

Leadership skills for the 21st century of administrators in the University of Nanning City under Guangxi Province

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ABSTRACT

This study aimed to identify the components of 21st century leadership skills among university administrators in Nanning City, Guangxi Province, and to propose implementation guidelines for enhancing these skills. A mixed-methods design was used. Quantitative data were collected from 310 professors selected through stratified random sampling from 1,551 professors across ten universities, while qualitative data were obtained from focus group discussions with 9 experts. The conceptual framework, synthesized from relevant literature, initially included six dimensions: vision, organizational management, communication, staff development, strategic planning, and collaboration. Quantitative data were analyzed using descriptive statistics and exploratory factor analysis, and qualitative data were analyzed through content analysis. Findings showed a high overall level of leadership skills among administrators ($M = 4.12$). The data were suitable for factor analysis ($KMO = 0.829$; Bartlett's Test, $\chi^2 = 14,615.382$, $p < .001$). Seven components were identified: organizational management, visionary management, staff development, collaborative leadership, communication competence, systematic management, and strategic planning. Together, they explained 62.298% of the total variance. Based on these findings, 33 implementation guidelines were proposed to support leadership development and strengthen institutional effectiveness in higher education.

KEYWORDS: Leadership Skills for the 21st Century, University Administrators, Higher Education Leadership, Nanning City, Guangxi Province

Introduction

The 21st century presents unprecedented challenges such as terrorism, poverty, global warming, and war, alongside rapid technological development (Yvette Mucharraz, 2016). Economic globalization has intensified competition among nations, with human resources becoming a decisive factor. As institutions responsible for cultivating talent, universities play a critical role in advancing national science,

technology, and culture, while administrators shape both institutional development and broader societal progress. In this context, leadership has become a key determinant of organizational performance. Furthermore, innovation has emerged as a transformative force in leadership, with creativity identified as its core (Csikszentmihalyi, 2013; Sternberg, 2002; Sternberg, Kaufman, & Pretz, 2004).

As higher education institutions continue to experience rapid technological

advancement and digital transformation, the expectations placed upon university administrators have expanded significantly. Beyond traditional managerial responsibilities, contemporary leaders are required to navigate complex organizational environments characterized by technological disruption, increased stakeholder expectations, internationalization, and evolving educational models. Effective leadership in the digital era requires administrators to demonstrate strategic vision, organizational management capability, communication competence, collaborative leadership, staff development expertise, systematic management, and strategic planning. These competencies enable leaders to foster innovation, facilitate organizational learning, strengthen institutional adaptability, and promote sustainable development. Consequently, leadership skills have become increasingly important for ensuring that higher education institutions remain competitive, resilient, and responsive to societal changes in the twenty-first century (Mumford, Campion, & Morgeson, 2007; Kurniady et al., 2020; Oliveira & Saraiva, 2023; Keil et al., 2024).

The challenges in China's higher education system stem from multiple factors. First, resources are unevenly distributed, with high-quality universities concentrated in developed areas, while remote and rural regions remain underserved. Of more than 3,000 universities, only about 5% are considered high-quality and are mostly located in first-tier cities (Ministry of Education of the People's Republic of China, 2024). This has widened the gap between eastern and western regions. Second, the quality of education varies significantly, with some universities excelling in faculty, research, and facilities, while others suffer from weak teaching and limited student opportunities. Third, systemic rigidity hinders progress, as outdated structures, curricula, and regulations fail to meet the demands of modern society, underscoring the need for innovation and reform (Li & Chen, 2023). These challenges require university administrators to possess diverse leadership

competencies that can effectively support institutional transformation, improve governance quality, and enhance organizational performance in a rapidly changing educational environment.

Although previous studies have examined leadership skills and leadership competencies in educational settings, most have focused on schools, general educational organizations, or specific leadership dimensions. Limited empirical research has investigated the underlying components of leadership skills required for university administrators within the context of higher education transformation in China, particularly in Nanning City under Guangxi Province. Moreover, the accelerating pace of digital transformation and organizational change has created new demands for leadership competencies that may differ from those identified in previous studies. Therefore, there is a need to systematically identify and validate the essential leadership skill components required by university administrators and to develop practical guidelines that can support effective leadership development in contemporary higher education institutions.

The findings of this study are expected to contribute both theoretically and practically. Theoretically, the study expands the body of knowledge on leadership skills for the 21st century by identifying empirically validated leadership components relevant to higher education administrators. Practically, the findings provide a framework for policymakers, university leaders, and educational practitioners to design leadership development programs, strengthen institutional governance, enhance organizational effectiveness, and support sustainable university development. The proposed guidelines may also serve as a reference for improving leadership capacity among university administrators in Guangxi Province and other higher education institutions facing similar challenges in the digital era.

Research Objectives

1. To study components of leadership skills for the 21st century of administrators in the university of Nanning city under Guangxi Province

2. To propose guidelines for leadership skills for the 21st century of administrators in the university of Nanning city under Guangxi Province

Literature Review

Leadership Skills for the 21st Century

Mumford, Campion, and Morgeson (2007) proposed that effective leadership requires a combination of cognitive, interpersonal, business, and strategic skills. Leaders at higher organizational levels need strong strategic thinking, decision-making, communication, and organizational management competencies to cope with increasingly complex environments. Their framework highlights the importance of integrating multiple leadership skills to achieve organizational effectiveness. Kurniady et al. (2020) emphasized that leadership in higher education management requires administrators to possess vision, collaboration, communication, innovation, and the ability to manage institutional change. University leaders must be capable of fostering organizational learning, promoting teamwork, and responding effectively to the challenges of globalization and educational transformation. Oliveira and Saraiva (2023) argued that the emergence of Education 4.0 and digital transformation has reshaped leadership requirements in higher education. Contemporary leaders are expected to demonstrate adaptability, strategic planning, digital awareness, communication competence, and innovation-oriented management. These competencies enable institutions to remain competitive and sustainable in rapidly changing educational environments.

Based on the above perspectives, leadership skills for the 21st century can be defined as a combination of strategic, managerial, communication, collaborative,

and developmental competencies that enable university administrators to effectively lead institutional transformation and achieve sustainable organizational success in the digital era.

Research Design

This study employed a mixed-methods research design consisting of quantitative and qualitative phases. The quantitative phase was conducted first to identify and validate the components of Leadership Skills for the 21st Century of university administrators in Nanning City, Guangxi Province. The qualitative phase was subsequently conducted to develop and refine implementation guidelines based on the quantitative findings.

Quantitative Research Phase:

The researcher reviewed and synthesized relevant theories, concepts, and empirical studies related to leadership skills for the 21st century. The synthesis of literature from 20 scholars resulted in six preliminary dimensions: (1) Vision, (2) Organizational Management, (3) Communication, (4) Staff Development, (5) Strategic Planning, and (6) Collaboration. Based on these dimensions, a structured questionnaire was developed to collect data from university professors.

The population consisted of 1,551 professors from ten public universities in Nanning City, Guangxi Province. The sample comprised 310 professors, determined using the Krejcie and Morgan (1970) sampling table and selected through stratified random sampling. The data collected were analyzed using descriptive statistics and Exploratory Factor Analysis (EFA) to identify the underlying components of leadership skills.

Qualitative Research Phase

Following the quantitative analysis, a qualitative study was conducted to develop implementation guidelines for enhancing leadership skills among university administrators. Nine experts from ten universities in Nanning City were selected through purposive sampling to participate in focus group discussions. The experts provided recommendations, validated the identified

leadership components, and proposed practical guidelines for implementation. The qualitative data were analyzed using content analysis.

Instruments and Quality Assessment

Two research instruments were employed in this study: a questionnaire and a focus group discussion protocol.

The questionnaire consisted of two sections. Section 1 collected demographic information of respondents, while Section 2 contained items measuring leadership skills for the 21st century based on the synthesized literature. The content validity of the questionnaire was evaluated by five experts using the Index of Item-Objective Congruence (IOC). The IOC values ranged from 0.80 to 1.00, indicating acceptable content validity. The questionnaire was subsequently pilot-tested, and reliability analysis yielded a Cronbach's alpha coefficient of 0.96, indicating excellent internal consistency.

The focus group discussion protocol was developed based on the findings from the quantitative phase and relevant literature. The protocol was reviewed by experts to ensure content relevance, clarity, and appropriateness. The IOC values ranged from 0.80 to 1.00, demonstrating satisfactory content validity. The discussion questions focused on validating the identified leadership components and generating practical recommendations for implementation in higher education institutions.

Data Analysis

Part 1: Result of Data Analysis on Questionnaire Demographic Information

The study surveyed 310 professors, of whom 70.3% were male and 29.7% female. In terms of age, 11.6% were between 20–45 years, while 88.4% were above 45 years. Regarding education, 1.9% held a bachelor's degree, 39.7% a master's degree, 52.3% a doctoral degree, and 6.1% a postdoctoral qualification. For work experience, 11.6% had less than 15 years, whereas 88.4% had more than 15 years.

Part 2 Result of Data Analysis on Questionnaire

Phase 1 involves identifying variables from the literature. The researcher conducted a content analysis and synthesis of the literature, which resulted in six key components: (1) vision, (2) organizational management, (3) communication, (4) staff development, (5) strategic planning, and (6) collaboration. A descriptive analysis was then carried out to summarize the data using mean and standard deviation.

The results indicate that the overall level of 21st-century leadership skills among university administrators in Nanning City, Guangxi Province, was relatively high (Mean = 4.12). All six components were rated at a high level. Communication received the highest rating (Mean = 4.15), followed by Vision (Mean = 4.14), Staff Development (Mean = 4.14), Collaboration (Mean = 4.12), Strategic Planning (Mean = 4.09), and Organizational Management (Mean = 4.07).

Phase 2 aims to explore the components of 21st-century leadership skills of university administrators in Nanning City, Guangxi Province. Before conducting factor analysis, the adequacy of the dataset was assessed using the Kaiser-Meyer-Olkin (KMO) Test and Bartlett's Test of Sphericity. The KMO statistic, which ranges from 0 to 1, measures sampling adequacy for factor analysis. Based on Kaiser's (1974) criteria, a KMO value above 0.90 indicates excellent suitability; values between 0.80–0.89 indicate good suitability; 0.70–0.79 are acceptable; 0.60–0.69 are marginally acceptable; and values below 0.50 suggest unsuitability for factor analysis. Bartlett's Test of Sphericity was also applied to determine whether the correlation matrix was significantly different from an identity matrix. Both tests were computed using statistical software.

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.829, exceeding the recommended minimum threshold of 0.50 and indicating a high level of suitability for factor analysis. Bartlett's Test of Sphericity produced a chi-square value of

14,615.382 with a p-value of 0.000, which is well below the 0.05 significance level. Taken

together, these results confirm that the dataset is appropriate for component analysis.

Table 1. Rotation Sums of Squared loadings

Components	Eigenvalues	Rotation Sums of Squared loadings	
		Percentage of Variance	Percentage of Cumulative
1	13.655	23.544	23.544
2	5.789	9.981	33.525
3	5.174	8.921	42.445
4	3.922	6.763	49.208
5	2.813	4.849	54.057
6	2.577	4.444	58.501
7	2.202	3.797	62.298

As presented in Table 1, based on the extraction criterion of eigenvalues greater than 1, a total of 7 principal factors were identified. The cumulative variance explained by these 7 factors reached 62.298% . And The 7 components included a total of 56 variables with factor loadings between 0.483 and 0.823. The Exploratory factor analysis (EFA) was employed to examine the questionnaire content,

yielding seven distinct guideline components for the 21st century of administrators in the university of Nanning city under Guangxi Province, as illustrated in Figure 1.

The Components for Leadership Skills for the 21st Century of Administrators in the University of Nanning City under Guangxi Province

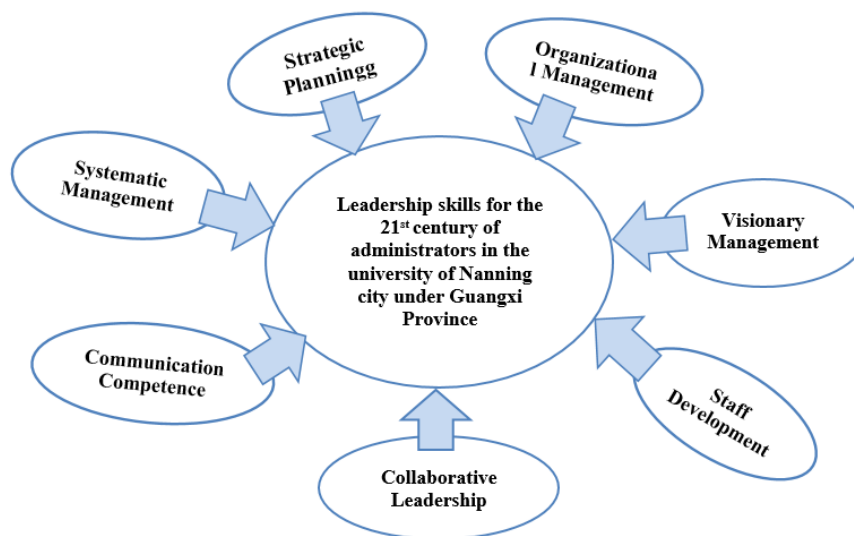


Figure 1 The Components for Leadership Skills for the 21st Century of Administrators in the University of Nanning City under Guangxi Province

This figure summarizes the seven empirically derived guideline components that constitute leadership skills for administrators in Nanning city under Guangxi Province in the 21st century.

Component 1: "**Organizational Management**" consists of 1) Convey information and ideas clearly and effectively 2) Adapt language appropriately for different audience 3) Use data or evidence for planning and decision-making 4) Foster transparent and accountable decision-making processes 5) Maintain operational effectiveness 6) Contribute effectively to achieving institutional goals 7) Engage in constructive communication with stakeholders 8) Communication fosters collaboration within the organization 9) Foster collaboration among different departments 10) Practice active listening with staff and students.

Component 2: "**Visionary Management**" consists of 1) Shape a future-oriented vision focused on long-term development; 2) Communicate their vision clearly and effectively 3) Reflects the needs and expectations 4) Define long-term goals clearly 5) Inspire and motivate others 6) Promote continuous learning and organizational improvement 7) Align with the cultural context of the university 8) Requires collaboration among stakeholders 9) Motivate staff to work together towards shared goals.

Component 3: "**Staff Development**" consists of 1) Provide development programs that meet staff needs 2) To promote collaboration and knowledge sharing 3) Align staff development with the university's organizational goals 4) Enhance staff competencies and expertise 5) Support and foster staff leadership potential 6) Adapt strategies to changing contexts 7) Assess staff's professional development needs regularly 8) Encourages continuous self-improvement and motivation 9) Plan Systematically and implement continuously staff development 10) Empowers personnel to effectively contribute to organizational success.

Component 4: "**Collaborative Leadership**" consists of 1) Foster mutual

support within teams 2) Work effectively and harmoniously with others 3) Manage group dynamics appropriately; (4) Create an open and collaborative working environment 5) Courage shared responsibility in group settings 6) Ensure that strategic decisions are aligned with the organization's overall objectives 7) Acknowledge and integrate diverse perspectives throughout the planning process 8) Considers uncertainty and potential risks when planning for the future.

Component 5: "**Communication Competence**" consists of 1) Build productive and lasting relationships with others 2) Align collaborative efforts with organizational objective 3) Communicate to advance shared organizational goals 4) Provide constructive feedback that supports development 5) To promotes understanding and organizational unity; (6) Receive suggestions and embrace new ideas 7) Promote equal participation among all stakeholders; (8) Articulate the vision and goals of the institution.

Component 6: "**Systematic Management**" consists of 1) Monitor and evaluate organizational processes 2) Pledge to realize the vision 3) Delegate tasks clearly and appropriately according to individual role 4) Engage in systematic and effective planning 5) Allocate within the university management.

Component 7: "**Strategic Planning**" consists of 1) Understand and responds effectively to complex and dynamic educational contexts 2) View the university as an interconnected system and understands how each part influences the whole 3) Set clear and strategic goals aligned with the university's vision and mission; 4) Think comprehensively and considers multiple aspects before making strategic decisions 5) Think analytically and assess complex situations logically 6) Develop long-term plans that support sustainable development.

Part 3 Analysis of implementation guidelines

The guidelines for leadership skills for the 21st century of administrators in the university of Nanning city under Guangxi Province. The objectives of this research were:

(1) to identify the components of Leadership Skills for the 21st Century of university administrators in Nanning City, Guangxi Province, and (2) to propose implementation guidelines for enhancing these leadership skills. A mixed-methods research design was employed. In the quantitative phase, data were collected from 310 professors selected through stratified random sampling from a population of 1,551 professors across ten universities in Nanning City. In the qualitative phase, nine experts participated in focus group discussions to validate and refine the findings.

The conceptual framework was synthesized from the literature and initially consisted of six dimensions: vision, organizational management, communication, staff development, strategic planning, and collaboration. The quantitative data were analyzed using descriptive statistics and Exploratory Factor Analysis (EFA), while qualitative data were analyzed through content analysis.

The findings revealed that the overall level of leadership skills among university administrators was high (Mean = 4.12). The Kaiser-Meyer-Olkin (KMO) value of 0.829 and Bartlett's Test of Sphericity ($\chi^2 = 14,615.382, p < .001$) confirmed the suitability of the data for factor analysis. The EFA results identified seven empirically derived components that explained 62.298% of the total variance. These components were: (1) Organizational Management, (2) Visionary Management, (3) Staff Development, (4) Collaborative Leadership, (5) Communication Competence, (6) Systematic Management, and (7) Strategic Planning. The findings indicate that effective university leadership in the 21st century requires an integrated framework that combines strategic direction, organizational capability, communication effectiveness, collaborative practices, and

systematic management. Based on the conceptual framework and empirical findings, 33 implementation guidelines were proposed to support leadership development and institutional effectiveness in higher education.

The 33 guidelines are as follows: 1) Listen actively to staff and students, model behavior, and accept accountability. 2) Administrator' management practices effectively contribute to achieving institutional goals in disciplinary development, faculty building, talent cultivation, and social services. 3) Optimize actively resource allocation to maximize its effectiveness. 4) Adopt data and evidence-based approaches in planning and decision-making to achieve efficient organizational operation. 5) Ensure transparency and accountability in the decision-making process. 6) Ensure university operational efficiency by building learning-oriented innovative teams and enhancing member capabilities. 7) Help employees identify shared values and goals, guiding them to reflect on their own identity and mission within the context of those values. 8) Develop a strategic road-map for the team and establish an efficient execution process. 9) Construct shared visions by adhering to the essential principle of broad participation among faculty, students, and stakeholders for visions. 10) Establish a flexible and continuous cyclical mechanism for vision tracking, monitoring, feedback evaluation, and iterative refinement. 11) Articulate a common vision that inspires stakeholders, offers extensive developmental opportunities, gains follower identification, and provides continuous guidance for organizational or team advancement. 12) Vision embodies a future-oriented, challenging perspective that emphasizes long-term developmental objectives. 13) Conduct comprehensive research and understanding of teachers' development needs. 14) Improving the Teacher Training and Development System. 15) Support and cultivate employees' leadership potential. 16) Establish scientific performance appraisal systems and regularly implement diverse evaluation processes. 17) Enhance comprehensive welfare and benefit

systems while implementing contribution-based compensation distribution to attract and retain core staff members. 18) Establish clearly defined, strategically aligned common objectives. 19) Foster an environment of academic knowledge-sharing and open collaboration within the team. 20) Facilitate conflict resolution within the team. 21) Create a relaxed and inclusive environment for innovation. 22) Establish an effective incentive mechanism. 23) Listen to and genuinely understand both staff and students. 24) Express themselves clearly, precisely, and concisely by administrators. 25) Provide timely feedback. 26) Use nonverbal communication. 27) Allocates personnel, finance, materials, and affairs systematically. 28) Coordinate a rational division of responsibilities and allocation of powers. 29) Establish an effective oversight and evaluation mechanism. 30) Enhance and perfect the capacity for strategic planning and development. 31) Construct legitimacy mechanisms for higher education strategic management. 32) Develop long-term plans that support sustainable development. 33) Enhance strategic thinking ability.

Discussion

The findings revealed that Leadership Skills for the 21st Century of university administrators in Nanning City, Guangxi Province consist of seven components: Organizational Management, Visionary Management, Staff Development, Collaborative Leadership, Communication Competence, Systematic Management, and Strategic Planning. These findings reflect the increasingly complex role of university administrators in responding to educational transformation, organizational change, and digital advancement in higher education.

The prominence of Organizational Management and Systematic Management indicates that effective university leadership requires administrators to efficiently manage resources, coordinate institutional processes, and ensure organizational effectiveness. This finding is consistent with Mumford, Campion, and Morgeson (2007), who emphasized that

leadership effectiveness depends not only on interpersonal skills but also on managerial and strategic capabilities. In contemporary higher education, administrators are expected to integrate resources, maintain accountability, and support institutional performance in increasingly dynamic environments.

The emergence of Visionary Management and Strategic Planning highlights the importance of future-oriented leadership. University administrators must be able to establish a clear institutional direction, communicate shared goals, and formulate long-term development strategies. This finding supports the view of Kurniady et al. (2020) that higher education leaders must possess the ability to guide institutional transformation and respond proactively to changing educational demands. Strategic leadership is particularly important in ensuring the sustainability and competitiveness of universities in the twenty-first century.

The identification of Staff Development, Collaborative Leadership, and Communication Competence further demonstrates that effective leadership extends beyond administrative control to encompass human resource development and stakeholder engagement. Administrators must create supportive environments that encourage professional growth, collaboration, and knowledge sharing among faculty and staff. These findings are consistent with Oliveira and Saraiva (2023), who argued that leadership in the era of Education 4.0 requires adaptability, collaboration, communication, and continuous learning. Similarly, Keil et al. (2024) emphasized that sustainable organizational development depends on leaders' ability to foster participation, innovation, and collective responsibility.

Overall, the seven components identified in this study suggest that leadership skills for the 21st century represent an integrated set of managerial, strategic, interpersonal, and developmental competencies. These competencies are essential for enabling university administrators to navigate digital transformation, enhance institutional

effectiveness, and promote sustainable development in higher education institutions.

Recommendation

Recommendations from research findings

Based on the findings that identified seven essential components of Leadership Skills for the 21st Century, Organizational Management, Visionary Management, Staff Development, Collaborative Leadership, Communication Competence, Systematic Management, and Strategic Planning, the following recommendations are proposed.

1) For Universities. Universities should establish systematic leadership development programs for administrators at all levels, focusing on the seven identified leadership competencies. Training activities should emphasize strategic thinking, vision development, communication skills, collaborative leadership, and evidence-based decision-making. In addition, universities should create continuous professional development opportunities that enable administrators to adapt to technological changes and emerging challenges in higher education.

2) For University Leadership Development and Human Resource Management. Higher education institutions should integrate the identified leadership competencies into leadership assessment, succession planning, and performance evaluation systems. Staff development programs should be designed to strengthen administrators' capabilities in strategic planning, organizational management, and team development. Universities should also encourage mentoring systems and leadership coaching to support continuous leadership growth.

3) For enhancing Inter-University Collaboration. Universities should strengthen collaboration and knowledge-sharing networks among higher education institutions.

Collaborative activities such as leadership forums, professional learning communities, joint training programs, and best-practice exchanges can facilitate the dissemination of effective leadership practices. Such cooperation may enhance administrators' capacity to address common challenges related to digital transformation, organizational innovation, and institutional governance.

4) For Government and Educational Policy Agencies. Government agencies and higher education authorities should utilize the findings as a reference for developing leadership competency frameworks and policy guidelines for university administrators. National and provincial educational authorities should support leadership development initiatives, allocate resources for administrator training, and promote policies that strengthen institutional governance, strategic management, and organizational effectiveness in higher education institutions. Particular attention should be given to preparing university leaders for the challenges associated with digital transformation and sustainable educational development.

Recommendation for Further Research:

1) Future studies should examine the leadership skills of university administrators in different regions of China or across countries to compare leadership competency patterns in diverse higher education contexts.

2) Future research should investigate the relationship between the identified leadership skill components and organizational outcomes, such as institutional effectiveness, innovation, employee performance, and university competitiveness.

3) Future studies should explore the impact of digital transformation on leadership skills and examine how digital leadership competencies contribute to sustainable development in higher education institutions.

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