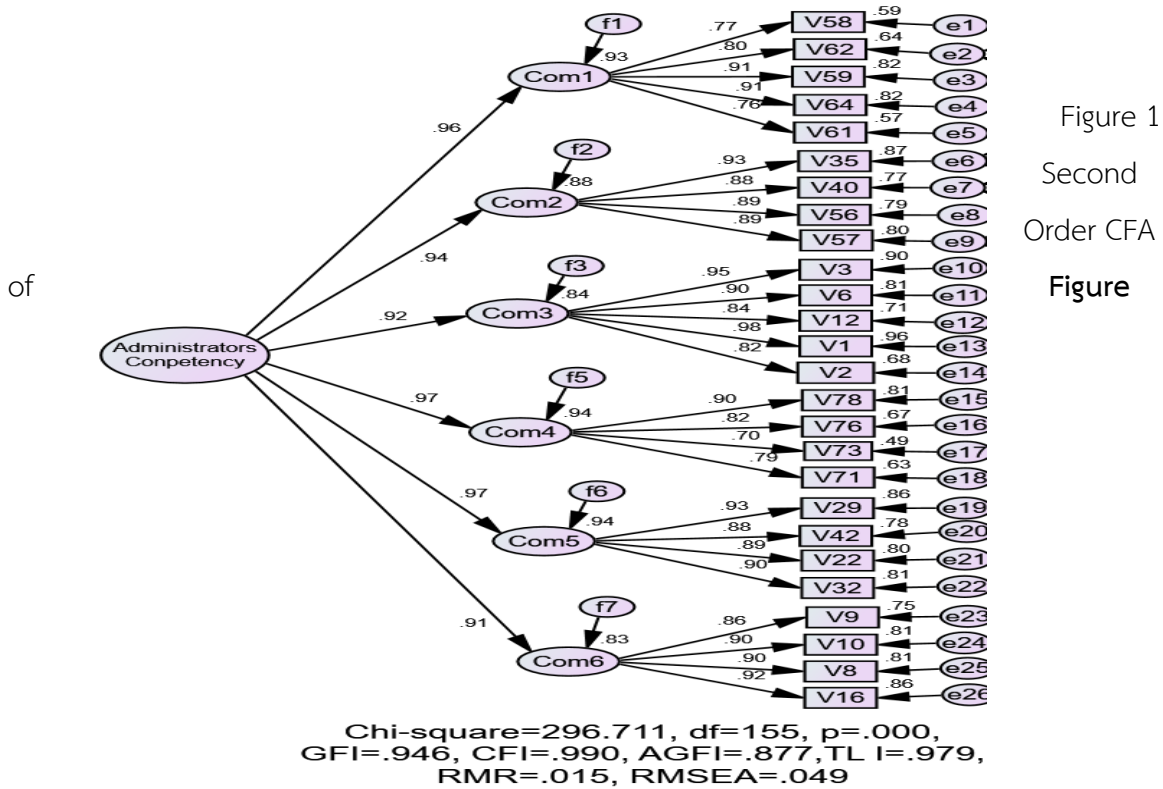
of

Chi-square=296.711, df=155, p=.000,
GFI=.946, CFI=.990, AGFI=.877,TL I=.979,
RMR=.015, RMSEA=.049

Figure 1 Administrator' competencies model

Table 1 Index value to examine the consistent with the empirical data. (final adjustment)

Value	Standard	Value after adjustment	Result
$\chi^2/$ df	2.00 or below	1.914	very good
GFI	0.90 to 1.00	0.946	very good
AGFI	0.90 to 1.00	0.877	very good
CFI	0.90 to 1.00	0.990	very good
TLI	0.90 to 1.00	0.979	very good
RMR	0.05 or below	0.015	very good
RMSEA	0.08 or below	0.049	very good

Note: Index to determine the CFA. model fit with the empirical data were cited from various reference such as: Diamantopoulos & Siguaw, 2000; Schumacker & Lomax, 2010; Jöreskog & Sörbom, 2012; Kelloway, 2015; Hair, et al, 2019; Suksawang, 2021).

Table 2 Statistical value of administrators' competency model for private vocational colleges

	Latent and observable	Standardized Factor loading	S.E.	Z-test	p	R^2
	Component 1	0.963	0.04	24.324	***	0.928
	V59	0.908	0.04	20.617		0.824
	V64	0.906	0.03	22.022		0.821
	V62	0.803	0.04	-		0.645
	V58	0.767	0.03	28.821		0.588
	V61	0.758	0.04	19.976		0.575
	Component 2	0.936	0.05	21.520	***	0.876
	V35	0.933	0.03	26.696		0.870
	V56	0.879	0.04	-		0.773
	V57	0.887	0.03	24.824		0.787
	V40	0.892	0.04	27.414		0.796
	Component 3	0.918	0.04	22.454	***	0.843
Administrators' Competencies Model	V1	0.997	0.03	31.772		0.994
	V3	0.948	0.03	-		0.899
	V6	0.900	0.04	28.147		0.810
	V12	0.845	0.04	26.989		0.714
	V2	0.824	0.04	18.379		0.679
	Component 4	0.970	0.06	15.876	***	0.940
	V78	0.901	0.05	17.776		0.811
	V76	0.821	0.04	24.367		0.673
	V71	0.792	0.04	-		0.627
	V73	0.697	0.03	18.428		0.486
	Component 5	0.971	0.04		***	0.944
	V29	0.927	0.04	29.073		0.859
	V32	0.899	0.03	-		0.808
	V22	0.893	0.03	26.393		0.798
	V42	0.882	0.03	26.650		0.778
	Component 6	0.914	0.04	22.783	***	0.835

	Latent and observable	Standardized Factor loading	S.E.	Z-test	p	R^2
	V16	0.925	0.04	26.756		0.855
	V8	0.900	0.03	29.784		0.811
	V10	0.900	0.03	29.809		0.810
	V9	0.864	0.03	-		0.747

Figure 2, abd Table 2 The statistics results showed that Administrator's Competencies for ZUIT : (1) Leadership competency has predictive power = 94.40%, key indicators wereV29: be able to build faith among personnel both inside and outside the educational institution in driving the mission of the college, V32: be able to make decisions and exercise leadership appropriately, and V22: there is fairness, commitment and respect for individual differences person; (2) Directing subordinate competency had predictive power = 94.40% key indicators were: V78: assessment criteria are used to judge performance, V76: participate in conflict resolution negotiations, and V71: there are effective assignments emphasis on teamwork; (3) Personal competency: Predictive power = 92.80%, key indicators: V59: Continuing education and research to stay updated with new academic and professional knowledge, V64: Maintaining a strict work schedule and setting time to complete tasks, V62: Focusing on progress and seeking opportunities; (4) Professional competency: Predictive power = 87.60%, key indicators: V35: Using analytical data to research the needs of teachers, learners, and communities, V40: Managing organizational structure and defining roles appropriately, V57: Adapting work styles to suit the group; (5) Managerial competency: Predictive power = 84.30%., key indicators: V1: Implementing policies by creating understanding among colleagues and involving them in every step, V3: Applying knowledge continuously to develop work, V6: Understanding principles of organizational management, budgeting, resource utilization, finance, management, and technology; and (6) Analyzing and deciding competency: Predictive power = 83.50%, key indicators: V16: Setting policies, planning operations, and assessing the quality of education management, V8: Allocating financial resources to support activities, development, and project reviews, V10: Encouraging the search for resources and new innovations for research to enhance the teaching system.

Discussion

The results of this study identified six key components and 49 indicators of competencies necessary for head departments at Zhengzhou University of Industrial Technology (ZUIT) in Henan city. These components include personal competency, professional competency, managerial competency, directing subordinate competency, leadership competency, and analyzing and deciding competency. The identified competencies are crucial for effective educational administration and align with existing literature on educational leadership and management.

1. The leadership competency component had the highest predictive power (94.40%). This component is crucial as it involves the ability to inspire and motivate staff, create a shared vision, and build trust within the institution. Effective leadership is essential for fostering a positive organizational culture and driving institutional success (Northouse, 2019). Key indicators within this component, such as building faith among personnel and making appropriate decisions, align with the transformational leadership theory, which emphasizes the importance of inspiring and motivating followers (Bass & Avolio, 1994).

2. The directing subordinate competency also had a predictive power of 94.40%. This component includes the ability to provide clear instructions, supervise and evaluate performance, and manage team dynamics. Effective management of subordinates ensures that institutional goals are met through coordinated efforts and teamwork (Yukl, 2013). Indicators such as using assessment criteria and participating in conflict resolution are essential for maintaining high performance standards and a harmonious work environment.

3. Personal competency, with a predictive power of 92.80%, involves self-management, continuous learning, and adaptability. Administrators need to exhibit enthusiasm, maintain a strict work schedule, and continuously seek knowledge. These traits are critical for personal and professional growth, enabling leaders to adapt to changing environments and remain effective (Goleman, 2000). Indicators such as continuous education and a focus on progress align with the concept of lifelong learning, which is vital for staying current in the rapidly evolving field of education.

4. Professional competency had a predictive power of 87.60%. This component includes the ability to manage organizational structures, support community cooperation, and utilize analytical data. Administrators with strong professional competencies can effectively manage resources, implement policies, and engage with the community to support educational goals (Leithwood, Harris, & Hopkins, 2008). Indicators such as managing

organizational structures and promoting community cooperation are consistent with the principles of effective educational leadership.

5. Managerial competency, with a predictive power of 84.30%, involves applying knowledge to work development, policy implementation, and understanding organizational management principles. Effective management is crucial for translating vision into actionable plans and achieving institutional goals (Mintzberg, 1973). Indicators such as implementing policies and understanding management principles highlight the importance of strategic planning and resource management in educational leadership.

6. Analyzing and deciding competency had a predictive power of 83.50%. This component includes the ability to analyze complex situations, make informed decisions, and integrate technology in teaching. Effective decision-making is essential for addressing challenges and capitalizing on opportunities in the educational sector (Simon, 1960). Indicators such as policy formulation and resource allocation emphasize the importance of strategic thinking and problem-solving skills.

The findings of this study are consistent with existing literature on educational leadership and competency models. Competency-based approaches in educational administration are widely recognized for their effectiveness in enhancing leadership performance and institutional outcomes (Spencer & Spencer, 1993; Boyatzis, 1982). Effective leaders are characterized by their ability to inspire and motivate others, manage resources efficiently, and adapt to changing environments (Northouse, 2019; Yukl, 2013). Research by Goleman, Boyatzis, and McKee (2002) on emotional intelligence supports the importance of personal and professional competencies in educational leadership. Their work highlights the need for leaders to possess self-awareness, self-regulation, and social skills to effectively manage themselves and their relationships with others.

The results also align with the work of Leithwood, Harris, and Hopkins (2008), who identified key practices of successful school leaders, including setting directions, developing people, and redesigning the organization. These practices are reflected in the identified competencies of leadership, directing subordinates, and managerial skills.

The competency model developed in this study provides a comprehensive framework for assessing and developing the skills of head departments at ZUIT. By identifying key competencies and their indicators, this model can be used for self-assessment, professional development, and training purposes. It offers a structured

approach to improving leadership effectiveness and enhancing the overall quality of education at ZUIT.

Educational institutions can use this model to guide the selection and training of future leaders, ensuring they possess the necessary competencies to navigate the complexities of modern educational environments. Furthermore, the model can serve as a benchmark for evaluating leadership performance and identifying areas for improvement.

Recommendations

1. Recommendation for Policies Formulation

1) Administrators at ZUIT should monitor and evaluate their competencies across the six identified components: personal competency, professional competency, managerial competency, directing subordinate competency, leadership competency, and analyzing and deciding competency. Improvements can be achieved through self-improvement or in-service training.

2) Emphasis should be placed on maintaining and improving personal competency skills, such as enthusiasm for job completion, progress-focused activities, continuous learning, and serving as role models for personnel development.

3) Professional competency development should focus on supporting the use of analytical data, fostering community cooperation, managing organizational structures, and effectively communicating with the community.

4) Managerial competency should include continuous application of knowledge for work development, policy implementation, creative problem-solving, and understanding organizational management principles.

5) Directing subordinate competency should emphasize using assessment criteria, participating in conflict resolution, supervising personnel, effective assignments, teamwork, and motivating subordinates.

6) Leadership competency should develop skills for building faith among personnel, making appropriate decisions, and leading educational institutions effectively, even under crisis.

7) Analyzing and deciding competency should support technology integration, resource allocation, policy formulation, and broad, in-depth situation analysis.

2. Recommendation for Further Research

1) Comparative studies between public and private vocational colleges under the Office of the Vocational Education Commission should be conducted to evaluate administrators' competencies.

2) Research and development (R&D) should be employed to assess the impact of management based on this research's findings on college administration effectiveness.

3) Future research should use a qualitative model leading to quantitative studies to investigate factors influencing the effectiveness of private vocational colleges in Bangkok or other areas of Thailand, creating conceptual frameworks, causal relationships, and validating models.

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