

DEVELOPMENT OF A MANAGERIAL EFFECTIVENESS MODEL FOR
INTERDISCIPLINARY TEAMWORK IN ART DISCIPLINES OF
UNIVERSITIES IN ETHNIC MINORITY REGIONS IN GUANGXI

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Thesis Title Development of a Managerial Effectiveness Model for Interdisciplinary Teamwork in Art Disciplines of Universities in Ethnic Minority Regions in Guangxi

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บทคัดย่อ

งานวิจัยนี้พัฒนาและตรวจสอบความถูกต้องของแบบจำลองประสิทธิผลการบริหารจัดการสำหรับการทำงานเป็นทีมแบบสหวิทยาการในสาขาวิชาศิลปะที่มหาวิทยาลัยในมณฑลกว่างซี โดยคำนึงถึงความซับซ้อนขององค์กรและความเฉพาะเจาะจงทางวัฒนธรรมของภูมิภาค งานวิจัยนี้มีวัตถุประสงค์สามประการ ได้แก่ การตรวจสอบประสิทธิผลในปัจจุบัน การสร้างแบบจำลองเชิงประจักษ์ และการประเมินความเป็นไปได้ใช้ระเบียบวิธีวิจัยแบบผสมผสาน ข้อมูลเชิงปริมาณได้มาจากแบบสอบถาม 65 ข้อ ครอบคลุมหอคงค์ประกอบ ได้แก่ ภาวะผู้นำเชิงเปลี่ยนแปลง ความปลอดภัยทางจิตใจของทีม วิสัยทัศน์ร่วมกัน การเชื่อมโยงข้ามสาขาวิชา การเจรจาและการกำหนดบทบาทที่ชัดเจน และการสนับสนุนจากสถาบันสำหรับการทำงานแบบสหวิทยาการ ซึ่งมีบุคลากร 297 คนจากสามมหาวิทยาลัยตอบแบบสอบถาม ข้อมูลเชิงคุณภาพจากการสัมภาษณ์และการสนทนากลุ่มช่วยปรับปรุงแบบจำลองให้ดียิ่งขึ้น

ผลการวิจัยชี้ให้เห็นว่าประสิทธิผลการบริหารจัดการโดยรวมอยู่ในระดับสูง วิสัยทัศน์ร่วมกัน การสนับสนุนเชิงสถาบันสำหรับสหวิทยาการ การเชื่อมโยงข้ามขอบเขตระหว่างสหวิทยาการ และการเจรจาและการกำหนดบทบาทที่ชัดเจน ได้คะแนนสูง ในขณะที่ภาวะผู้นำเชิงเปลี่ยนแปลงและความปลอดภัยทางจิตใจของทีมอยู่ในระดับปานกลาง ซึ่งบ่งชี้ว่าการสนับสนุนเชิงโครงสร้างนั้นแข็งแกร่งกว่าอิทธิพลของภาวะผู้นำหรือความปลอดภัยทางจิตใจในระดับลึกลับแบบจำลองระบุว่าวิสัยทัศน์ร่วมกันเป็นตัวขับเคลื่อนเชิงกลยุทธ์ที่ปรับเปลี่ยนโครงสร้างการประสานงานเพื่อให้สามารถฝังตัวในระดับสถาบันได้ ภาวะผู้นำเชิงเปลี่ยนแปลงและความปลอดภัยทางจิตใจของทีมทำหน้าที่เป็นตัวช่วยในระดับจุลภาค

ในขณะที่การเชื่อมโยงข้ามขอบเขตระหว่างสหวิทยาการเชื่อมโยงกระบวนการของทีมเข้ากับการปฏิรูปองค์กร สร้างเส้นทางการกำกับดูแลหลายระดับการประเมินยืนยันความเหมาะสมของแบบจำลองสำหรับสาขาวิชาศิลปะในภูมิภาคชนกลุ่มน้อย โดยชี้แนะผู้บริหารให้เปลี่ยนจากวิสัยทัศน์ไปสู่การสนับสนุนเชิงโครงสร้าง ซึ่งนำเสนอกลยุทธ์การกำกับดูแลที่คำนึงถึงบริบทสำหรับมหาวิทยาลัยในสภาพแวดล้อมที่หลากหลายและซับซ้อน

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ABSTRACT

This study develops and validates a managerial effectiveness model for interdisciplinary teamwork in art disciplines at Guangxi universities, addressing the demands of organizational complexity and regional cultural specificity. The study had three objectives: examining current effectiveness, constructing an empirical model, and evaluating its feasibility. A mixed-methods design was utilized. Quantitative data came from a 65-item questionnaire across six constructs: transformational leadership, team psychological safety, shared vision, interdisciplinary boundary spanning, role negotiation and clarity, and Institutional support for interdisciplinarity, completed by 297 staff from three universities. Qualitative data from interviews and focus groups refined the model.

Results indicate that overall managerial effectiveness is high. Shared vision, institutional support for interdisciplinarity, interdisciplinary boundary spanning, and role negotiation and clarity scored high, while transformational leadership and team psychological safety remained medium, suggesting structural support is stronger than deep leadership influence or psychological safety. The model identifies shared vision as a strategic driver that reshapes coordination structures to enable institutional embedding. Transformational leadership and team psychological safety act as micro-

level enablers, while interdisciplinary boundary spanning links team processes to organizational reform, creating a multi-level governance pathway. Evaluation confirmed the model's suitability for art disciplines in ethnic minority regions, guiding administrators to move from vision to structural support. This offers context-sensitive governance strategies for universities in diverse, complex environments.

Keywords: Managerial Effectiveness, Interdisciplinary Teamwork, Art Disciplines of Universities

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Liu Jia

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Chapter 1

Introduction

Rationale

Over the past decade, interdisciplinary collaboration has ascended to become a core issue in the reform of global higher education. UNESCO (2021) advocates for a new social contract for education centered on “shared problems and shared solutions,” urging higher education institutions to create interdisciplinary knowledge with social value. Similarly, the OECD (2018) has identified collaboration and creativity as essential future competencies. Against this backdrop, owing to their unique advantages in integrating aesthetic innovation, technological literacy, and social value, art disciplines have seen their interdisciplinary teamwork evolve from a peripheral activity into a cornerstone for enhancing the organizational effectiveness of higher education institutions.

China has actively responded to this trend through a series of national strategies. Policy documents such as “China Education Modernization 2035”, the “New Liberal Arts” construction initiative, and the “Overall Plan for Deepening the Reform of Educational Evaluation in the New Era” not only established the central role of interdisciplinary innovation in talent cultivation and the “Double First-Class” initiative but also identified the managerial effectiveness of interdisciplinary teamwork as a key evaluation indicator. However, despite clear policy direction, management frameworks that are specifically tailored for art universities and possess contextual sensitivity remain severely underdeveloped in practice.

With the deepening of the “New Liberal Arts” construction and the regional innovation-driven development strategy, universities in ethnic minority regions have been entrusted with the special mission of promoting cultural inheritance and social services through interdisciplinary cooperation. Art disciplines have increasingly become important participants in this practice; yet, there remains a lack of

systematic theoretical elucidation regarding the specific organizational and managerial conditions required for their sustained and effective operation.

Existing research predominantly relies on classical team effectiveness models, such as those proposed by Hackman (2002) or Salas et al. (2005), analyzing general variables such as leadership style and team processes. However, these theories primarily originate from Western corporate or healthcare contexts and exhibit evident contextual limitations. On one hand, they rarely consider the cultural embeddedness of artistic practices, the collective ethical norms of ethnic communities, or the unique administrative governance logic of Chinese higher education institutions. On the other hand, current research often implicitly assumes a homogeneity in higher education organizational contexts, overlooking the differences in the institutional positions of art disciplines (e.g., core, collaborative, or supportive status) across different types of universities. This leads to conclusions that face dilemmas of “insufficient explanatory power” and “limited adaptability” when interpreting interdisciplinary practices in art.

This theoretical deficiency is particularly pronounced in the context of universities in ethnic minority regions like Guangxi.

As a national pilot zone for “Integration of Arts and Sciences,” the higher education system in Guangxi exhibits significant diversity in school-running orientation and governance structures. Across different institutions, art disciplines may occupy the “institutional core position,” “collaborative participation position,” or “embedded support position.” These variations profoundly influence decision-making power distribution, the dominance of interdisciplinary agendas, and modes of institutional support, thereby resulting in significant differences in the generative logic, organizational morphology, and operational mechanisms of interdisciplinary art teams. Neglecting these differences in institutional context and directly applying a unified management framework fails to accurately reflect the operational reality of these teams and limits the practical guiding value of the model.

Based on the aforementioned background, this study adopts an institutional comparison perspective, taking the university type and the disciplinary institutional

position as critical entry points for understanding the managerial effectiveness of interdisciplinary teams in art disciplines. The research focuses not only on whether the teams are “effective,” but more importantly, on how managerial effectiveness is constructed, sustained, and brought into play under different institutional structures.

By systematically examining the formation paths and operational mechanisms of teams within diverse higher education organizational contexts, and grounded in the specific context of Guangxi, this paper aims to construct and empirically test a managerial effectiveness model for interdisciplinary teamwork in art disciplines that possesses both contextual sensitivity and theoretical generalizability. Through integrating key elements such as transformational leadership, team psychological safety, role clarity, boundary-spanning capability, shared goals, and institutional support, this study attempts to enrich the theoretical explanatory framework for interdisciplinary team management. It responds to the issue of “insufficient understanding of institutional context” in current research and provides practical and targeted decision-making references for universities in ethnic minority regions to optimize organizational governance and achieve innovative transformation within resource-constrained environments.

Research Questions

1. What is the current level of managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi?
2. What is the model for developing managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi?
3. Is the model for developing managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi suitable and feasible?

Objectives

1. To study the current situation of managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi.
2. To develop the model for developing managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi.
3. To evaluate the models for developing managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi.

Scope of the Research

Population and the Sample Group

Population

The population of this research was 1269 administrators and teachers from 3 art disciplines of universities in ethnic minority regions in Guangxi.

The Sample Group

According to Krejcie and Morgan sampling table (1970), the sample group of this research was 297 administrators and teachers from 3 art disciplines of universities in ethnic minority regions in Guangxi. By using stratified random sampling and simple random sampling.

The interviewee

The interviewee in this research was 6 high-level administrators in the art disciplines of universities in ethnic minority regions in Guangxi. The qualifications of the interviewee are as follows: 1) at least 6 years of work experience as a high-level administrator, 2) received a certificate in the field of professional art skills, and 3) graduated with a master's degree or above.

Expert group

The experts for evaluating the suitability and feasibility of guidelines were 24 experts from the art disciplines of universities in ethnic minority regions in Guangxi.

The qualifications of the experts are as follows: 1) at least 10 years of work experience as a high-level administrator in art universities, 2) have received a certificate in the field of professional art skills, and 3) an associate professor or a doctoral degree.

The Variable

According to the analysis of related theories and research, characteristics of interdisciplinary teamwork are as follows:

1. Transformational leadership
2. Team psychological safety
3. Shared vision
4. Interdisciplinary boundary spanning
5. Role negotiation and clarity
6. Institutional support for interdisciplinarity

Time

June 2025 – August 2025

Advantages

1. To gain deeper insights into the current level of managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi, enabling a clearer understanding of strengths and weaknesses.
2. To provide structured models that can guide administrators and faculty in systematically improving managerial effectiveness in interdisciplinary teamwork.
3. To ensure the developed model is both practical and adaptable, increasing the likelihood of successful implementation and long-term sustainability.

Definition of Terms

Interdisciplinary teamwork refers to the deliberate collaboration of professionals from distinct disciplines who integrate specialized knowledge to address complex problems beyond any single field. Grounded in systems theory and team science, it assumes disciplinary boundaries create epistemic silos; thus,

effective teamwork requires cognitive flexibility, mutual respect, shared mental models, and boundary-spanning communication. When these conditions are met, synergy yields emergent insights and innovative solutions unattainable through multidisciplinary approaches.

Transformational leadership refers to a multidimensional approach where leaders articulate a shared vision and enhance intrinsic motivation to transform followers' cognition, emotions, and behaviors. Systematized by Bass and Avolio (1994), it encompasses four dimensions: Idealized Influence involves ethical role-modeling; Inspirational Motivation communicates a compelling vision; Intellectual Stimulation encourages innovative problem-solving; and Individualized Consideration provides personalized mentoring. Collectively, these dimensions enhance followers' autonomy and drive systemic transformation in educational organizations.

Team psychological safety refers to a shared belief among educators that their team enables open expression and professional risk-taking without fear of negative evaluation or blame. Grounded in Edmondson (1999), this multidimensional construct comprises three dimensions. Voice Safety allows members to freely express ideas and question practices without suppression. Error Safety frames mistakes as opportunities for collective learning rather than punishment. Relational Safety emphasizes trust and mutual support to navigate complex educational changes. Together, these dimensions provide essential conditions for reflective practice, knowledge sharing, and collaborative innovation, forming a foundation for continuous school improvement.

Shared vision refers to a collective understanding among educators regarding future direction, goals, and values. Grounded in organizational learning theory, it comprises three dimensions: Goal Clarity ensures actionable goals aligning activities with institutional priorities; Vision Inspiring Force stimulates intrinsic motivation through a challenging, meaningful vision; and Value Congruence aligns organizational vision with personal beliefs, fostering emotional attachment. Collectively, they form a cognitive and motivational foundation sustaining engagement for organizational improvement and innovation.

Interdisciplinary boundary spanning refers to proactive behaviors that transcend disciplinary, social, and institutional constraints to advance knowledge integration and innovation. Grounded in boundary spanning theory, it comprises three dimensions. Cognitive Boundary Spanning integrates theories and methods across disciplines to address complex problems. Social Boundary Spanning builds trust and facilitates collaboration among diverse members through adaptive communication. Institutional Boundary Spanning strategically overcomes structural and regulatory barriers to create spaces for interdisciplinary work. Collectively, these dimensions highlight the integrative and institutional change capabilities essential for sustainable interdisciplinary research.

Role negotiation and clarity refers to the process of interacting and negotiating to clearly define responsibilities and expected behaviors in collaborative settings. Grounded in role theory, it comprises three dimensions. Role Clarity ensures a shared understanding of responsibilities, reducing ambiguity and conflict. Role Negotiation Mechanism allows members to dynamically communicate and adjust role boundaries to meet evolving demands. Collaborative Adaptability reflects members' capacity to flexibly adjust behaviors and coordination to sustain team performance. Together, these dimensions optimize role distribution and provide a foundation for effective cross-departmental collaboration.

Institutional support for interdisciplinarity refers to the infrastructure through which universities strategically allocate resources, implement incentive policies, and establish collaborative platforms to enable sustainable interdisciplinary research. Grounded in organizational support and institutional theories, it comprises three dimensions. Resource Provision ensures the continuous supply of essential inputs, including funding, facilities, and human capital, to sustain research. Policy Incentives utilize evaluation systems and achievement-based rewards to motivate faculty engagement. Platform and Coordination Mechanisms establish structured systems and routines to facilitate knowledge integration and reduce procedural barriers. Collectively, these dimensions form a systemic foundation supporting interdisciplinary research efficiency and innovation.

Art disciplines of universities in ethnic minority regions refer to authorized institutions like Guangxi Arts University, Guangxi Normal University, and Guilin University of Technology. Selected for their legitimacy and policy alignment, they demonstrate robust interdisciplinary coordination through inter-departmental committees and shared platforms. Integrating team development into strategic plans aligned with the “New Liberal Arts,” they foster deep collaboration. Amid higher education transformation, traditional skill-centered art programs are unsustainable, making interdisciplinary paradigms imperative. As pioneers in Guangxi, these universities leverage mature capacities to lead interdisciplinary teaching teams, offering a replicable regional model for navigating sectoral changes.

Research Framework

According to the analysis of related theories and research, the characteristics of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions are as follows: 1) Transformational leadership, 2) Team psychological safety, 3) Shared vision, 4) Interdisciplinary boundary spanning, 5) Role negotiation and clarity, and 6) Institutional support for interdisciplinarity.

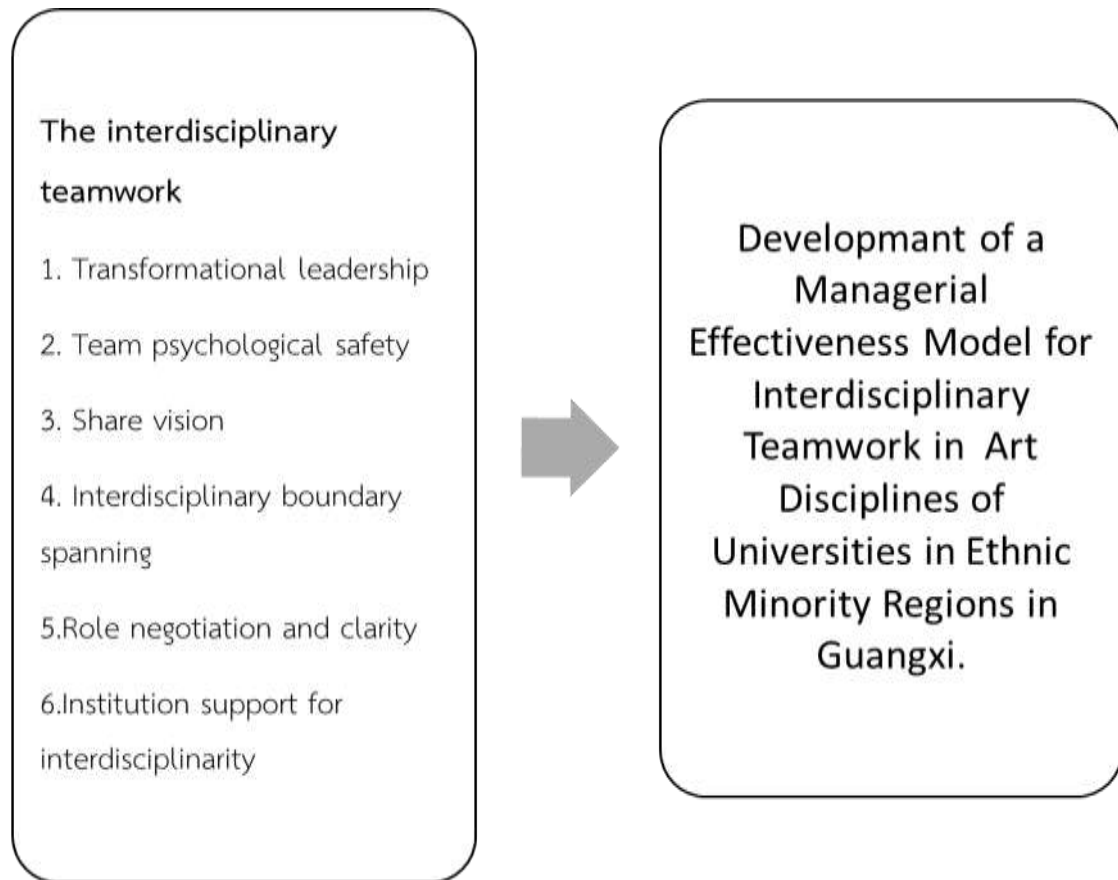


Figure 1.1 Research Framework

Chapter 2

Literature Review

This chapter will focus on the research questions raised in Chapter 1, summarizing the main theoretical basis and relevant researchers of this research, in order to clarify the theoretical inheritance, improvement, and expansion relationship between this research and existing achievements. In order to explore the theoretical basis for the improvement of teamwork and managerial effectiveness of interdisciplinary teams in art colleges and universities in Guangxi, this chapter puts forward the following theories:

1. Concept and theory of educational administration
2. Concept and theory of organizational behavior theory
3. Concept and theory of interdisciplinary teamwork
4. Context of art disciplines of universities in ethnic minority regions in Guangxi
5. Related Research

The details are as follows.

Educational administration and organizational behavior theories drive interdisciplinary teamwork through macro-governance and micro-interactions. Administration theory builds a “macro stage” with institutional legitimacy and resources via matrix structures, distributed leadership, and reshaped evaluation systems. Behavior theory fosters psychological safety, clarifies dynamic roles, and transforms disciplinary divergences into fact-based constructive conflicts, propelling diverse members from “physical assemblage” to a deep “chemical reaction.” Synergistically, macro-support eliminates the fear of boundary-crossing, while micro-dynamics endow the structure with true innovative vitality, together forging a complete interdisciplinary ecosystem.

Concept and theory of educational administration

Definition of educational administration

Educational administration is a purposeful, value-driven practice through which schools and educational institutions strategically orchestrate resources and relationships to advance equitable, high-quality learning. Far from mere bureaucratic management, it bridges policy and practice while responding to cultural, political, and contextual complexities (Bush, 2011; Leithwood, 2020). Contemporary scholarship underscores its dual nature: integrating efficient organizational coordination with relational leadership that builds trust, shared purpose, and collective capacity (Hallinger, 2022). Thus, educational administration may be defined as a normative, adaptive form of stewardship ethically grounded in equity and learning that aligns people, processes, and policies to fulfill educational missions.

Gunter (2016, p. 329) suggests that contemporary educational governance increasingly emphasizes the integration of public values into institutional policy frameworks. Rather than focusing solely on administrative efficiency, governance systems seek to embed societal goals and democratic principles within policy design and leadership practices, thereby strengthening the alignment between educational institutions and broader social responsibilities.

Robinson, Lloyd, and Rowe (2017, p. 433) demonstrate that leadership practices focused on teaching and learning improvement have significant positive effects on student outcomes. Their findings indicate that effective school leadership fosters professional learning cultures, coordinates curriculum and instructional improvement, and aligns organizational processes with the goal of enhancing student learning.

Marginson (2018, p. 10) notes that the governance of contemporary higher education systems is increasingly shaped by global competition, market-oriented reforms, and performance-based accountability mechanisms. These structural pressures have strengthened universities' focus on knowledge production, research output, and credential certification, while simultaneously generating ongoing debates regarding the preservation of universities' broader public missions.

Hallinger and Kulophas (2019, p. 399) emphasize that leadership for learning places the improvement of teaching and student learning at the center of school leadership practice. This perspective highlights the need for alignment among curriculum, instructional practices, and assessment systems while encouraging collaborative leadership practices that support continuous instructional improvement.

Harris (2020, p. 27) argues that contemporary perspectives on distributed leadership conceptualize leadership as a practice stretched across multiple actors rather than a role confined to a single formal leader. Within educational organizations, leadership activities emerge through interactions among administrators, teachers, and situational contexts, forming a collaborative network of influence that collectively shapes decision-making and school improvement processes.

Ishimaru (2020, p. 42) highlights that educational leadership in diverse societies requires leaders to critically engage with issues of social inequality, power relations, and cultural diversity. Effective leadership, therefore involves building inclusive partnerships with families and communities while addressing institutional structures that may reproduce inequitable participation and educational outcomes.

In summary, contemporary educational administration is conceptualized as a dynamic, systemic process that integrates institutional resources through strategic planning, data-informed decision-making, and distributed leadership to enhance resilience and effectiveness in complex, uncertain environments. Scholars emphasize adaptive and inclusive leadership, shared governance, stakeholder engagement, and the cultivation of a learning-oriented culture as essential to fostering innovation, equity, and academic quality in diverse educational contexts from schools to universities while also reflecting on the influence of broader socio-political and global economic forces.

Importance of educational administration

The importance of educational administration lies in its role as the organizational backbone of effective schooling and the key conduit through which policy becomes practice. Far from a peripheral function, it is central to ensuring

teaching quality, institutional coherence, and systemic improvement in contexts demanding equity, accountability, and responsiveness (Leithwood, 2020; Hallinger, 2022). Without it, even well-designed reforms risk fragmentation or failure. Educational administration aligns vision with action, fosters collaborative professional cultures, and bridges external expectations with local capacity balancing efficiency, adaptability, and democratic values (Bush, 2011; Owens & Valesky, 2015). Thus, educational administration may be defined as: the indispensable organizational and leadership infrastructure that enables educational institutions to enact their missions and fulfill their public commitment to equitable, high-quality learning for all.

Hargreaves and O'Connor (2018, p. 12) argue that effective professional learning communities require supportive leadership and organizational structures that enable educators to engage in continuous collaborative inquiry. Educational leadership plays a key role in cultivating cultures of trust, collective responsibility, and reflective professional dialogue that sustain long-term school improvement.

H Bush (2020, p. 6) argues that educational administration should be understood as both a strategic and value-driven process that integrates leadership practices with organizational management. Effective educational leaders must respond to contextual challenges while coordinating institutional structures, decision-making processes, and leadership strategies in order to achieve sustainable educational development.

Leithwood, Harris, and Hopkins (2020, p. 7) reaffirm that school leadership is second only to classroom instruction in its influence on student learning. Their analysis shows that effective leadership contributes to school improvement by strengthening organizational capacity, promoting professional collaboration, and aligning leadership practices with instructional priorities.

Harris (2020, p. 31) argues that distributed leadership strengthens school improvement by enabling collaborative decision-making and shared responsibility among educators. Through distributed leadership practices, schools can foster organizational learning and professional collaboration that support long-term educational innovation.

Bush (2020, p. 4) argues that educational administration and leadership play a critical role in shaping the effectiveness and sustainability of educational organizations. He emphasizes that educational management is not merely a technical or bureaucratic function, but a strategic and normative practice that integrates leadership, organizational processes, and contextual responsiveness to achieve educational goals.

Leithwood, Harris, and Hopkins (School Leadership & Management, 2020, p. 6) revisit the core claims of successful school leadership and argue that educational leadership is second only to classroom teaching in its impact on student learning. They highlight that effective educational administration contributes significantly to school improvement by building organizational capacity, fostering professional collaboration, and aligning leadership practices with instructional priorities.

In summary, educational administration plays a pivotal role in shaping both classroom-level outcomes and the success of large-scale systemic reforms. Empirical studies demonstrate that effective instructional and distributed leadership enhances teacher competencies, student engagement, and learning achievement through vision-driven goal setting, curricular alignment, and professional community building. At the macro level, successful reform relies on collaborative governance, data-informed decision-making, and institutional capacity-building. However, administration must also navigate complex tensions such as those between global rankings and national sovereignty, or efficiency and equity while integrating cultural values, ethical principles, and democratic practices. Scholars consistently affirm that justice, inclusivity, ethical integrity, and culturally grounded governance are indispensable to resilient, equitable, and transformative educational systems.

Characteristic features of educational administration

Educational administration is a purposeful practice defined by its integration of structure, values, context, and relationships. It functions as a systematic, evidence-informed process that aligns resources with educational aims (Owens & Valesky, 2015), is grounded in ethical commitments to equity and the public good rather than technical efficiency (Bush, 2011), adapts policy to local realities instead of applying

universal templates (Leithwood, 2020), and advances change through trust, collaboration, and shared purpose (Hallinger, 2022). Thus, educational administration may be defined as a context-sensitive, ethically grounded, and relationally enacted form of organizational stewardship that advances equitable learning through the strategic integration of structure and human agency.

Hargreaves and Fullan (2016, p. 98) argue that educational administration plays a crucial role in creating systemic coherence within schools by aligning leadership practices, professional collaboration, and institutional structures. Effective administration enables educational leaders to integrate policy priorities with classroom practices, thereby fostering sustainable school improvement and organizational learning.

Robinson, Lloyd, and Rowe (2017, p. 432) demonstrate that leadership practices focused directly on teaching and learning improvement exert the strongest influence on student outcomes. Educational administrators contribute to school effectiveness by prioritizing instructional quality, supporting teacher professional development, and coordinating curriculum implementation across the organization.

Brown and Greany (2018, p. 58) argue that effective educational administration increasingly depends on evidence-informed decision making. Educational leaders are expected to integrate research evidence, professional knowledge, and contextual understanding when designing policies and improvement strategies that enhance teaching quality and institutional performance.

Harris (2020, p. 31) emphasizes that contemporary educational administration increasingly relies on distributed leadership practices that mobilize the expertise of teachers and middle leaders. By sharing leadership responsibilities across professional communities, educational organizations can strengthen collaboration, enhance professional agency, and promote organizational learning.

Leithwood, Harris, and Hopkins (2020, p. 7) argue that effective school leadership contributes significantly to school improvement by building organizational capacity and strengthening professional collaboration among teachers. Their analysis suggests that educational administration functions as a key mechanism through

which leadership practices influence instructional quality and student learning outcomes.

In summary, contemporary scholarship defines educational administration through four key characteristics: comprehensiveness, systematicity, participation, and innovativeness. It integrates academic, financial, and operational functions in alignment with policy and context; operates through evidence-based, cyclical processes to achieve learning outcomes; engages diverse stakeholders to strengthen legitimacy and responsiveness; and embraces emerging technologies and adaptive practices to foster future-ready institutions. These traits support core design principles shared vision, collaboration, transparency, contextual sensitivity, and supportive leadership especially critical in arts education. Ultimately, educational administration is a socially embedded practice that balances rational organization with ethical stewardship, democratic engagement, and cultural responsiveness to advance equitable, sustainable learning.

Concept and theory of organizational behavior theory

Definition of organizational behavior theory

Organizational behavior theory is a systematic, evidence-based framework that explains and influences human behavior in organizations. In educational management, it examines how individuals, groups, and structures interact within schools and colleges, drawing on psychology, sociology, and management to understand how leadership, communication, motivation, and culture shape outcomes (Owens & Valesky, 2015; Bush, 2022). Thus, Organizational behavior may be defined as the study of human behavior in educational settings, aimed at improving interactions among people, structures, and processes to enhance effectiveness, professional growth, and the core mission of teaching and learning.

Grandey and Melloy (2017, p. 409) argue that emotional labor should be understood as a complex regulatory process shaped not only by individual emotional management but also by organizational support structures. Their analysis suggests that when employees perceive strong organizational support, emotional

regulation demands are more likely to result in positive work attitudes and sustainable performance rather than emotional exhaustion.

Liden, Wayne, and Sparrowe (2016, p. 1096) demonstrate that leader member exchange relationships significantly influence employees' willingness to engage in organizational citizenship behavior. Their findings indicate that high-quality relational exchanges between leaders and employees strengthen trust and reciprocity, thereby encouraging discretionary behaviors that contribute to organizational effectiveness.

Diefendorff, Erickson, Grandey, and Dahling (2016, p. 349) find that surface acting in emotional labor is associated with emotional exhaustion and reduced psychological well-being. However, supportive organizational environments and effective leadership practices can mitigate these negative effects by providing emotional resources and reinforcing employees' sense of meaning at work.

Banks, McCauley, Gardner, and Guler (2016, p. 636) show that transformational leadership positively influences employee motivation and organizational climate by promoting trust, autonomy, and shared vision. Their meta-analytic findings suggest that transformational leadership enhances employee engagement and prosocial behavior by creating supportive organizational environments.

Schneider, Ehrhart, and Macey (2017, p. 468) argue that organizational climate reflects shared perceptions of policies, practices, and procedures within organizations. A supportive and positive climate can enhance employees' job satisfaction and professional engagement by reducing workplace stress and strengthening a sense of collective identity and organizational belonging.

In summary, organizational behavior theory is a multidisciplinary, evidence-based framework that examines how individuals, groups, and structures interact in educational settings, drawing on psychology, sociology, and management to understand behavior through leadership, communication, motivation, and culture aimed at improving effectiveness and advancing educational missions. While foundational models focus on universal behavioral dynamics, contemporary research underscores the importance of cultural context: in collectivist, high-power-distance

settings like China, relational harmony, leader virtue (de), and perceived organizational support critically shape motivation and well-being. Thus, effective application requires blending universal principles with culturally responsive practice.

Importance of organizational behavior theory

The significance of organizational behavior theory lies in its ability to reveal patterns of human behavior in educational organizations and guide evidence-based leadership. It helps leaders understand how teacher motivation, collaboration, culture, and leadership shape school effectiveness and learning quality. By informing HR practices, changing efforts, and decision-making, it fosters supportive, learner-centered environments. In today's governance, which emphasizes people-centeredness, innovation, and quality, it bridges policy and practice through attention to interpersonal dynamics. Thus, Organizational Behavior may be defined as a framework that enhances both organizational effectiveness and humanistic care by analyzing and strategically shaping behavioral dynamics to align mission and management.

Carmeli, Reiter-Palmon, and Ziv (2016, p. 127) demonstrate that inclusive leadership strengthens employees' psychological safety and encourages them to express novel ideas and challenge existing practices. Their findings indicate that when leaders foster openness, accessibility, and respect, employees become more willing to engage in creative problem-solving and collaborative innovation.

Detert and Burris (2016, p. 874) show that employees are more likely to remain silent when organizational hierarchies create large power distances and when leaders fail to provide interpersonal support. Their findings suggest that leadership openness and supportive supervisory relationships are critical for encouraging employees to voice constructive suggestions and feedback within organizations.

Liang, Farh, and Farh (2017, p. 79) distinguish between promotive voice and prohibitive voice and demonstrate that supportive and inclusive leadership significantly increases employees' willingness to speak up with constructive suggestions. Their findings indicate that when leaders provide interpersonal respect

and openness, employees perceive greater psychological safety, which encourages them to share ideas and challenge ineffective practices within organizations.

Edmondson and Bransby (2019, p. 28) argue that psychological safety is a critical organizational behavior mechanism that enables individuals to express ideas, ask questions, and acknowledge mistakes without fear of negative interpersonal consequences. Their analysis demonstrates that when leaders cultivate psychologically safe environments, employees are more likely to engage in learning behaviors, knowledge sharing, and collaborative problem-solving, thereby strengthening innovation and collective performance in organizations.

Skaalvik and Skaalvik (2021, pp. 602–616) emphasize that teachers' occupational stress is strongly shaped by school-context factors such as time pressure, low student motivation, and value conflicts. Their longitudinal analysis shows that these contextual stressors are significantly associated with emotional exhaustion, job satisfaction, and teachers' turnover intentions. Importantly, job resources including autonomy and administrative support mediate these relationships, indicating that organizational resources within schools play a critical role in shaping teacher burnout and its behavioral consequences.

S Stahl, Mäkelä, Zander, and Maznevski (2022, p. 146) argue that cultural diversity in global teams can enhance creativity and decision quality when supported by inclusive leadership, strong communication structures, and high levels of cultural intelligence. Their analysis suggests that organizational behavior mechanisms—such as trust-building, knowledge sharing, and intercultural competence—are critical for enabling diverse teams to transform cultural differences into collaborative advantages.

In summary, organizational behavior theory is vital in education for offering a systematic, evidence-based understanding of human behavior in institutions. It helps leaders grasp how motivation, leadership, team dynamics, and culture shape teaching quality and organizational effectiveness. Grounded in psychology, sociology, and management, organizational behavior supports scientific decision-making, strategic HR practices, and learner-centered environments. In an era emphasizing

people-centered, collaborative, and high-quality education, it bridges policy and practice. Research shows OB-informed approaches improve conflict resolution, inclusion, communication, crisis response, and well-being especially when adapted to local contexts, such as virtue-based leadership in China. Ultimately, organizational behavior aligns institutional goals with human needs, advancing both managerial excellence and humanistic care.

Characteristic features of organizational behavior theory

Organizational behavior is an interdisciplinary field defined by its systematic, evidence-based, and humanistic approach to understanding behavior in educational settings. It views schools as dynamic systems where individuals, groups, and structures interact. It draws on psychology, sociology, and management to interpret behavior in context-sensitive ways recognizing how culture, policy, and history shape practice. Grounded in empirical inquiry, it prioritizes human development, dignity, and collaboration, aligning with education's mission of "moral and intellectual cultivation" (Owens & Valesky, 2015; Sergiovanni, 2017). Thus, Organizational behavior may be defined as a theoretical framework that enhances organizational effectiveness and educational quality through contextually attuned, human-centered interventions.

Parker, Morgeson, and Johns (2017, p. 414) argue that employees' perceptions of work design significantly shape their engagement, motivation, and adaptive performance. Their integrative review indicates that communication clarity, role structure, and organizational support function as key mechanisms through which organizational design interventions influence employee behavior and innovation.

Frazier, Fainshmidt, Klinger, Pezeshkan, and Vacheva (2017, p. 121) demonstrate that psychological safety is strongly associated with team learning behaviors, engagement, and performance. Their meta-analysis shows that psychologically safe teams are more likely to share knowledge, experiment with new ideas, and develop collective efficacy, thereby improving collaborative productivity and team outcomes.

Schneider, Ehrhart, and Macey (2017, p. 368) argue that organizational culture and climate influence employees' discretionary behavior by shaping shared norms, expectations, and collective interpretations of organizational goals. Their review demonstrates that culture operates as a contextual mechanism linking leadership strategies with organizational citizenship behaviors and overall performance.

Newman, Donohue, and Eva (2017, p. 523) identify psychological safety as a fundamental condition for effective teamwork and organizational learning. Their systematic review shows that psychologically safe environments promote open communication, collaborative learning, and adaptive performance, particularly when supported by inclusive leadership and transparent organizational practices.

Miao, Humphrey, and Qian (2018, p. 134) demonstrate that leaders' emotional intelligence plays a crucial role in fostering trust, psychological safety, and collaborative learning within teams. Their meta-analysis indicates that emotionally intelligent leaders improve team performance by encouraging interpersonal openness and facilitating constructive social interactions.

Zaccaro, Dubrow, and Kolze (2018, p. 380) argue that organizational behavior research increasingly conceptualizes organizations as multilevel systems in which individual cognition, team interaction processes, and structural conditions jointly shape organizational outcomes. Their review highlights that contemporary organizational behavior studies integrate individual, team, and organizational perspectives to explain adaptability, performance, and collective learning within complex work environments.

Morgeson and Hofmann (2019, p. 517) explain that contemporary organizational behavior research increasingly adopts multilevel frameworks that connect individual attitudes, team processes, and organizational systems. Their theoretical analysis highlights that understanding work behavior requires integrating psychological, social, and contextual perspectives to explain how individual actions interact with broader organizational dynamics.

In summary, organizational behavior theory is characterized by five core features: systematicity, interdisciplinarity, context sensitivity, evidence-based

orientation, and humanistic orientation. It treats educational institutions as dynamic, interconnected systems in which individuals, groups, and structures continuously shape one another. Drawing on psychology, sociology, management, and education, organizational behavior offers multidimensional insights into workplace behavior. It emphasizes that leadership, motivation, and effectiveness are deeply influenced by contextual factors, including institutional type, cultural norms, and policy landscapes, and it insists on the use of empirical data to guide administrative decisions. Crucially, organizational behavior places human dignity, development, and collaborative relationships at the center of organizational life, thereby aligning management practice with the moral and intellectual mission of education. Contemporary scholarship affirms that organizational behavior equips leaders with actionable and research-informed tools, such as adaptive HR policies, inclusive governance models, and conflict-resolution protocols, in order to enhance performance, equity, and resilience, particularly in complex, multicultural, and interdisciplinary settings such as arts education.

Concept and Theory of interdisciplinary teamwork

Definition of interdisciplinary teamwork

Interdisciplinary teamwork theory describes purposeful collaboration among educators from diverse fields, such as teaching, counseling, technology, and leadership, who work together on complex tasks such as curriculum design or student support. It emphasizes equitable dialogue, shared accountability, and complementary roles to break down disciplinary and institutional silos, fostering an integrated, student-centered approach (Darling-Hammond et al., 2017; Fullan & Quinn, 2016). Accordingly, Interdisciplinary Teamwork may be defined as a structured, co-governed practice in educational organizations that synthesizes diverse expertise through collaboration to address complex challenges and improve teaching and learning.

Börner, Contractor, Falk-Krzesinski, Fiore, Hall, Keyton, Spring, Stokols, Trochim, and Uzzi (2010/updated discussions widely cited in recent team-science

literature; see later empirical extensions) conceptualize interdisciplinary teamwork as the integration of diverse disciplinary expertise through collaborative knowledge exchange and shared problem-solving processes. More recent analyses emphasize that such collaboration requires mechanisms that enable boundary crossing, collective sense-making, and coordinated learning across disciplinary domains (Hall et al., 2018, p. 536).

Reeves, Xyrichis, and Zwarenstein (2018, p. 166) explain that interdisciplinary teamwork in professional contexts such as healthcare involves collaborative interactions among professionals from diverse disciplines who coordinate their expertise toward shared goals. Their review highlights that effective interprofessional collaboration depends on communication structures, clear role alignment, and shared accountability for outcomes.

Pearce and Conger (2018, p. 292) argue that shared leadership structures play a critical role in collaborative team settings by distributing influence across members rather than concentrating authority in a single leader. Their research indicates that shared leadership enhances engagement, mutual accountability, and collaborative learning, particularly in interdisciplinary teams with diverse expertise and perspectives.

Tushman and Scanlan (2018, p. 308) explain that boundary-spanning roles are essential for connecting different professional or disciplinary domains within organizations. Their work shows that individuals occupying such roles facilitate knowledge exchange across structural boundaries. Still, interdisciplinary collaboration can be constrained by role ambiguity and power dynamics that require deliberate coordination and negotiation.

Stokols, Hall, Taylor, and Moser (2018, p. 6) emphasize that interdisciplinary teamwork in team-science contexts requires clearly structured collaboration processes, transparent leadership, and reflexive learning practices. Their research suggests that these mechanisms support shared responsibility, coordinated knowledge integration, and collective learning among team members working across disciplinary boundaries.

In summary, interdisciplinary teamwork is a structured, purpose-driven form of collaboration in which professionals from diverse disciplines and functional roles, such as teachers, technologists, counselors, and administrators, work together through equitable dialogue, shared accountability, and complementary expertise to address complex educational challenges. Rooted in principles of professional integration and co-governance, it seeks to break down disciplinary and institutional silos, fostering a student-centered, problem-oriented approach that synthesizes knowledge and enables collective action. Empirical studies highlight that effective interdisciplinary teamwork depends on shared mental models, integrative leadership, boundary-spanning practices, and institutional supports such as aligned incentives and reflective processes. Crucially, it moves beyond mere multidisciplinary coexistence toward genuine epistemic synthesis, transforming disciplinary knowledge through dialogue to generate more comprehensive, socially relevant, and innovative solutions in education and beyond.

Importance of interdisciplinary teamwork theory

The importance of interdisciplinary teamwork theory lies in its capacity to address the complex, systemic challenges of modern education, such as curriculum integration, equity, and school reform, where single-discipline approaches fall short. By integrating diverse professional knowledge and perspectives, it strengthens decision-making, pedagogical coherence, student support, and organizational learning. The theory provides a foundation for collaborative, learner-centered ecosystems and supports professional communities and improved governance, aligning with national goals like China's Education Modernization 2035 that prioritize integrative and innovative talent development. Accordingly, interdisciplinary teamwork may be defined as a practice-oriented paradigm that harnesses multi-professional collaboration and collective intelligence through structured teamwork to enhance teaching quality and drive systemic transformation.

Valentine and Edmondson (2020, p. 480) argue that effective interdisciplinary collaboration requires mutual recognition of different professional perspectives and expertise. Their findings show that teams that actively value disciplinary diversity are

better able to overcome epistemic barriers, enabling more inclusive collaboration and improved innovative outcomes.

Meinel and Leifer (2020, p. 15) emphasize that design thinking provides a collaborative framework that enables interdisciplinary teams to develop shared problem definitions and iterative solution strategies. Their research indicates that early-stage collaborative framing improves communication and supports teams in addressing complex and ill-structured problems.

O'Mahony and Bechky (2021, p. 142) explain that interdisciplinary teamwork supports innovation by facilitating the integration of specialized knowledge from different domains. Their analysis shows that successful knowledge integration depends on interaction patterns, relational coordination, and shared interpretive frameworks that allow team members to combine diverse expertise effectively.

Hall, Vogel, and Croyle (2021, p. 243) highlight that interdisciplinary teamwork is most effective when collaboration processes are clearly structured and supported by transparent leadership and shared accountability. Their research in team science demonstrates that reflexive communication practices and collective learning processes strengthen knowledge integration and improve collaborative outcomes.

Murphy, Crick, and Davenport (2022, p. 417) argue that structured interdisciplinary learning environments enhance students' collaborative competencies by encouraging the integration of perspectives from multiple domains. Their study demonstrates that cross-disciplinary project-based learning improves teamwork, communication, and complex problem-solving skills, which are essential for addressing real-world challenges.

In summary, interdisciplinary teamwork theory is essential because modern educational challenges, such as curriculum integration, equity, and reform, cannot be solved by any single discipline alone. By integrating diverse professional knowledge and perspectives, it strengthens decision-making, teaching coherence, student support, and organizational learning. It underpins collaborative, learner-centered ecosystems and aligns with national goals like China's Education Modernization 2035, which emphasizes integrative and innovative talent development. Research shows it

fosters 21st-century skills, drives innovation in art and STEM, and enhances resilience through shared cognition. Its success depends on shared purpose, trust, reflective practice, and supportive structures. Thus, interdisciplinary teamwork is not just a method but a transformative paradigm that links high-quality teaching with systemic renewal.

Characteristic features of interdisciplinary teamwork theory

Interdisciplinary teamwork is characterized by integrative knowledge, complementary roles, collaborative governance, shared purpose, and reflective practice. It synthesizes diverse disciplinary perspectives, coordinates expertise, fosters inclusive decision-making, aligns members around a common educational mission, and promotes ongoing reflection and learning. These features distinguish it from hierarchical or single-discipline models (Darling-Hammond et al., 2017; Fullan & Quinn, 2016; Hargreaves & O'Connor, 2017). Accordingly, it may be defined as a dynamic, practice-oriented paradigm that advances professional collaboration and systemic innovation through integrated knowledge and shared commitment to holistic education.

Aalbers, Dolfma, and Koppius (2021, p. 653) argue that interdisciplinary innovation depends strongly on the structure of collaboration networks within teams. Their study demonstrates that tie strength, network centrality, and relational embeddedness influence the extent to which diverse knowledge sources can be integrated into coherent and innovative outcomes.

Hall, Vogel, Huang, Serrano, Rice, Tsakraklides, and Fiore (2021, p. 244) emphasize that interdisciplinary knowledge integration requires flexible role structures in which team members maintain disciplinary expertise while engaging in reciprocal learning across fields. Such role fluidity supports collective sense-making and facilitates the synthesis of diverse knowledge within collaborative research teams.

Baer, Evans, Oldham, and Boasso (2022, p. 145) show that task interdependence plays a critical role in shaping collaborative processes within complex team settings. Their research indicates that teams working on highly

interdependent tasks are more likely to develop supportive interaction patterns and coordinated workflows, which significantly improve implementation effectiveness and collective performance outcomes.

Edmondson and Lei (2023, p. 88) demonstrate that psychological safety is a key determinant of learning behavior and performance in collaborative teams. Their findings show that when individuals perceive a safe environment to express ideas and ask questions, teams are more likely to engage in knowledge sharing and adaptive learning, particularly in virtual or distributed collaboration contexts.

In summary, interdisciplinary teamwork theory is defined by five core features: integrative knowledge, complementary roles, collaborative governance, shared purpose, and reflective praxis. It blends disciplinary perspectives through epistemic humility, coordinates specialized contributions, practices distributed and democratic decision-making, aligns around a common mission, and engages in ongoing reflection to refine collaboration. Together, these enable genuine professional symbiosis rather than siloed efforts. Research further shows that psychological safety, shared problem framing, and dialogic engagement are key enablers especially in complex contexts like AI-humanities projects, sustainability education, and art-science community initiatives.

Table 2.1 The results of the synthesis of Interdisciplinary Teamwork characteristics

Characteristics Of Interdisciplinary Teamwork /Author	Bernard M. Bass (1990)	Bruce J.Avolio (1978)	Huang Weide (2018)	Zhang Lihua (2018)	Mark Davies(2019)	Wang Zhanjun(2020)	Chen Chunhua (2021)	AmyC.Edmondason (2021)	Yang Baiyin (2021)	Linda A. Bennett (2009)	Boas Shamir (2020)	Nancy P. Bagraim (2022)	MarianneD.Sortheix (2021)	Jing Zhou (2020)	YEeva Anttila (2022)	Total
Transformational leadership	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	15
Team psychological safety	√	√	√	√	√	√		√	√	√	√	√	√	√	√	14
Shared vision	√	√	√	√	√	√	√	√	√	√	√	√	√	√		14
Interdisciplinary boundary spanning	√	√	√	√	√	√	√		√	√	√	√	√			12
Institutional support for interdisciplinarity	√	√	√	√	√			√	√				√	√	√	13
Role negotiation and clarity	√	√	√	√		√		√	√	√	√	√				10
Creative conflict management		√	√	√	√	√			√	√				√	√	9
Resource interdependence	√	√			√	√	√	√	√			√		√		9
Mutual trust	√	√	√		√	√	√		√		√					8
Collective efficacy		√	√	√		√	√			√	√	√				8

According to Table 2.1, the researchers analyzed and synthesized documents, concepts, theories, and research related to innovative leadership of university administrators, which consisted of Bernard M. Bass (1990), Bruce J. Avolio (1978), Huang Weide (2018), Zhang Lihua (2019), Mark Davies (2019), Wang Zhanjun (2020), Chen Chunhua (2021), Amy C. Edmondson (2021), Yang Baiyin (2021), Zhao Xiaoyu (2022). The researcher used the criteria to consider the corresponding characteristics. To use as a framework for research in this study. By selecting characteristics with a frequency of 10 or more. Which can be synthesized in 6 characteristics as follows: 1) Transformational leadership, 2) Team psychological safety, 3) Shared vision, 4) Institutional support for interdisciplinarity. 5) Interdisciplinary boundary spanning, and 6) Role negotiation and clarity.

Among all variables examined in this study, role negotiation and clarity demonstrate greater dynamism and processuality than role clarity alone. In interdisciplinary arts teams, roles are rarely predetermined; rather, they emerge iteratively through ongoing negotiation among collaborators, such as curators, AI co-creators, intangible cultural heritage bearers, and technical developers, whose role boundaries remain fluid and context-dependent. Role negotiation and clarity, thus more accurately captures the dynamic coordination capacities essential to effective educational leadership and team management.

Integrating institutional support for interdisciplinarity into the theoretical model elucidates the interactive mechanisms linking micro-level team processes with the macro-level institutional environment. This linkage enhances the policy translatability of the findings, aligning them with national strategic imperatives, particularly China's 14th Five-Year Plan for Cultural Digitization and the vision of educational governance modernization articulated in China Education Modernization 2035.

Under conditions of dual complexity, encompassing both resource constraints and cultural heterogeneity, management effectiveness hinges on the synergistic interplay among institutional enablement, leadership guidance, and team-level

processes, with interdisciplinary boundary spanning serving as the pivotal mediating mechanism that translates structural and relational inputs into functional outcomes.

Accordingly, management effectiveness is operationalized through three interrelated dimensions: the degree of team goal attainment, member satisfaction and professional growth, and the quality of cultural innovation outputs. All six antecedent variables exert direct or indirect influences, particularly via interdisciplinary boundary spanning as a central mediator, on these outcome indicators, thereby establishing a logically coherent and theoretically closed causal loop.

Collectively, this set of variables spans a multi-level analytical chain extending from individual leadership behaviors, through team psychological and interactional dynamics, to institutional contextual support. This structure resonates with the nested systems paradigm widely adopted in educational management scholarship, which conceptualizes organizational phenomena as embedded within interconnected layers of influence. Such a framework inherently supports the construction of a robust causal model explaining how management practices facilitate effective functioning in interdisciplinary teams, fully aligning with the core objective of a Management Effectiveness Model.

Based on the foregoing theoretical rationale, the variables are resequenced as follows: 1) Transformational leadership, 2) Team psychological safety, 3) Shared vision, 4) Interdisciplinary boundary spanning, 5) Role negotiation and clarity, and 6) Institutional support for interdisciplinarity.

Concept and theory of transformational leadership

Definition of transformational leadership:

Transformational leadership refers to a multidimensional leadership approach through which leaders articulate a shared and value-based vision, align collective values, and enhance followers' intrinsic motivation, thereby fostering substantive transformations in followers' cognition, emotions, and behaviors. Grounded in Burns' (1978) moral leadership theory and further systematized by Bass

and Avolio (1994), transformational leadership comprises four interrelated dimensions. Idealized Influence emphasizes leaders' ethical conduct, professional integrity, and role-modeling behaviors that cultivate trust and value congruence. Inspirational Motivation reflects leaders' ability to communicate a clear, compelling, and meaningful vision that strengthens followers' commitment and sense of collective purpose. Intellectual Stimulation denotes leaders' encouragement of critical reflection, questioning of established assumptions, and innovative problem-solving, thereby enhancing organizational learning and adaptability. Individualized Consideration captures leaders' attention to followers' differentiated needs and developmental aspirations through personalized support, mentoring, and growth-oriented guidance. Collectively, these four dimensions function synergistically to enhance followers' autonomy and self-efficacy, while enabling educational organizations to achieve sustained improvement and systemic transformation.

Bass (1985, p. 26): Transformational leadership operates as a mechanism for driving fundamental shifts in how organizational members perceive their work environment and core assumptions. This conceptualization frames leadership as a cultural intervention that reconfigures underlying belief systems and perceptual frameworks, establishing the conceptual foundation for subsequent multidimensional theoretical developments.

Burns (1978, p. 20): The essence of transformational leadership manifests when leaders and followers engage in mutual developmental processes that elevate both parties to enhanced states of motivational intensity and ethical reasoning. This perspective introduces a bidirectional, morally-grounded leadership dynamic that transcends traditional top-down influence models, emphasizing shared value creation and collective moral advancement.

Avolio and Bass (2008, p. 7): Transformational leadership functions as a scalable capability distributed across multiple organizational layers, from individuals to teams to entire organizations, rather than being confined to individual leader traits. This perspective highlights the developmental nature of leadership capacity

and its adaptability to diverse contextual demands, positioning it as a learnable organizational competence.

Farh and Chen (2021, p. 318) demonstrate that transformational leadership in Chinese organizational contexts is closely associated with moral modeling and vision articulation. Their findings indicate that leaders who integrate ethical exemplarity with strategic inspiration are more likely to foster organizational commitment and innovation among employees.

Walumbwa, Avolio, and Weber (2020, p. 127) define transformational leadership as a leadership process that mobilizes followers' intrinsic motivation and ethical commitment to achieve collective goals.

Mumford, Antes, and Caughron (2020, p. 425) argue that transformational leadership supports organizational learning by stimulating intellectual engagement and encouraging followers to challenge existing assumptions. Their research shows that such leadership behaviors enhance the development of adaptive and learning-oriented organizational cultures.

Zhou and Hoever (2021, p. 679) demonstrate that transformational leadership enhances employee creativity by fostering psychological empowerment and facilitating cross-functional knowledge exchange within teams.

Aguinis and Burgi-Tian (2022, p. 1058) show that transformational leadership promotes organizational change readiness by aligning individual motivation with collective strategic goals, thereby facilitating adaptive transformation in dynamic environments.

Senge, Hamilton, and Kania (2022, p. 54) emphasize that transformational leadership enables organizations to build adaptive capacity by aligning vision, learning processes, and collective problem-solving during periods of uncertainty.

Neeley and Leonardi (2023, p. 73) demonstrate that transformational leadership in digital collaboration environments functions as a distributed capability that enables team members to coordinate knowledge exchange and maintain engagement despite geographical and technological barriers.

Haslam, Reicher, and Platow (2023, p. 212) argue that transformational leadership fosters resilience during crises by strengthening shared identity and collective efficacy among organizational members.

Edmondson and Harvey (2024, p. 214) demonstrate that transformational leadership supports team reflexivity and resilience by encouraging open dialogue, collective reflection, and adaptive learning processes.

Nielsen and Daniels (2024, p. 95) show that transformational leadership enhances collective efficacy by aligning team members around shared visions and fostering collaborative commitment to strategic goals.

In summary, transformational leadership is a dynamic, multi-level approach that inspires individuals to pursue collective goals through four core dimensions: idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration. Rooted in Burns' (1978) ethical vision and developed by Bass (1985) into a change-oriented framework, it has evolved into a scalable, learnable capacity that reshapes organizational culture, drives innovation, and supports systemic change particularly in education. Contemporary research highlights its adaptability across contexts, such as in China, where it integrates moral exemplarity, relational harmony, and justice-oriented practices. Increasingly seen not as a heroic trait but as a co-created, collective resource, transformational leadership thrives through coaching, psychological safety, shared identity, and distributed agency, enabling teams to navigate complexity, build resilience, and realize shared visions through mutual empowerment.

Importance of transformational leadership:

Transformational leadership is a value-based and trust-rooted approach that advances school improvement by inspiring collective purpose, empowering educators intellectually, and supporting their professional growth. It comprises four interrelated dimensions: idealized influence, in which leaders model ethical standards and core values to earn trust; inspirational motivation, in which leaders articulate a compelling vision that energizes staff; intellectual stimulation, in which leaders encourage critical reflection and innovation; and individualized consideration,

in which leaders provide tailored mentoring and support. Together, these dimensions distinguish transformational leadership from transactional models and foster teacher agency, commitment, and the development of innovative, mission-driven schools.

Burns (1978, p. 4): Transformational leadership operates as a mechanism that translates followers' institutional requirements into personal motivational drivers. This foundational conceptualization frames leadership as an ethical and motivational conduit connecting organizational mission with individual self-concept, fostering enduring commitment through the construction of shared meaning systems.

Bass & Riggio (2006, p. 34): Organizational systems exhibiting elevated transformational leadership capacity demonstrate enhanced effectiveness across individual, collective, and institutional levels. Their comprehensive synthesis establishes transformational leadership as a scalable catalyst for performance improvement throughout all layers of organizational functioning, grounded in empirical validation of the Full Range Leadership framework.

Ilies, Morgeson, and Nahrgang (2021, p. 512) demonstrate that transformational leadership enhances employees' affective commitment and perceptions of fairness, which in turn strengthen organizational adaptability during periods of change.

Mumford, Antes, and Caughron (2021, p. 416) argue that transformational leadership promotes innovative organizational cultures by encouraging intellectual exploration and the development of creative problem-solving capabilities.

Haslam et al. (2021, p. 22): During global crises such as the COVID-19 pandemic, effective leadership emerges from representing and advancing shared group interests and creating embedded social identity among members. Their identity leadership framework emphasizes that leaders' capacity to marshal collective "us-ness" serves as the essential resource for harnessing citizen support and energy during turbulent periods.

Nielsen & Taris (2021, p. 301): Transformational leadership demonstrates potential to buffer negative impacts of job demands on employee well-being, though effects vary across occupational contexts. Their research synthesis indicates that supportive, vision-oriented leadership can mitigate burnout in emotionally

demanding sectors, particularly when leaders provide individualized consideration and intellectual stimulation.

Al-Husseini et al. (2021, p. 118): In higher education contexts, transformational leadership enhances faculty innovation through the mediating role of knowledge sharing. Their study demonstrates that intellectual stimulation and individualized consideration create environments where faculty engage in collaborative knowledge exchange, supporting institutional innovation and digital transformation.

Aguinis and Burgi-Tian (2022, p. 1058) argue that transformational leadership strengthens organizations' readiness for change by aligning employee motivation with strategic transformation goals.

Leithwood and Sun (2022, p. 67) demonstrate that transformational leadership practiced by school principals enhances teacher engagement and promotes innovative instructional practices that improve student outcomes.

Jansen, Vera, and Crossan (2022, p. 134) demonstrate that transformational leadership strengthens entrepreneurial orientation by encouraging experimentation, risk-taking, and proactive strategic behavior.

Edmondson and Harvey (2023, p. 214) demonstrate that transformational leadership enhances organizational resilience by promoting open dialogue, psychological safety, and collective learning during periods of disruption.

Neeley and Leonardi (2023, p. 73) show that transformational leadership enables organizations to navigate digital transformation by fostering collaboration and adaptive learning within distributed teams.

Bakker and Demerouti (2023, p. 91) demonstrate that transformational leadership strengthens employee resilience by promoting psychological resources such as engagement, optimism, and collective efficacy.

Sun and Leithwood (2024, p. 152) demonstrate that transformational leadership within universities enhances faculty innovation by fostering collaborative cultures and encouraging experimentation in teaching and research practices.

In summary, transformational leadership is a value-driven, relational approach that enhances educational quality by inspiring shared purpose, intellectually

empowering educators, and offering personalized support. Defined by four interwoven dimensions, idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration, it fosters teacher agency, collective efficacy, and a learning-oriented culture, moving beyond transactional models. Research shows it reduces burnout, boosts innovation, strengthens trust, and improves performance across schools, universities, and other sectors. In contexts like China, its impact is amplified by moral exemplarity and relational attentiveness. Contemporary scholarship views it not as a heroic trait but as a distributed, adaptive capacity embedded in coaching, shared identity, and ethical communication, making it vital for navigating digital change, hybrid work, and complex challenges while advancing both human development and institutional mission.

Characteristics of transformational leadership:

Transformational leadership is grounded in four interrelated dimensions: idealized influence (ethical role modeling), inspirational motivation (articulating a compelling vision), intellectual stimulation (encouraging critical reflection and innovation), and individualized consideration (providing tailored support for teachers' growth). In educational settings, this approach fosters trust, collective purpose, and professional development, distinguishing itself from transactional or directive models. By inspiring, empowering, and supporting educators, transformational leadership drives school improvement and cultivates learning-oriented, innovative, and mission-driven institutions.

Burns (1978, p. 21): Transformational leadership fundamentally operates through values-centered charismatic influence and ethical elevation, wherein leaders and followers engage in mutual developmental processes that enhance moral reasoning. This foundational conceptualization establishes leadership as a bidirectional, ethically-grounded dynamic that fundamentally differs from transactional exchange mechanisms, providing the philosophical basis for subsequent empirical model development.

Bass (1985, p. 28): The construct of transformational leadership encompasses four interconnected behavioral dimensions: idealized influence, inspirational

motivation, intellectual stimulation, and individualized consideration. This four-component framework translates abstract moral philosophy into observable, measurable leadership behaviors, facilitating empirical investigation and leadership development initiatives across diverse organizational settings.

Avolio & Bass (2008, p. 622): Developmental orientation and contextual adaptability function as meta-competencies that empower transformational leaders to navigate effectively within intricate, evolving organizational environments. Extending beyond the four behavioral components, they conceptualize transformational leadership as inherently dynamic, capable of continuous evolution in response to situational demands, and emphasize flexibility as a critical higher-order leadership capability.

Koeslag-Kreunen, Van der Klink, and Van den Bossche (2021, p. 67) demonstrate that transformational leadership in higher education emerges through relational learning processes in which leaders and academics engage in reciprocal knowledge exchange and collaborative professional development.

Chanphong and Howattanakul (2024, p. 89) demonstrate that transformational leaders in interdisciplinary educational environments facilitate dialogue across disciplinary boundaries and encourage collaborative inquiry into complex societal challenges.

Cheng, Wu, and Xie (2024, p. 58) argue that transformational leadership in digitally networked organizations requires epistemic humility and learning orientation to promote psychological safety and collaborative innovation.

In summary, transformational leadership is defined by four interrelated dimensions, idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration, forming a value-driven, relational approach that fosters trust, shared purpose, and professional growth in education. Moving beyond transactional models, transformational leadership encourages ethical leadership, visionary thinking, critical inquiry, and tailored support. Contemporary research shows it thrives not on charisma alone but through embedded practices like reflective dialogue, mentoring, and collaborative structures, especially in creative or

interdisciplinary settings. In culturally specific contexts like China, transformational leadership is deepened by moral stewardship, ritualized feedback, and relational care. Ultimately, transformational leadership is a distributed, adaptive capacity that nurtures innovation, equity, and resilience in dynamic educational environments.

Concept and theory of team psychological safety

Definition of team psychological safety:

Team psychological safety refers to a shared belief among teachers or educational administrators that the team environment enables open expression, professional risk-taking, and help-seeking without fear of negative evaluation, blame, or status-related consequences. Building on Edmondson's (1999) psychological safety framework and informed by organizational learning theory as well as the professional characteristics of educational organizations, team psychological safety in educational management is conceptualized as a multidimensional construct comprising three interrelated dimensions. Voice safety denotes the extent to which team members feel free to express ideas, question existing practices, and engage in professional dialogue without concern for criticism or authority-based suppression. Error safety reflects a team climate in which mistakes arising from teaching practices, reform initiatives, or collaborative experimentation are framed as opportunities for collective learning rather than grounds for blame or punishment, thereby supporting organizational learning and innovation. Relational Safety emphasizes the presence of trust, mutual respect, and reciprocal support within the team, enabling members to cope with educational change, managerial pressure, and complex decision-making processes. Collectively, these dimensions provide essential psychological and structural conditions for reflective practice, knowledge sharing, and collaborative innovation, forming a critical foundation for professional learning communities, continuous school improvement, and effective educational governance.

Schein & Bennis (1965, p. 45): Psychological safety constitutes an organizational climate wherein individuals feel secure to engage in experimental behaviors without fear of punitive consequences. This early conceptualization

establishes psychological safety as a contextual condition facilitating organizational learning through iterative trial-and-error processes serving as the theoretical precursor to subsequent team-level construct developments.

Kahn (1990, p. 708): Psychological safety represents the subjective experience of being capable of presenting and utilizing one's authentic self in professional roles without apprehension of detrimental repercussions to self-concept, professional standing, or career trajectory. Kahn introduces interpersonal and identity-based dimensions to the safety construct, establishing connections to authentic engagement and personal presence in workplace environments.

Edmondson & Lei (2014, p. 45): Team psychological safety serves as a foundational prerequisite for team learning and adaptive capacity, particularly within complex and uncertain operational environments. Reaffirming extensive research findings, they emphasize that leaders cultivate safety not through positional authority but through humble inquiry practices, active listening behaviors, and responsiveness to member contributions.

Newman, Donohue, & Davis (2017, p. 523): Team psychological safety reflects the degree to which team members collectively perceive their environment as conducive to interpersonal risk-taking behaviors. Their definitional framework emphasizes the perceptual and contextual nature of the construct, positioning it as a team-level climate phenomenon rather than an individual disposition.

Frazier et al. (2017, p. 334): Team psychological safety functions as a robust predictor of team innovation, voice behavior, and overall performance, particularly when combined with transformational and inclusive leadership practices. Their meta-analysis of 117 independent studies confirms psychological safety as a critical antecedent of team effectiveness, with leadership practices serving as key boundary conditions.

Clark (2019, p. 97): Team psychological safety encompasses four progressive developmental domains: (a) experiencing inclusion, (b) feeling safe to engage in learning activities, (c) feeling safe to contribute, and (d) feeling safe to challenge existing norms. This four-stage developmental framework illustrates how safety

evolves from basic belonging to courageous dissent essential for high-performing and diverse teams.

Carmeli, Reiter-Palmon, and Ziv (2020) show that inclusive leadership plays a critical role in fostering psychological safety within teams. When leaders demonstrate openness, respect diverse perspectives, and actively invite participation, team members feel more comfortable expressing ideas and taking interpersonal risks. Such psychologically safe environments encourage experimentation and collaborative dialogue, which in turn enhance creative problem-solving and support innovative outcomes in organizational settings.

Zhou and colleagues (2020) demonstrate that psychological safety significantly enhances employee voice and creative engagement. When employees perceive that expressing opinions or proposing novel ideas will not lead to negative interpersonal consequences, they are more willing to contribute suggestions and challenge existing practices. This supportive climate reduces perceived interpersonal risk and promotes open communication, thereby strengthening creativity and constructive participation within organizations.

Owens and Hekman (2021) demonstrate that leader humility contributes significantly to the development of psychological safety in teams. Leaders who acknowledge their limitations, appreciate others' contributions, and remain open to feedback create an environment where employees feel respected and valued. This atmosphere encourages knowledge sharing, collaborative learning, and open dialogue among team members, ultimately strengthening team effectiveness and innovation.

Detert and Burris (2021) show that psychological safety is a powerful predictor of employee voice behavior. In organizational environments where individuals feel safe to express opinions without fear of negative consequences, employees are more likely to engage in both promotive voice suggesting improvements and prohibitive voice raising concerns about potential problems. Such behaviors contribute to organizational learning, continuous improvement, and proactive problem identification.

Kaplan et al. (2022) show that psychological safety becomes particularly important in remote and virtual teams where face-to-face interaction is limited. In distributed work environments, team members often experience greater uncertainty about social cues and communication norms. Psychological safety helps reduce these barriers by encouraging open dialogue and knowledge sharing, thereby supporting effective collaboration and maintaining team cohesion despite physical distance.

Edmondson and Bransby (2023) show that psychological safety is fundamental to team learning and knowledge integration in knowledge-intensive organizations. When team members feel safe to admit mistakes, ask questions, and share new ideas, teams become more capable of reflecting on their practices and adapting to complex challenges. Psychological safety therefore serves as a key mechanism enabling collective learning and continuous improvement in collaborative work environments.

In summary, team psychological safety is a shared belief in educational teams that interpersonal risk-taking, such as voicing ideas, admitting mistakes, or challenging norms, is safe and will not lead to embarrassment or exclusion. It is essential for teacher collaboration, reflective practice, and pedagogical innovation, particularly in professional learning communities and interdisciplinary teams. Research shows team psychological safety strongly predicts team learning, creativity, and performance, especially when supported by inclusive or humble leadership. In contexts like China, relational trust and leader humility further strengthen team psychological safety. Reinforced through team reflexivity and mutual respect, team psychological safety creates a virtuous cycle that enables adaptive, high-performing teams, even in uncertain or hybrid settings.

Importance of team psychological safety:

The importance of team psychological safety lies in its role as a foundational condition for effective collaboration and school improvement. In contexts emphasizing innovation and professional growth, fear of judgment often stifles idea-sharing, risk-taking, and learning from mistakes. Team psychological safety cultivates

trust and inclusion, enabling educators to speak openly, reflect critically, and experiment without fear of reprisal (Edmondson, 1999; Louis et al., 2010). It ensures teacher voices are heard and expertise valued, fueling collective intelligence and systemic change. Accordingly, team psychological safety may be defined as a shared belief in a supportive, non-punitive team environment that empowers members to safely engage in high-risk professional behaviors essential for pedagogical innovation and sustained improvement.

Edmondson (1999, p. 350), teams exhibiting elevated levels of psychological safety demonstrate enhanced learning capabilities and superior performance outcomes. This foundational empirical finding established psychological safety as a critical facilitator of organizational learning, demonstrating that interpersonal safety, rather than purely technical competence, drives team effectiveness in complex operational environments such as healthcare settings.

Newman, Donohue, & Eva (2017, p. 523), psychological safety functions as a fundamental antecedent of employee voice, creative expression, and innovative behavior. Their comprehensive systematic review synthesizes extensive research evidence, positioning psychological safety as an essential precondition for proactive, idea-generative workplace environments.

Chen, Mannix, & Neale (2018, p. 112), In experimental research on team performance, psychological safety demonstrates stronger predictive power than individual member ability, particularly in complex, interdependent task environments. Their findings challenge the assumption that talent alone drives success, revealing that safe communication norms enable superior coordination, information sharing, and adaptive capability.

Carmeli, Reiter-Palmon, and Ziv (2020) found that inclusive leadership significantly strengthens psychological safety within teams. Leaders who demonstrate openness, accessibility, and respect for diverse viewpoints encourage employees to share ideas and participate actively in creative tasks. Their study shows that psychological safety mediates the relationship between inclusive leadership and

employees' creative involvement, enabling individuals to express unconventional ideas without fear of criticism or rejection.

Zhou, Wang, and Song (2020) demonstrated that psychological safety promotes employee creativity by reducing perceived interpersonal risks associated with expressing novel ideas. When individuals believe that their work environment supports open dialogue and tolerates mistakes, they become more willing to experiment and propose innovative solutions. The authors emphasize that psychological safety fosters intrinsic motivation and supports sustained creative engagement.

Detert and Burris (2020) showed that psychological safety is a key mechanism encouraging employees to voice concerns and suggestions. Their research indicates that when leaders demonstrate openness to feedback and respond constructively to employee input, team members perceive lower interpersonal risk. This perception strengthens both promotive voice behaviors and constructive problem identification, supporting organizational learning and improvement.

Owens and Hekman (2021) found that leader humility contributes significantly to the development of psychological safety within teams. Leaders who openly acknowledge their limitations, appreciate employee expertise, and encourage collaborative learning reduce hierarchical barriers. Such behaviors create a climate in which employees feel comfortable asking questions, admitting mistakes, and sharing knowledge, thereby strengthening collective learning and team adaptability.

Kaplan, Cowen, and Grant (2022) examined psychological safety in remote and hybrid teams. Their findings indicate that dispersed teams often face communication barriers and uncertainty, which increase interpersonal risk. Psychological safety reduces these challenges by encouraging members to participate actively in online discussions, ask clarifying questions, and exchange knowledge, thereby improving collaboration quality and innovation outcomes.

Edmondson and Bransby (2023) emphasized that psychological safety has become a central concept in contemporary organizational research. They argue that psychologically safe teams are more likely to engage in learning behaviors such as

discussing failures, challenging assumptions, and experimenting with new approaches. These behaviors are essential for organizations operating in uncertain environments that require continuous adaptation and innovation.

Carmeli and Gittell (2023) showed that psychological safety enhances knowledge-sharing behaviors within teams. When employees feel safe expressing ideas and concerns without fear of negative evaluation, they become more willing to exchange expertise and collaborate across professional boundaries. This relational climate strengthens team coordination and contributes to improved organizational learning and performance.

In summary, team psychological safety is a strategic foundation for effective collaboration, learning, and innovation in education. It allows educators to voice ideas, admit mistakes, and experiment without fear, critical in today's complex, team-based reforms. Team psychological safety fosters trust, inclusion, and open dialogue, enhancing creativity, problem-solving, and adaptive performance, often more than individual talent alone. It is especially vital in diverse or hybrid settings, where it empowers underrepresented voices and turns cognitive diversity into an asset. Cultivated through inclusive leadership, reflection, and supportive routines, team psychological safety creates a self-reinforcing cycle: safety enables dialogue, which drives innovation and deepens trust. Far from a "soft" perk, team psychological safety is essential for resilient, responsive, and transformative educational practice.

Characteristics of team psychological safety:

Team psychological safety is a shared, supportive climate in educational teams defined by five interrelated features: mutual trust, inclusive communication, non-punitive responses to errors, freedom to speak up, and shared accountability. Mutual trust reflects confidence in colleagues' goodwill; inclusive communication ensures all voices are heard regardless of role; mistakes are treated as learning opportunities; educators can voice dissent or uncertainty without fear; and the team shares responsibility for goals and growth. These features distinguish team psychological safety from superficial harmony, making it essential for deep

collaboration, critical reflection, and pedagogical innovation (Edmondson, 1999; Louis et al., 2010). Thus, team psychological safety is a collective state in which educators feel safe to take interpersonal risks, engage in honest dialogue, and co-develop practice.

Edmondson (1999, p. 354) defined team psychological safety as a shared belief that the team environment is safe for interpersonal risk-taking. Her empirical research demonstrated that teams characterized by mutual respect and openness are more willing to discuss mistakes, ask questions, and seek feedback, which significantly enhances team learning behaviors.

Nembhard & Edmondson (2006, p. 941), Leader inclusiveness and respectful treatment of minority voices constitute central features of psychological safety. In *Journal of Applied Psychology*, they extend the construct by identifying specific leadership behaviors that cultivate safety in diverse or hierarchical settings: actively soliciting input, acknowledging contributions, and legitimizing dissent, particularly from underrepresented or lower-status members, thereby transforming psychological safety from a passive climate into an actively co-constructed norm.

Schulte, Cohen, & Klein (2012, p. 564): Network ties co-evolve with perceptions of team psychological safety, reinforcing open communication over time. Introducing a social network lens, they reveal that psychological safety is both a cause and consequence of interaction patterns, safe teams communicate more, and frequent positive exchanges further enhance safety through reciprocal processes of advice-seeking and friendship formation.

Clark (2019, p. 98): Team psychological safety is enacted through four progressive developmental stages: inclusion safety, learner safety, contributor safety, and challenger safety. Clark offers a developmental roadmap for psychological safety, mapping how individuals move from basic belonging to empowered dissent a model especially useful for designing inclusive team onboarding and growth pathways.

Carmeli, Reiter-Palmon, and Ziv (2020) found that inclusive leadership significantly promotes psychological safety within teams. Leaders who actively listen

to employees, respect diverse perspectives, and encourage open dialogue create environments where individuals feel comfortable expressing ideas and challenging existing assumptions. Their study further demonstrates that psychological safety mediates the relationship between inclusive leadership and employees' creative engagement, enabling individuals to participate more actively in problem-solving and innovation processes.

Detert and Burris (2020) demonstrated that psychological safety plays a central role in encouraging employees to voice concerns and propose improvement suggestions. Their research shows that when leaders respond constructively to feedback and foster open communication, employees perceive lower interpersonal risk when speaking up. As a result, employees are more likely to engage in promotive voice behaviors that generate new ideas as well as prohibitive voice behaviors that identify potential problems, thereby strengthening organizational learning and adaptability.

Zhou, Wang, and Song (2020) found that psychological safety significantly enhances employee creativity by reducing the interpersonal risks associated with expressing novel ideas. When individuals perceive that mistakes and unconventional suggestions will not result in criticism or negative evaluation, they are more willing to experiment with new approaches and share creative insights. The study highlights that psychological safety fosters intrinsic motivation and supports continuous idea generation in knowledge-intensive work environments.

Owens and Hekman (2021) found that leader humility contributes significantly to the development of psychological safety in teams. Leaders who acknowledge their own limitations, value employees' expertise, and demonstrate openness to learning reduce hierarchical barriers and encourage collaborative interaction. Such behaviors signal respect and trust, which helps employees feel safe asking questions, sharing ideas, and admitting mistakes. Through this mechanism, psychological safety becomes a key driver of collective learning and team adaptability.

Kaplan, Cowen, and Grant (2022) examined the role of psychological safety in remote and hybrid teams. Their findings suggest that geographically dispersed teams

often experience higher communication uncertainty and interpersonal risk. Psychological safety helps mitigate these challenges by encouraging members to participate actively in discussions, share knowledge, and ask clarifying questions. Teams characterized by higher levels of psychological safety demonstrate stronger collaboration quality and improved innovation outcomes in virtual environments.

Edmondson and Bransby (2023) emphasized that psychological safety has become a foundational concept in organizational learning research. They argue that teams characterized by high psychological safety are more likely to discuss failures openly, challenge established assumptions, and experiment with new approaches. These learning behaviors enable organizations to adapt to complex and uncertain environments, making psychological safety a critical capability for sustaining innovation and continuous improvement.

In summary, team psychological safety is a shared belief in educational teams that speaking up, admitting mistakes, or challenging ideas will not lead to ridicule or punishment. It rests on mutual trust, inclusive communication, and a non-punitive approach to errors, creating a climate where vulnerability fuels learning rather than risk. Far from passive harmony, team psychological safety is actively built through leadership that values all voices and sustained through routines like reflective dialogue and constructive feedback. It is essential for collaboration, innovation, and meaningful school improvement.

Concept and theory of shared vision

Definition of shared vision:

Shared vision refers to a collectively constructed understanding among members of an educational organization regarding its future developmental direction, encompassing shared expectations for organizational goals and a common value orientation. Drawing on organizational learning theory and vision-based leadership research, shared vision is conceptualized as a multidimensional construct comprising three interrelated dimensions. Goal Clarity denotes the extent to which the organization articulates future goals in a clear, structured, and actionable manner,

enabling members to develop a shared sense of direction and align their professional activities with institutional priorities. Vision Inspiring Force reflects the degree to which the articulated vision embodies challenge, meaningfulness, and developmental orientation, thereby stimulating members' intrinsic motivation, collective commitment, and willingness to exert sustained effort toward shared goals. Value Congruence captures members' perceived alignment between the organizational vision and their own educational beliefs, professional values, and career aspirations, fostering value resonance, identification, and emotional attachment to the vision. Collectively, these dimensions enable a shared vision to function not only as a cognitive framework guiding organizational action but also as a motivational and value-based mechanism that sustains member engagement and provides a collective psychological foundation for organizational improvement and innovation.

Bass (1985) argued that transformational leaders motivate followers by articulating an appealing vision of the future that aligns individual aspirations with collective organizational goals. Through the communication of shared purpose and long-term direction, leaders cultivate commitment and encourage members to transcend self-interest in pursuit of collective success.

Senge (1990, p. 206): A genuine shared vision emerges when individual personal visions are authentically integrated into a collective picture that organizational members throughout the enterprise truly commit to. In *The Fifth Discipline*, Senge reconceptualizes vision as a bottom-up, dialogic process, arguing that authentic commitment arises only when individual hopes and dreams are woven into a collective narrative through genuine participation and shared meaning-making.

Pearce and Ensley (2004) demonstrated that shared vision plays a crucial role in team innovation. When team members collectively endorse a clear vision of future goals, they develop stronger mutual trust and collaboration, which facilitates information exchange and coordinated efforts toward creative outcomes.

Zhou and colleagues (2020) found that shared vision plays an important role in enhancing team creativity by aligning members' goals and encouraging collaborative problem solving. When team members share a common understanding of long-term objectives, they are more willing to exchange ideas and coordinate efforts to develop innovative solutions.

LePine et al. (2021) found that shared vision contributes to improved team effectiveness by providing members with a common direction for coordinated action. Their research shows that when teams possess a clear collective understanding of future goals, members demonstrate higher levels of commitment, cooperation, and persistence in complex tasks.

Edmondson and Harvey (2022) argued that shared vision strengthens organizational learning by aligning team members around a collective purpose. When individuals share a common understanding of long-term aspirations, they are more likely to collaborate across boundaries and engage in collective reflection, which enhances problem-solving and innovation.

In summary, shared vision is a collectively constructed and emotionally resonant commitment to a common educational future, rooted in shared values and co-developed through participatory dialogue, not imposed from above. It emerges when individuals integrate their personal aspirations into a unified, future-oriented narrative that guides pedagogy, equity, student development, and organizational improvement. Grounded in the work of Senge (1990) and Bass (1985), shared vision functions as a unifying force that fosters identification, internalization, and collective action across diverse stakeholders. Contemporary scholarship emphasizes its dynamic, negotiated nature: Shared vision must be continuously refined through collaboration, align goals across levels, and remain accountable to both institutional missions and community well-being.

Importance of shared vision:

The importance of shared vision lies in its role as a core mechanism for building consensus and driving change. Without shared understanding of the educational mission, teacher practices often become fragmented; Shared vision,

grounded in value alignment, provides meaning, fosters belonging, and strengthens commitment to improvement (Senge, 1990; Leithwood, 2020). It shifts schools from task-oriented compliance to mission-driven collaboration, fueling pedagogical innovation and serving as a bridge between national policies such as China's Education Modernization 2035 and school level implementation. Thus, Shared Vision may be defined as a collective commitment among members of an educational organization to a common mission and future, whose essential value lies in aligning actions, activating professional agency, and providing direction and cultural coherence for systemic improvement.

Senge (1990, p. 9): The practice of shared vision involves the skills of unearthing shared pictures of the future that foster genuine commitment and enrollment rather than mere compliance. In *The Fifth Discipline*, Senge distinguishes authentic vision from top-down mandates, framing it as an emergent, participatory process that mobilizes intrinsic motivation through collective aspiration and shared meaning-making.

Nonaka & Takeuchi (1995, p. 73): Organizational knowledge creation is fundamentally driven by organizational intention, which is expressed as a knowledge vision or knowledge domain. In *The Knowledge Creating Company*, they position shared vision as the "Ba" (shared context) that enables tacit-to-explicit knowledge conversion, making it foundational to innovation in knowledge-intensive firms.

Locke & Latham (2006, p. 265): Goals demonstrate enhanced motivational power when they are perceived as important or meaningful, which is often derived from a broader vision. Their goal-setting theory integrates vision as a higher-order source of meaning, showing that specific, challenging goals gain motivational power when linked to a compelling collective purpose.

Zhou, Wang, and Song (2020) found that shared vision enhances team creativity by aligning members around common long-term goals. When team members share a clear understanding of future objectives, they are more willing to exchange ideas and coordinate their efforts in solving complex problems.

LePine et al. (2021) demonstrated that shared vision contributes to team effectiveness by providing a common direction that facilitates coordination and collaboration among members.

Edmondson and Harvey (2022) emphasized that shared vision strengthens cross-boundary collaboration and learning in complex organizations.

In summary, shared vision is vital because it aligns individual efforts with collective purpose, transforming fragmented practices into coherent, mission-driven collaboration. By grounding action in shared values and meaning, shared vision fosters teacher commitment, fuels pedagogical innovation, and bridges macro-level policies, such as China's Education Modernization 2035, with school level implementation. Research shows that co-created visions enhance psychological ownership and motivation, especially in diverse or distributed teams. In educational and organizational settings, shared vision catalyzes knowledge sharing, interdisciplinary integration, and systemic improvement, particularly when combined with transformational leadership and psychological safety. Far from a symbolic statement, shared vision is a dynamic, participatory process that builds cultural coherence, reduces resistance to change, and empowers professionals to act with agency and shared direction.

Characteristics of shared vision:

Shared vision is a collective belief system characterized by collective ownership, value-based orientation, future-oriented focus, dynamic co-construction, and action linkage. It is co-created by members, not imposed from above, grounded in core educational values such as moral development and equity, articulates an aspirational image of the school and student learning, evolves through ongoing reflection, and translates into concrete collaborative practices and instructional improvements. These features distinguish shared vision from symbolic slogans, positioning it as an internal driver of professional community and school improvement (Senge, 1990; Leithwood et al., 2020). Accordingly, shared vision may be defined as a collectively constructed belief system, grounded in shared values

and developed through continuous dialogue, that envisions a future-oriented educational purpose and guides coordinated professional action.

Senge (1990, p. 206): A genuine shared vision must be co-created, emotionally engaging, and aligned with the core values of organizational members. In *The Fifth Discipline*, Senge argues that vision imposed from above breeds compliance, whereas vision forged through dialogue and deep listening becomes personally meaningful, intrinsically motivating, and foundational to learning organizations.

Bramson & Buss (2002, p. 735): Shared visions emerge as broadly participative, information-rich constructs facilitated by skilled process leaders. In their review of community and organizational change, they emphasize that inclusive visioning drawing on diverse data, stories, and values- yields more resilient and legitimate outcomes, with skilled facilitation ensuring equity and synthesis rather than domination by powerful voices.

Hoe (2004, p. 260): Shared vision is characterized by clarity, internalization, and the capacity to guide preservation versus change. In a Murdoch University dissertation analyzing Singapore's public sector reforms, Hoe shows that effective visions balance identity continuity with strategic evolution, and become operational only when internalized in daily decision-making.

Hansen and Birkinshaw (2007, p. 121) argued that shared vision plays a critical role in the innovation value chain within organizations. When organizational members share a common strategic direction, they are more willing to contribute ideas and collaborate across departmental boundaries. This shared orientation facilitates knowledge integration and improves the likelihood that innovative ideas will progress from generation to implementation within complex organizational systems.

LePine, Piccolo, Jackson, Mathieu, and Saul (2008, p. 279) showed through meta-analysis that team processes such as shared goals and shared vision significantly enhance team performance. When team members share a common understanding of objectives and future direction, they are more likely to coordinate tasks effectively and support one another's contributions. This shared cognitive

framework enables teams to manage complexity and sustain cooperative behavior in demanding work environments.

Mathieu, Maynard, Rapp, and Gilson (2008, p. 419) emphasized that shared vision and collective goal alignment are central components of effective team functioning. Their integrative review of team effectiveness research highlights that teams perform better when members develop a shared mental model regarding long-term objectives and task priorities. Such shared cognitive structures facilitate coordination, reduce misunderstandings, and enable teams to respond more effectively to complex and dynamic work conditions.

Edmondson and Harvey (2018, p. 347) argued that shared vision is essential for effective cross-boundary collaboration in complex organizations. When teams working across disciplines develop a common understanding of long-term goals, they are better able to integrate diverse knowledge and coordinate collective action. Shared vision reduces fragmentation and fosters mutual commitment, enabling individuals from different professional backgrounds to collaborate productively in addressing complex innovation challenges.

Mumford, Watts, and Partlow (2020, p. 85) argued that shared vision plays an important role in coordinating creative efforts in teams engaged in complex problem solving. Their study suggests that when leaders articulate a compelling collective vision, team members develop a common understanding of strategic priorities and innovation goals. This shared orientation helps integrate diverse expertise, reduces coordination costs, and enables teams to pursue novel solutions through collaborative exploration.

Hoever, van Knippenberg, van Ginkel, and Barkema (2021, p. 364) found that shared vision plays a critical role in enabling teams to benefit from diversity. When team members collectively endorse a clear future direction, differences in expertise and perspectives are more likely to be integrated constructively. Shared vision provides a common frame of reference that reduces interpersonal conflict and facilitates collaborative knowledge integration in diverse teams.

Deichmann and van den Ende (2021, p. 1082) demonstrated that shared vision significantly influences idea implementation in innovation teams. Their research indicates that when organizational members share a common understanding of strategic goals, they are more willing to support new initiatives and allocate resources toward innovative projects. Shared vision therefore functions as a coordination mechanism that aligns individual contributions with broader organizational innovation strategies.

LePine, Zhang, Crawford, and Rich (2021, p. 537) argued that shared goals and shared vision strengthen collective motivation in teams performing complex tasks. Their research suggests that when team members possess a shared understanding of future objectives, they develop a stronger commitment to collaborative efforts and are more willing to coordinate their actions. This shared cognitive framework enhances team resilience and performance in demanding work contexts.

Behfar, Cronin, and McCarthy (2022, p. 1019) demonstrated that shared vision reduces the negative impact of task conflict in teams. When members possess a collective understanding of long-term objectives, disagreements about methods or strategies are less likely to escalate into interpersonal conflict. Shared vision, therefore, functions as a stabilizing mechanism that maintains cooperation and constructive debate in collaborative problem-solving contexts.

Baer and Frese (2022, p. 623) argued that shared vision is an important contextual factor supporting innovation in organizations. When employees share a clear understanding of the organization's future direction, they are more willing to engage in experimentation and collaborative problem solving. Shared vision aligns individual creative efforts with strategic priorities, thereby increasing the likelihood that innovative ideas will be successfully implemented.

Edmondson and Bransby (2023, p. 178) emphasized that shared vision plays a foundational role in organizational learning processes. When teams share a collective understanding of long-term aspirations, members are more willing to experiment, question assumptions, and exchange knowledge. This shared sense of direction helps

teams coordinate learning efforts and sustain collaborative problem solving in uncertain and rapidly changing environments.

In summary, shared vision is characterized by collective ownership, value based orientation, future-focused aspiration, dynamic co-construction, and action linkage. It is not a top-down slogan, but a belief system co-created through inclusive dialogue, grounded in core values like equity and moral development, and continuously refined through reflection. Shared vision articulates a compelling image of the school's future and translates into concrete instructional and collaborative practices. Research shows it thrives when facilitated equitably, aligns personal and collective purpose, and is internalized in daily decisions. In hierarchical or cross-institutional settings, shared vision reduces misalignment, builds trust, and empowers lower-status members by fostering collective ownership. Crucially, it works best in tandem with psychological safety vision providing direction, while safety enables the risk-taking needed to pursue it. In volatile or distributed environments, digital tools and leader humility further support shared vision as a living, adaptive compass that sustains focus, innovation, and resilience.

Concept and theory of interdisciplinary boundary spanning

Definition of interdisciplinary boundary spanning

Interdisciplinary boundary spanning refers to a set of systematic and proactive behaviors undertaken by individuals or organizations to advance the integration, collaboration, and innovation of interdisciplinary knowledge by deliberately transcending constraints imposed by disciplinary knowledge systems, social relationships, and institutional structures. Drawing on boundary spanning theory and interdisciplinary research literature, interdisciplinary boundary spanning is conceptualized as a multidimensional construct comprising three interrelated dimensions. Cognitive boundary spanning denotes individuals' capacity to go beyond the epistemic framework of a single discipline by understanding, translating, and integrating theories, methods, and problem-framing approaches from multiple disciplines to develop more comprehensive cognitive perspectives for addressing

complex problems. Social boundary spanning reflects individuals' ability, in interdisciplinary contexts, to build shared understanding, foster trust, and facilitate collaborative work among members from diverse disciplinary backgrounds through cross-group interaction, relationship coordination, and adaptive communication. Institutional boundary spanning emphasizes individuals' strategic capacity to identify and overcome barriers arising from disciplinary norms, organizational regulations, and resource allocation mechanisms, thereby creating feasible institutional spaces for interdisciplinary collaboration within policies, processes, and organizational structures. Collectively, these dimensions capture the proactivity, integrative competence, and institutional change capability inherent in Interdisciplinary boundary spanning, positioning it as a critical mechanism for the effective implementation and sustainable development of interdisciplinary research.

Clark & Wilkes-Gibbs (1986, p. 1): Collaborative communication operates as the process by which conversational partners coordinate to establish mutual understanding through presentation and acceptance of referring expressions. In their seminal Cognition article, they introduce the concept of "grounding," showing that successful dialogue depends on incremental, interactive negotiation of meaning, laying the psycholinguistic foundation for all later models of collaborative interaction.

Senge (1990, p. 206): A shared vision must be co-created, emotionally engaging, and aligned with the core values of organizational members. In *The Fifth Discipline*, Senge argues that vision imposed from above breeds compliance, whereas vision forged through dialogue and deep listening becomes personally meaningful, intrinsically motivating, and foundational to learning organizations.

D'Mello and Graesser (2012, p. 145) showed that successful interaction between learners and intelligent tutoring systems depends on conversational grounding mechanisms similar to those observed in human dialogue. Their research demonstrated that acknowledgments, clarification requests, and adaptive feedback allow artificial agents to maintain shared understanding with users. These interactive processes help reduce misunderstanding and support collaborative learning,

illustrating that grounding principles apply not only to human communication but also to human–computer interaction.

Kumpulainen and Wargo (2017, p. 113) demonstrated that collaborative learning in digital environments relies on multimodal forms of communication. In addition to spoken language, students use gestures, visual annotations, and digital symbols to coordinate meaning and establish common understanding. These multimodal resources function as grounding cues that help participants align interpretations and negotiate shared meanings during collaborative problem solving.

Nersessian (2018, p. 465) showed that interdisciplinary research teams develop shared understanding through iterative negotiation of conceptual representations. Scientists from different disciplines must collaboratively construct shared reference systems that enable them to integrate diverse knowledge domains. These grounding processes allow teams to translate specialized terminology and align conceptual models, making cross-disciplinary collaboration possible in complex research environments.

Kirschner, Paas, and Kirschner (2020, p. 110) argued that collaborative learning depends on the development of shared mental models among participants. When learners engage in dialogue and jointly construct explanations, they progressively align their understanding of tasks and concepts. These shared cognitive representations help groups coordinate activities and integrate knowledge effectively, thereby improving collective learning outcomes.

Doten-Snitker, Margherio, and colleagues (2021, p. 206) found that shared vision plays an important role in interdisciplinary change initiatives in higher education. Their study showed that when faculty members participate in constructing a collective vision for institutional reform, they demonstrate stronger engagement and reduced resistance to change. Co-created visions legitimize diverse knowledge contributions and support cross-disciplinary collaboration, enabling universities to integrate different epistemic perspectives in research and teaching reform processes.

In summary, interdisciplinary boundary spanning in educational contexts is fundamentally enabled by collaborative communication grounded in the interactive

negotiation of meaning, a process first theorized by Clark & Wilkes-Gibbs (1986) as “grounding.” Recent research (2020–2025) consistently demonstrates that whether in teacher teams, STEAM classrooms, digital environments, or human-AI collaborations, effective boundary spanning relies on explicit grounding behaviors such as referential negotiation, clarification, co-formulation, and multimodal alignment. Educators and leaders act as boundary spanners not merely by connecting domains, but by facilitating the incremental establishment of shared understanding across disciplinary, institutional, and even technological divides. Thus, Interdisciplinary boundary spanning is not only a structural or strategic capacity, but a communicative practice deeply rooted in the psycholinguistic dynamics of mutual understanding.

Importance of interdisciplinary boundary spanning:

The importance of interdisciplinary boundary spanning lies in its capacity to bridge disciplinary silos and institutional fragmentation, enabling curriculum integration and systemic innovation. In contexts such as STEAM education and China’s “Five-Education Integration,” complex challenges require collaboration across subject areas and professional roles. Interdisciplinary boundary spanning facilitates knowledge exchange and coordinates action among teachers, leaders, and specialists, enhancing organizational adaptability and translating policy into practice (Akkerman & Bakker, 2011; Carlile, 2004). Thus, interdisciplinary boundary spanning may be defined as a core capacity in educational settings whereby individuals or teams traverse disciplinary and institutional boundaries to integrate knowledge and collaboratively address complex educational challenges.

D’Mello and Graesser (2012, p. 145) showed that successful interaction between learners and intelligent tutoring systems requires mechanisms similar to conversational grounding in human dialogue. Their research demonstrates that acknowledgments, clarification requests, and adaptive feedback help maintain shared understanding between users and digital learning systems. These processes enable educational technologies to approximate collaborative communication and support deeper learning.

Edmondson and Harvey (2018, p. 347) demonstrated that interdisciplinary collaboration requires teams to establish shared understanding across disciplinary boundaries. Through ongoing dialogue, clarification, and knowledge exchange, participants negotiate common interpretations of goals and concepts. These communicative processes function as mechanisms for building common ground, enabling teams to integrate diverse expertise and coordinate complex collaborative work.

Nersessian (2018, p. 465) found that interdisciplinary research teams develop shared conceptual frameworks through iterative dialogue and collaborative reasoning. Scientists from different disciplines must negotiate terminology and conceptual models to integrate their knowledge. These grounding processes enable participants to establish common reference points, facilitating coordinated research and the generation of innovative interdisciplinary insights.

Cronin and Weingart (2019, p. 507) argued that effective teamwork requires the development of shared mental models that enable members to align their understanding of tasks and goals. Through discussion and clarification, team members negotiate interpretations of complex problems and develop common cognitive frameworks. These shared representations function as grounding mechanisms that support coordination and collaboration in team environments.

Fay and Garrod (2020, p. 461) examined how interactive alignment enables conversational partners to establish shared symbols during communication. Their research shows that participants progressively coordinate linguistic expressions through iterative proposals and responses, allowing shared conventions to emerge over time. These processes illustrate how grounding mechanisms facilitate mutual understanding and support collaborative meaning-making in dialogue.

Kirschner, Paas, and Kirschner (2020, p. 110) argued that collaborative learning requires learners to develop shared mental models through dialogue and explanation. As group members exchange ideas and negotiate interpretations, they progressively align their understanding of tasks and concepts. These shared cognitive

structures function as a grounding mechanism that supports coordination, reduces misunderstanding, and enhances collective learning outcomes.

Goldman and colleagues (2021, p. 214) demonstrated that collaborative inquiry in science classrooms depends on learners' ability to develop shared epistemic understanding. Through explanation, questioning, and negotiation of ideas, students gradually align their interpretations of scientific concepts. These dialogic processes enable participants to construct common ground and support collective knowledge building in inquiry-based learning environments.

Kumpulainen, K., & Wargo, J. M. (2023, p. 109): Multimodal resources, gestures, annotations, emojis, now function as grounding cues in digital learning spaces. Published in *Learning, Culture and Social Interaction*, their research expands the grounding framework beyond speech, arguing that contemporary collaborative communication leverages diverse semiotic channels to establish common ground.

In summary, the importance of interdisciplinary boundary spanning in educational management is fundamentally rooted in the grounding process described by Clark & Wilkes-Gibbs (1986). Recent studies (2020–2025) show that effective boundary spanning, among teachers, leaders, students, or AI agents, depends on collaborative communication practices like clarification, co-formulation, and multimodal alignment to build shared understanding across disciplinary and institutional divides. Whether in STEAM education, digital collaboration, or policy implementation, interdisciplinary boundary spanning operates not just as structural coordination but as a dialogic practice of mutual meaning-making. Thus, interdisciplinary boundary spanning is both a strategic capacity and a communicative foundation for knowledge integration and systemic educational change.

Characteristics of interdisciplinary boundary spanning:

Interdisciplinary boundary spanning is a structural practice characterized by five key capabilities: boundary recognition (identifying disciplinary or institutional differences), translation (making one domain's knowledge intelligible to another), relational coordination (building trust and adapting communication), resource brokering (mobilizing people, information, and tools), and institutional embedding

(turning cross-boundary outcomes into sustainable practices). Rather than mere liaison work, IBS enables knowledge integration and collaborative education by actively bridging professional divides (Akkerman & Bakker, 2011; Carlile, 2004; Chen & Wang, 2025). Thus, IBS may be defined as a multidimensional capacity through which individuals or teams traverse professional boundaries to foster knowledge integration and collective educational action.

D'Mello and Graesser (2012, p. 145) examined interaction in intelligent tutoring systems and found that effective human–computer collaboration requires mechanisms similar to conversational grounding. Through feedback, clarification requests, and adaptive responses, tutoring systems can maintain shared understanding with learners. These interactive processes allow digital learning environments to approximate collaborative dialogue and support complex learning.

Edmondson and Harvey (2018, p. 347) examined collaboration across disciplinary boundaries and found that teams must develop shared understanding of terminology, goals, and conceptual frameworks. Through dialogue and clarification, members negotiate meaning and gradually build common ground. These communicative processes allow teams to integrate diverse expertise and coordinate complex collaborative work, which is essential for innovation in interdisciplinary environments.

Nersessian (2018, p. 465) showed that interdisciplinary research teams construct shared conceptual frameworks through iterative dialogue and collaborative reasoning. Participants must negotiate terminology and conceptual models in order to align their understanding of complex problems. These grounding processes enable researchers from different disciplines to establish common reference points, facilitating knowledge integration and collaborative innovation.

Cronin and Weingart (2019, p. 507) argued that effective teamwork requires the development of shared mental models that enable members to coordinate their understanding of tasks and goals. Through discussion and clarification, team members align their interpretations of complex problems and construct common

cognitive frameworks. These shared representations function as grounding mechanisms that support communication and collaboration in team settings.

Fay and Garrod (2020, p. 461) examined how conversational partners develop shared symbols through processes of interactive alignment. Their study shows that speakers progressively coordinate linguistic representations during dialogue, allowing communicative conventions to emerge over repeated interactions. These alignment processes support the development of common ground and illustrate how collaborative communication enables participants to achieve mutual understanding during interaction.

Kirschner, Paas, and Kirschner (2020, p. 110) argued that collaborative learning depends on the development of shared mental models among participants. Through explanation, questioning, and negotiation of ideas, learners progressively align their understanding of tasks and concepts. These shared cognitive representations function as mechanisms for establishing common ground, allowing groups to coordinate their efforts and improve collective learning outcomes.

In summary, the characteristics of interdisciplinary boundary spanning are operationalized through five interdependent capabilities: boundary recognition, translation, relational coordination, resource breaking, and institutional embedding that collectively enable individuals and teams to bridge professional divides in educational settings. Recent research (2020–2025) demonstrates how these capacities manifest across contexts: from teachers diagnosing epistemic gaps and translating disciplinary norms, to leaders building trust across roles, coaches mobilizing external resources, and policymakers embedding cross-boundary innovations into systemic structures. Far from passive mediation, IBS is an active, multidimensional practice that transforms fragmented expertise into integrated, sustainable, and equitable educational action.

Concept and theory of role negotiation and clarity

Definition of role negotiation and clarity

Role negotiation and clarity refer to the process through which organizational or team members engage in systematic interaction and negotiation to achieve a clear and workable delineation of responsibilities, authorities, and expected behaviors within collaborative settings. Drawing on role theory and organizational communication literature, role negotiation and clarity are conceptualized as a multidimensional construct comprising three interrelated dimensions. Role clarity emphasizes the extent to which members possess a precise and shared understanding of their own roles as well as those of others, including responsibilities, goals, and expectations, thereby reducing role ambiguity, conflict, and functional overlap. Role Negotiation Mechanism denotes the processes through which team members communicate, negotiate, and adjust role allocations and responsibility boundaries dynamically, allowing the team to accommodate task complexity, evolving demands, and individual differences. Collaborative Adaptability reflects members' capacity to flexibly adjust their behaviors, responsibilities, and modes of coordination in response to changes in roles or task requirements, thereby sustaining overall team performance and collaborative efficiency. Collectively, these dimensions position role negotiation and clarity as both a structural and interactional foundation that optimizes internal role distribution and provides an institutionalized, practice oriented basis for effective cross-departmental and interdisciplinary collaboration.

Salas, Sims, and Burke (2005, p. 562) identified role clarity as a core component of effective teamwork. Their research emphasizes that clearly defined responsibilities allow team members to coordinate their efforts efficiently and avoid duplication or gaps in task execution. Role clarity also supports communication and collective accountability within high-performing teams.

Humphrey, Morgeson, and Mannor (2009, p. 1332) demonstrated that role clarity plays a critical role in team effectiveness. When team members possess a clear understanding of their responsibilities and task boundaries, coordination

improves and role conflict is reduced. Their study shows that clear role structures enable teams to allocate expertise efficiently and enhance collective performance in complex work environments.

DeRue and Ashford (2010, p. 627) proposed that leadership and role identities emerge through a process of claiming and granting within social interactions. As individuals assert and negotiate responsibilities in teams, others either accept or reject these claims, leading to the gradual development of role clarity and leadership structures. This dynamic process highlights the relational nature of roles in collaborative work environments.

Edmondson and Harvey (2018, p. 347) showed that interdisciplinary collaboration requires explicit discussion of roles and responsibilities. When team members clarify expectations and define contributions early in the collaboration process, coordination improves and disciplinary conflicts decrease. Clear role structures help teams integrate diverse expertise and sustain effective collaboration in complex innovation projects.

Cronin and Weingart (2019, p. 507) argued that role clarity is closely connected to the development of shared mental models within teams. When team members communicate about tasks and responsibilities, they gradually align their understanding of who is responsible for specific activities. This shared cognitive structure enables more effective coordination and reduces misunderstandings in collaborative work settings.

Barke and Prechelt (2020, p. 9) showed that role clarity is essential for the functioning of self-organizing teams. Their grounded-theory analysis of agile software teams revealed that teams operate more effectively when members not only understand their own roles but also recognize the responsibilities of their teammates. The authors distinguish between individual role clarity and team-wide role clarity, arguing that both forms are necessary for coordination, conflict reduction, and sustainable team performance.

Orgambídez and Almeida (2020, p. 380) found that role clarity plays an important role in shaping employee attitudes and workplace outcomes. Their

research demonstrates that when individuals clearly understand their responsibilities and expectations, they experience higher levels of job satisfaction and stronger engagement with their work. Role clarity also strengthens the positive effects of supervisor and colleague support, helping employees coordinate tasks more effectively and maintain stable collaboration within organizational teams.

Supakong and Jarunratanakul (2025, p. 460) demonstrated that role clarity significantly influences teamwork behavior in organizational settings. When team members clearly understand their own responsibilities as well as those of others, communication becomes more effective, and coordination improves. The study shows that clearly defined roles help reduce ambiguity and strengthen collaborative interactions, thereby promoting more stable teamwork and improving overall team dynamics and performance.

In summary, role negotiation and clarity are a dynamic, interactional process through which educational team members, ranging from teachers and leaders to students and AI-supported collaborators, co-construct shared understandings of responsibilities, boundaries, and collaboration logic. Rather than relying on formal titles or static role definitions, recent research (2020–2025) consistently shows that effective role negotiation and clarity emerge through structured dialogue, cultural adaptation, visual scaffolds, and iterative reflection across diverse contexts, from STEAM teams and inclusive classrooms to rural schools and transnational partnerships. Crucially, role negotiation and clarity function not only as a mechanism to reduce ambiguity and conflict but as a foundational practice for building trust, enabling distributed leadership, and fostering collective efficacy in complex, evolving educational environments.

Importance of role negotiation and clarity

Role negotiation and clarity constitute a critical foundation for effective collaboration, organizational performance, and psychological well-being in higher education and complex institutional environments. Grounded in role theory, clearly defined expectations reduce ambiguity, prevent conflict, and enhance coordination among organizational members. Early organizational research in The Social

Psychology of Organizations demonstrates that role ambiguity and role conflict undermine job satisfaction, performance, and organizational commitment (Kahn et al., 1964). Subsequent empirical work further confirms that unclear expectations regarding responsibilities, authority, and evaluation criteria generate stress and reduce effectiveness in team settings (Rizzo, House, & Lirtzman, 1970). Within interdisciplinary collaboration, role negotiation is particularly essential because participants bring diverse disciplinary norms, expertise, and professional identities, requiring explicit alignment of responsibilities and decision-making structures (Beauchamp & Bray, 2001). When roles are collaboratively negotiated and clearly communicated, teams experience improved trust, accountability, and shared understanding, which strengthens collective efficacy and performance outcomes (Salas, Sims, & Burke, 2005). Conversely, poorly defined roles can produce duplication of effort, coordination failure, and power disputes, especially in complex academic institutions characterized by distributed authority. Therefore, effective leadership and institutional governance must prioritize structured role negotiation, transparent responsibility allocation, and continuous clarification processes. Role clarity is not merely procedural it is a central mechanism for sustaining collaboration, reducing organizational friction, and enhancing institutional effectiveness.

Kundu, Kumar, and Lata (2020, p. 457) found that perceived role clarity plays an important role in promoting innovative work behavior. When employees clearly understand their responsibilities and expectations, they experience stronger intrinsic motivation and greater involvement in their work. These psychological mechanisms increase engagement and encourage employees to propose and implement creative ideas, thereby strengthening organizational innovation capacity.

Curnin et al. (2020) found that leadership behaviors strongly influence team role clarity through the development of shared expectations regarding responsibilities and decision authority. Their longitudinal research demonstrates that when leaders consistently communicate task priorities and performance standards, team members develop clearer role perceptions, which subsequently enhance coordination and reduce uncertainty in high-risk organizational environments.

Graziotin and colleagues (2020) examined leadership role distribution in agile teams and found that clear role differentiation between team leaders and members supports collaborative performance. Their study indicates that when leadership responsibilities are explicitly negotiated and gradually shared within teams, members develop clearer understandings of authority, accountability, and task ownership, which strengthens team coordination and organizational learning.

De Clercq and Pereira (2021) argued that role clarity functions as an important psychological resource that shapes employees' proactive behavior in organizations. Their research shows that when employees clearly understand their responsibilities and performance expectations, they are more likely to engage in knowledge sharing and collaborative problem solving, thereby strengthening team learning and collective performance outcomes.

Rasul, Rogger, and Williams (2021, p. 259) provided field evidence that clearer task and role definitions significantly improve organizational performance in public sector institutions. Their study shows that when employees receive explicit expectations regarding responsibilities and evaluation criteria, they are better able to prioritize tasks and coordinate efforts. Such clarity reduces uncertainty and improves implementation efficiency, thereby enhancing overall productivity within public organizations.

Mertens et al. (2022) demonstrated that role clarity is a critical factor in distributed leadership within educational organizations. Their findings indicate that when school leaders clearly define responsibilities and decision boundaries among teachers, collaborative leadership structures function more effectively, enabling staff members to coordinate instructional initiatives and support collective school improvement.

Aguinis and Burgi-Tian (2023) emphasized that clear role expectations are fundamental to effective performance management systems. Their study highlights that organizations that explicitly define employee roles and responsibilities create stronger alignment between individual contributions and organizational goals. Such

clarity enhances accountability, reduces role ambiguity, and improves both team effectiveness and organizational performance.

Han, Jumat, and Cleland (2023, p. 727) examined interprofessional collaboration in health professions education and found that role negotiation is a central process in collaborative curriculum development. Their findings suggest that when responsibilities and expertise boundaries are not clearly defined, professionals may experience marginalization or uncertainty regarding their contributions. Establishing clearer role expectations therefore helps strengthen coordination and improve the effectiveness of interdisciplinary teaching teams.

In summary, role negotiation and clarity are fundamental mechanisms for enhancing collaboration, organizational performance, and psychological well-being in complex institutional environments. Rooted in role theory, clearly defined expectations reduce ambiguity, prevent conflict, and strengthen coordination by clarifying responsibilities, authority, and evaluation standards. Evidence consistently shows that role clarity improves job satisfaction, engagement, innovation, and productivity, while role ambiguity generates stress, weakens performance, and creates barriers to effective teamwork. In interdisciplinary and interprofessional contexts, where diverse expertise and professional identities must be integrated, explicit role alignment supports shared understanding, trust, and coordinated decision-making, thereby preventing knowledge marginalization and functional conflict. Conversely, poorly defined roles may lead to duplication of effort, coordination failure, and power disputes. Therefore, structured role negotiation, transparent responsibility allocation, and continuous clarification processes are essential leadership and governance strategies for sustaining collaboration, reducing organizational friction, and promoting institutional effectiveness.

Characteristics of role negotiation and clarity

Role negotiation and clarity are a collaborative process marked by dynamic negotiation, shared cognition, contextual adaptability, structural explicitness, and relational interdependence. Roles are continually shaped through interaction, not predefined, and teams develop a shared understanding of responsibilities and

dependencies. Role negotiation and clarity adapts to changing tasks or contexts, makes implicit expectations visible through tools like role charts, and is grounded in mutual trust rather than top-down mandates. These features establish role negotiation and clarity as a micro-foundation for professional collaboration and school improvement (Kahn et al., 1964; Marks & Mathieu, 2022; Chen & Wang, 2022). Accordingly, role negotiation and clarity may be defined as a structural practice in educational teams through which members interactively and contextually negotiate explicit, shared role understandings to enable effective collaboration and collective efficacy.

Katz and Kahn (1978) emphasized that role clarity is essential for organizational functioning because employees must clearly understand task expectations and behavioral norms. When role expectations are ambiguous, individuals experience uncertainty that disrupts communication and coordination within teams.

Biddle (1986) proposed that role theory explains how individuals understand expected behaviors associated with their social positions. Within organizations, role clarity refers to the degree to which individuals understand expectations, responsibilities, and authority structures associated with their roles. Clear role expectations reduce uncertainty and enable more effective coordination among team members.

Salas et al. (2005) argued that role clarity contributes to the development of shared mental models within teams. When team members clearly understand their own roles and those of others, coordination improves and team performance becomes more predictable.

Cronin and Weingart (2007) showed that role clarity helps reduce task and relationship conflict within teams by aligning members' expectations regarding responsibilities and decision authority. When role expectations are shared, teams experience smoother collaboration and improved coordination. Harris (2014) emphasized that distributed leadership requires clear role negotiation among

teachers and administrators. When leadership responsibilities are clearly distributed, collaborative leadership structures become more effective.

Kundu, Kumar, and Lata (2020) found that role clarity strengthens innovative work behavior by increasing job involvement and intrinsic motivation. When employees clearly understand their responsibilities, they are more likely to propose creative ideas and actively engage in organizational innovation.

Annenbaum and Salas (2020) emphasized that effective teamwork requires clear role definitions so that team members understand how their expertise contributes to collective goals.

Rasul, Rogger, and Williams (2021) demonstrated that clearer task assignments significantly improve productivity in public organizations. Their field evidence shows that employees perform more effectively when expectations regarding responsibilities and evaluation criteria are clearly defined.

De Clercq and Pereira (2021) argued that role clarity acts as an important psychological resource that supports knowledge sharing and proactive work behavior. Employees who clearly understand their roles are more willing to collaborate and exchange expertise.

Mertens et al. (2022) found that role clarity is a key mechanism supporting distributed leadership in schools. Clear definitions of responsibilities allow teachers to coordinate initiatives and participate effectively in collaborative leadership practices.

Knowles et al. (2023) found that interdisciplinary collaboration depends on establishing shared conceptual frameworks and clearly negotiated responsibilities among team members.

In summary, role negotiation and clarity is a multifaceted, interaction-driven process essential to effective collaboration in educational settings, defined by five interrelated characteristics: dynamic negotiation, shared cognition, contextual adaptability, structural explicitness, and relational interdependence. Recent research (2020–2025) demonstrates how these features operate across diverse contexts—from school leadership teams and co-teaching pairs to hybrid classrooms, cross-cultural

collaborations, and even student project groups. Whether through weekly role reviews, visual coordination tools, AI-supported dashboards, or peer-based feedback, Role negotiation and clarity consistently emerges not as a top-down assignment but as a socially constructed, trust-based, and context-responsive practice.

Concept and theory of institutional support for interdisciplinarity

Definition of institutional support for interdisciplinarity:

Institutional support for interdisciplinarity refers to the institutional infrastructure through which universities and educational research organizations strategically allocate resources, implement incentive-oriented policies, and establish collaborative platforms to enable the effective and sustainable conduct of interdisciplinary research and innovation. Drawing on organizational support theory, institutional theory, and innovation ecosystem perspectives, ISI is conceptualized as a multidimensional construct comprising three interrelated dimensions. Resource Provision denotes the systematic supply of essential inputs, including funding, research facilities, technical services, administrative assistance, and human resources, that ensure interdisciplinary teams have continuous, equitable, and deployable material and intellectual support throughout the research process. Policy Incentives reflect institutionalized mechanisms such as performance evaluation systems, project prioritization arrangements, workload adjustments, and achievement-based rewards that motivate and direct faculty and researchers toward active engagement in interdisciplinary collaboration. Platform and Coordination Mechanisms emphasize the establishment of structured collaborative platforms, information-sharing systems, cross-unit coordination processes, and standardized operational routines that facilitate knowledge integration, reduce procedural barriers, and sustain long-term interdisciplinary cooperation. Collectively, these dimensions underscore the coordinated functioning of resources, institutional policies, and collaborative platforms as a systemic foundation supporting the efficiency, continuity, and innovative outcomes of interdisciplinary research.

Newell (2001) proposed that interdisciplinary education programs require sustained institutional support to function effectively. His analysis emphasizes that successful interdisciplinary initiatives depend on coordinated administrative structures, shared academic resources, and faculty development programs that encourage collaboration across disciplinary boundaries. Without these institutional mechanisms, interdisciplinary teaching and research efforts often remain fragmented and difficult to sustain over time.

Rhoten and Parker (2004) argued that genuine institutional support for interdisciplinary research requires structural alignment between academic reward systems and collaborative scholarship. Their study found that although universities often rhetorically endorse interdisciplinarity, promotion and tenure systems still prioritize disciplinary publications. As a result, interdisciplinary researchers face higher career risks. The authors therefore suggest that universities must reform evaluation criteria and resource allocation mechanisms so that collaborative research outputs are formally recognized and rewarded within academic career structures.

Porter and Rafols (2009) analyzed global patterns of interdisciplinary research and found that institutional policies significantly shape the emergence of cross-disciplinary knowledge production. Their study shows that universities that invest in interdisciplinary centers, collaborative funding programs, and joint appointments tend to generate higher levels of interdisciplinary research outputs. Such structural investments provide the institutional infrastructure necessary for researchers to integrate diverse disciplinary perspectives and develop innovative solutions to complex societal problems.

Klein (2010) emphasized that interdisciplinary initiatives can only be sustained when universities establish supportive institutional cultures and infrastructures. Her analysis highlights the importance of interdisciplinary research centers, flexible curriculum structures, and revised evaluation systems that value collaborative scholarship. Without these structural supports, interdisciplinary programs often remain temporary initiatives rather than long-term institutional practices. Klein therefore argues that institutional support must integrate governance structures,

faculty incentives, and academic resources to foster durable interdisciplinary collaboration within universities.

Bozeman and Boardman (2014) examined how institutional environments influence scientific collaboration and team-based research. Their work demonstrates that interdisciplinary collaboration depends heavily on institutional resources such as research funding, administrative coordination, and collaborative infrastructures. Universities that establish interdisciplinary research centers and provide organizational support mechanisms significantly increase the productivity and effectiveness of research teams. The authors conclude that institutional support acts as a critical enabling condition that facilitates sustained collaboration across disciplinary boundaries.

Aldrich (2014) argued that organizational structures and institutional environments strongly influence the development of collaborative research networks. Universities that provide flexible governance structures and incentives for collaboration enable scholars from different disciplines to form productive partnerships. Such institutional arrangements help reduce structural barriers between disciplines and facilitate knowledge exchange across academic boundaries.

Tannenbaum and Salas (2020) highlighted that organizational and institutional support plays a critical role in enabling effective teamwork in complex environments. Their research demonstrates that institutions must provide resources, leadership commitment, and formal structures that support collaboration among team members. Such support mechanisms help teams coordinate their expertise, develop shared goals, and sustain high levels of performance in interdisciplinary contexts.

In summary, institutional support for interdisciplinarity is a structural commitment, not symbolic, to embedding interdisciplinarity in policy, practice, and culture. Recent research (2020–2025) shows institutional support for interdisciplinarity operates through concrete actions: revising evaluation systems, allocating dedicated collaboration time, aligning budgets, certifying interdisciplinary teaching, mandating supportive technologies, and reshaping governance. From Chinese high schools to rural networks and universities, institutional support for interdisciplinarity serves as

the institutional scaffolding that turns policy into sustainable innovation—reducing bureaucratic and cognitive barriers to enable meaningful integration and transformation.

Importance of institutional support for interdisciplinarity

The importance of institutional support for interdisciplinarity lies in its role as a structural bridge between national policies, such as China's "Five-Education Integration" and arts-science convergence, and classroom practice. Without institutional backing, interdisciplinary efforts remain fragmented and unsustainable. Institutional support for interdisciplinarity reduces cognitive and bureaucratic barriers by providing time, revising assessments, adjusting structures, and fostering collaboration, thereby enhancing teacher agency and educational outcomes. It transforms interdisciplinarity from an optional activity into an institutionalized practice, enabling systemic improvement. Accordingly, institutional support for interdisciplinarity may be defined as a structural mechanism through which educational organizations systematically support interdisciplinary collaboration via institutional arrangements and supportive ecosystems to advance policy implementation and pedagogical innovation.

Klein, J. T. (1990, p. 192): Without institutional support—redefined reward structures, flexible curricula, and administrative commitment, interdisciplinarity remains an ephemeral ideal, vulnerable to the centrifugal forces of disciplinary specialization. In her foundational monograph *Interdisciplinarity: History, Theory, and Practice*, Klein argues that the sustainability of cross-boundary work hinges not on individual heroism but on systemic institutional enablement, establishing institutional support as a necessary condition for epistemic integration.

National Academy of Sciences (2005, p. 6): Institutional support is the linchpin that transforms interdisciplinary aspiration into durable practice; without it, even the most compelling scientific questions stall at organizational boundaries. In the landmark report *Facilitating Interdisciplinary Research*, the National Academies identify institutional support as one of four critical pillars, alongside individual

capacity, team processes, and societal context, and emphasize that universities must reengineer policies, funding, and evaluation to lower barriers to collaboration.

National Academy of Sciences (2005, p. 6) emphasized that institutional support is a critical condition for interdisciplinary research. The report argues that universities must redesign policies, funding systems, and evaluation procedures to reduce organizational barriers to collaboration. By providing administrative support, flexible governance structures, and interdisciplinary funding opportunities, institutions can create environments that enable researchers to address complex scientific problems collaboratively.

Porter and Rafols (2009, p. 472) found that institutional policies and investments significantly influence the development of interdisciplinary research. Their study indicates that universities that invest in interdisciplinary centers, joint funding schemes, and collaborative academic programs tend to produce higher levels of cross-disciplinary knowledge integration, highlighting the critical role of institutional support in fostering interdisciplinary innovation.

Klein (2010, p. 18) argued that interdisciplinary initiatives can only be sustained when universities establish supportive institutional cultures and governance structures. She emphasized that institutional support includes interdisciplinary research centers, flexible curricular frameworks, and evaluation systems that recognize collaborative scholarship. Without such structural support, interdisciplinary programs often remain temporary initiatives rather than enduring academic practices embedded within university systems.

Bozeman and Boardman (2014, p. 32) noted that interdisciplinary collaboration depends strongly on institutional environments that provide research funding, administrative coordination, and collaborative infrastructures. Their analysis demonstrates that universities that establish interdisciplinary centers and shared research facilities significantly enhance team productivity and knowledge integration, suggesting that institutional support acts as a structural mechanism enabling sustained collaboration across disciplinary boundaries.

Aldrich (2014, p. 468) argued that institutional structures significantly shape the formation and sustainability of collaborative research networks. Universities that provide flexible governance arrangements, collaborative funding opportunities, and incentives for cross-disciplinary work create environments that encourage scholars from diverse fields to engage in sustained knowledge exchange and interdisciplinary innovation.

Tannenbaum and Salas (2020, p. 64) emphasized that organizational and institutional support is a key driver of effective teamwork. Their research indicates that institutions that provide leadership commitment, collaborative infrastructures, and formal coordination mechanisms enable teams to integrate diverse expertise and sustain high levels of performance, particularly in interdisciplinary contexts where collaboration across knowledge domains is essential.

IUPUI (2021-2024, p. 118): When university strategic plans explicitly name interdisciplinarity as a core mission, departments are more likely to reallocate budgets toward joint appointments and shared labs. In the IUPUI Promotion and Tenure Guidelines, they conceptualize institutional support as the translation of rhetorical commitment into budgetary and staffing decisions, with interdisciplinary and community-engaged work requiring clear documentation of individual contributions.

Leeds University (2024, p. 203): In interdisciplinary research initiatives, institutional support manifests as protected time for faculty teams to co-design projects and assess integrated outcomes. In the Horizons Interdisciplinary Assessment College, they define institutional support as the deliberate scheduling of collaborative labor as a non-negotiable professional norm, with panel members contributing to peer review of interdisciplinary proposals.

Global Innovation Hubs Index (2024, p. 88): When national education ministries fund interdisciplinary innovation hubs with autonomy over hiring and curriculum, they enact systemic rather than piecemeal support. The report demonstrates that large scientific facilities provide key support for interdisciplinary

sub-fields, such as medical imaging, synthetic biology, and brain science, enabling universities and enterprises to pursue innovation and development.

Cengage Group (2025, p. 61): In higher education, institutional support for interdisciplinarity correlates strongly with graduate employability, as employers value integrative problem-solving skills. Their 2025 Graduate Employability Report links institutional support not only to pedagogical quality but to societal relevance and institutional accountability, with only 30% of 2025 graduates finding jobs in their field and 48% feeling unprepared for entry-level positions.

In summary, institutional support for interdisciplinarity is foundational not optional for turning interdisciplinary aspirations into sustainable educational practice. As Klein (1990) and the National Academies (2004) long emphasized, without systemic backing, cross-disciplinary efforts remain fragmented and vulnerable to entrenched disciplinary structures. Recent evidence confirms that ISI functions as the essential bridge between policy mandates such as China's "Five-Education Integration" and classroom reality, by providing dedicated time, reformed incentives, supportive leadership, and coherent infrastructures. Far more than logistical aid, institutional support for interdisciplinarity institutionalizes interdisciplinarity as a normative, scalable practice that enhances teacher agency, promotes equity, and improves learning outcomes transforming it from a peripheral initiative into a core driver of educational innovation and accountability.

Characteristics of institutional support for interdisciplinarity

Institutional support for interdisciplinarity is a systemic arrangement characterized by policy integration, strategic resource allocation, organizational adaptability, assessment alignment, and cultural cultivation. It embeds interdisciplinary goals into institutional plans, allocates dedicated time and personnel, creates flexible coordination structures, aligns evaluations with cross-disciplinary outcomes, and fosters a collaborative culture through shared norms and professional learning. These features move institutional support for interdisciplinarity beyond symbolic support, making it the structural foundation for sustainable interdisciplinarity (Klein, 1990; National Academies, 2004; Lattuca et al., 2021).

Accordingly, institutional support for interdisciplinarity may be defined as a sustainable structural capacity of educational organizations, built through coordinated design and ecosystemic support, to systematically enable interdisciplinary teaching, research, and collaboration.

Klein, J. T. (1990, p. 198) outlines that robust institutional backing for interdisciplinary endeavors depends on adaptable academic frameworks, reconceptualized academic personnel responsibilities, and legitimizing administrative procedures that authorize trans-boundary scholarly activities. Through her seminal work *Interdisciplinarity: History, Theory, and Practice*, she delineates essential organizational elements facilitating enduring integrative scholarship across disciplinary divides, thereby constructing a foundational model for subsequent policy development.

Newell (2001, p. 9) argued that interdisciplinary programs require sustained institutional support in the form of administrative commitment, flexible curricular structures, and formal recognition of interdisciplinary teaching and research. Without these institutional mechanisms, interdisciplinary initiatives often struggle to maintain continuity because traditional disciplinary structures tend to dominate academic governance and resource allocation within universities.

Klein (2008, p. 406) noted that universities seeking to promote interdisciplinary collaboration must align institutional policies, funding mechanisms, and evaluation systems with integrative research goals. She emphasized that institutional support involves not only establishing interdisciplinary centers but also creating governance structures that encourage cooperation across departments and reward collaborative academic contributions.

Uzzi, Mukherjee, Stringer, and Jones (2013, p. 468) demonstrated that institutional environments encouraging collaboration across disciplinary networks significantly increase the impact of scientific research. Their findings indicate that organizations that provide structural support for cross-disciplinary partnerships enable researchers to combine diverse knowledge domains, leading to higher levels of creativity and innovation in scholarly outputs.

Graff (2015, p. 76) argued that institutional support is essential for legitimizing interdisciplinary scholarship within higher education. He noted that universities must redesign governance frameworks, funding priorities, and academic reward systems in order to reduce structural barriers between disciplines and create conditions that enable sustained intellectual integration.

Frodeman (2017, p. 58) emphasized that interdisciplinary collaboration depends on institutional arrangements that support communication across disciplinary boundaries. He argued that universities must develop new organizational models, including interdisciplinary institutes and collaborative research platforms, in order to address complex societal challenges that cannot be solved within single disciplinary frameworks.

Lyall, C., Bruce, A., Tait, J., & Meagher, L. (2015, p. 112) observe that organizations effectively fostering cross-disciplinary collaboration incorporate cooperative norms within recruitment standards, advancement benchmarks, and distribution of institutional assets. Their volume *Interdisciplinary Research Journeys: Practical Strategies for Capturing Creativity* elucidates how systematic incorporation of such policies throughout personnel management and administrative frameworks indicates substantive dedication to integrative intellectual pursuits.

Meagher, L., & Lyall, C. (2020, p. 89) contend that enduring interdisciplinary organizations necessitate formal acknowledgment of cooperative endeavors within permanent appointment and career advancement review panels, alongside guidance systems assisting academics navigating non-traditional professional trajectories. Examining capacity-development programs in United Kingdom higher education, they pinpoint administrative restructuring and adaptable evaluation methodologies as pivotal facilitators of institutionalized interdisciplinary support.

Holley, K. A. (2020, p. 134) asserts that academic institutions creating cross-disciplinary units possessing independent administrative frameworks, earmarked financial resources, and authority to recruit across academic departments exemplify organizational responsiveness as a fundamental attribute of institutionalized interdisciplinary support. In *Interdisciplinarity and Higher Education*, she maintains

that substantive structural self-governance contrasted with merely ceremonial presence differentiates authentic organizational backing from perfunctory administrative acknowledgment.

Pfirman, S., & Martin, P. (2020, p. 156) note that when organizations modify academic personnel assessment systems to expressly acknowledge cross-disciplinary cooperation, they implement evaluative coherence, a pivotal instrument for mainstreaming trans-boundary scholarly practices. Within *The Oxford Handbook of Interdisciplinarity* (2nd ed.), they demonstrate how productivity management mechanisms may be strategically deployed to encourage and maintain collaborative engagement across disciplinary boundaries.

In summary, institutional support for interdisciplinarity is defined by five interlocking characteristics, policy integration, strategic resource allocation, organizational adaptability, assessment alignment, and cultural cultivation, that collectively transform cross-disciplinary work from an individual endeavor into a systemic, sustainable practice. As foundational scholars like Klein (1990) and the National Academies (2004) established, and recent studies (2020–2025) confirm, effective institutional support for interdisciplinarity embeds interdisciplinarity into the institutional fabric: through hiring and promotion policies, protected collaboration time, flexible structures like innovation hubs, aligned evaluation systems, shared digital infrastructures, and recognition practices that valorize boundary-crossing. Far from symbolic gestures, these features constitute a coordinated ecosystem that enables interdisciplinary teaching, research, and collaboration to thrive across diverse educational contexts from Chinese “Future Schools” to rural consortia and global university networks.

Context of art disciplines of universities in ethnic minority regions in Guangxi

The development ecology of art disciplines in Guangxi’s higher education system exhibits pronounced patterns of stratification and institutional differentiation. Under the policy impetus of the New Liberal Arts initiative and interdisciplinary

innovation agendas, universities with divergent institutional missions demonstrate markedly different logics in resource allocation and pathways of disciplinary integration. To ensure both the comprehensiveness and representativeness of the research sample, this study adopts a dual-selection logic based on institutional positioning and demonstrated interdisciplinary performance, identifying three universities as representative institutional anchors within the regional higher education system.

The first case is Guangxi Arts University, the only independently established professional arts institution in Guangxi. Leveraging its National Experimental Teaching Demonstration Center (Art Experimental Teaching Center) and nationally recognized first-class undergraduate programs in Design, university serves as a benchmark case within an “endogenously driven core ecology” characterized by the deep integration of artistic ontology with science and technology.

The second case is Guangxi Normal University, a provincially key comprehensive normal university with a strong humanistic tradition. Relying on nationally recognized virtual simulation experimental teaching projects and key humanities and social science research bases in Guangxi, university has generated substantial interdisciplinary outcomes within a teacher education oriented comprehensive model that integrates art, education, and culture.

The third case is Guilin University of Technology, a multidisciplinary university with a strong engineering orientation and distinctive strengths in art and design. Drawing on the Guangxi Research Center for the Industrialization of Ethnic Traditional Arts and nationally recognized first-class undergraduate programs in Product Design, university has successfully constructed an applied engineering model characterized by “design-enabled industrial development.”

Together, these three universities represent three prototypical institutional contexts professional arts universities, comprehensive normal universities, and engineering-oriented universities. All have achieved verified interdisciplinary outcomes through nationally or provincially accredited platforms, thereby constituting a comprehensive spectrum of art discipline development in Guangxi. This

study focuses on three analytical dimensions: (1) whether art disciplines occupy a core institutional position within the university's development system, (2) whether they possess agenda-setting power in interdisciplinary collaboration, and (3) whether they receive sustained and stable organizational and institutional support. Through comparative analysis of this polarized sample group, the study aims to reveal with precision the differential mechanisms underlying team formation logic, organizational configurations, and operational effectiveness across institutional contexts, thereby providing empirically grounded and theoretically meaningful support for subsequent mechanism-based analysis.

Major Interdisciplinary Achievements of the Three Universities:

(1). Guangxi Arts University

(“Artist Engineer Anthropologist” Collaborative Research Model): Deep Integration of Artistic Ontology with Technology and Humanities

As the only independently established professional arts university in Guangxi, university strengths in interdisciplinary team development are primarily manifested in the deep integration of art theory with anthropology, ethnology, and digital technologies, addressing issues of artistic inheritance, innovation, and social application.

Research Center for Art Anthropology: The center has appointed Professor Xu Xinjian from Sichuan University as its Chief Expert. It aims to promote interdisciplinary dialogue in art anthropology, broaden the research horizons of faculty members, and support applications for high-level research projects. This indicates that the team building prioritizes the interdisciplinary integration of “art, culture, and society.”

Recurring Interdisciplinary Workshops: The Third Interdisciplinary Workshop held in 2024 focused on “Literature, Art, and Aesthetics in the Age of Digital Intelligence,” bringing together over 60 scholars to discuss frontier issues driven by artificial intelligence. These activities have advanced the development of literary anthropology, art anthropology, and aesthetic anthropology, while fostering inter-

institutional dialogue. This demonstrates university's dynamic capacity to respond to cutting-edge intersections between art and technology.

“Art Plus” Development Model and Rural Revitalization Practices:

Students in the Cultural Industry Management program implemented projects such as Fuxiang Runmin Camellia Oil Brand Development and Longxiao Cheng Navel Orange Brand Design, integrating art and design with branding, marketing, and rural revitalization. Meanwhile, the School of Design supported rural industries through tourism-related product packaging design competitions. These practices underscore an applied interdisciplinary approach integrating art, management, and industry.

Institutional Support and Achievements: University hosts a National Experimental Teaching Demonstration Center, ten nationally recognized first-class undergraduate programs, and national virtual simulation experimental teaching projects, and has secured major national-level research grants in art studies from the National Social Science Fund of China. Its Design discipline was rated B in the fourth round of national disciplinary evaluation, reflecting its leading position in interdisciplinary research.

(2). Guangxi Normal University

(“Art Educator Education Specialist Technology Expert” Collaborative Education Model): Integration of Art Education, Social Service, Aesthetic Education, and Ideological Political Education

As a provincially key normal university, university's distinctive advantage lies in embedding art deeply into educational systems, cultural transmission, and community service by leveraging its strong education discipline and humanities and social sciences foundation, thereby forming a clear model of “art education integration.”

Ministry of Education Virtual Teaching and Research Office for Primary Education: This platform brings together over 60 experts from 18 collaborating institutions to conduct thematic reports and roundtable discussions on teacher education reform, humanistic literacy development, first-class program construction,

and excellence in teacher training. It exemplifies large-scale national collaboration integrating art, education, and technology.

Virtual Teaching and Research Office for Intelligent Education Curriculum

Clusters: This initiative explores the construction pathways of virtual teaching and research offices under the New Normal Education framework, reflecting active engagement at the frontier of art, education, and artificial intelligence integration.

Social Service Teams of the School of Fine Arts: Through branded aesthetic education initiatives such as Painting Rural China and Celebrating Revitalization, university has established aesthetic education practice bases and led special research projects on Guangxi's intangible cultural heritage. These efforts systematically document folk art resources and provide academic support for the protection of ethnic traditional culture, highlighting an applied team model integrating art, culture, and community.

Institutional Support and Achievements: University hosts a Ministry of Education Teacher Education Experimental Teaching Demonstration Center, key humanities and social science research bases in Guangxi, and nationally recognized first-class undergraduate programs such as Chinese Language and Literature and Fine Arts. It has received multiple National Teaching Achievement Awards.

(3). Guilin University of Technology

(“Designer Engineer Industry Mentor” Collaborative Innovation Model):

Design Empowering Industry and Technology-Driven Artistic Innovation

As an engineering-oriented university with coordinated multidisciplinary development, university's core strength lies in embedding art and design deeply into engineering systems to serve industrial upgrading, rural revitalization, and smart living, forming a representative model of “art engineering integration.”

Guangxi Rural Revitalization Design Research Institute and the Smart Human Settlement Industry College: These platforms constitute the core of interdisciplinary team development integrating design, engineering, and industry. Faculty student teams have undertaken more than ten commissioned rural construction projects across 12 counties in Guangxi, including village landscape

enhancement projects in 10 villages across four towns in Liangqing District, with total investments exceeding RMB 500 million. The teams have also participated in the Guangxi Innovation-Driven Development Special Project on ecological rice crayfish farming industrialization (total funding RMB 16.7 million), contributing to demonstration construction in leisure fisheries tourism and industrial park planning. These efforts reflect close alignment with major industrial demands.

Technology-Driven Aesthetic Education and Ideological-Political Education Teams: The School of Art has established a five-linkage mechanism encompassing creation-driven, curriculum-led, platform-supported, technology enabled, and practice-oriented development. Through motion capture laboratories, VR laboratories, and other technological platforms, new aesthetic education scenarios have been developed. The teams have also contributed to campus cultural construction projects and provided creative design services for local cultural tourism industries, exemplifying applied integration of art, digital technology, and public space.

“Challenge Cup” Science and Technology Innovation Team: In the 12th “Challenge Cup” Guangxi Undergraduate Extracurricular Academic and Technological Works Competition, three teams from the School of Art advanced to the on-site finals, demonstrating strong innovation capacity and practical competence. Guidance from experts in innovation and entrepreneurship, tourism, and landscape architecture further reflects a collaborative interdisciplinary education model spanning art, tourism, and landscape studies.

Institutional Support and Achievements: University hosts provincially and ministerially recognized teaching and research platforms, including the Guangxi Culture and Tourism Research Base, as well as nationally recognized first class undergraduate programs (e.g., Product Design), and a National Master Craftsman Inheritance and Innovation Base. Its Design discipline received a B rating in the fourth round of disciplinary evaluation. The university has also established joint cultivation bases with leading enterprises such as Huawei and Dongfeng Liuzhou Motor, providing extensive industry linkage opportunities for interdisciplinary teams.



Figure 2.1 China map, Image source: Baidu.

Nanning: Guangxi Arts University;

Guilin: Guangxi Normal University; Guilin University of Technology

Guangxi Arts University is the only professional arts institution in the region, where art disciplines occupy a central position within the institutional governance structure. The university's disciplinary configuration encompasses fine arts, design, music, dance, theatre, and film, and art theory, supported by a complete undergraduate, postgraduate training system. Within the university's governance framework, artistic creation, research, and education constitute the fundamental logic of institutional development. Interdisciplinary engagement emerges primarily from the internal developmental needs of artistic practice, such as the contemporary transformation of ethnic arts, digital visual communication, and art-based socio-cultural research, rather than being driven by external policy mandates or project-based administrative directives. In terms of organizational form, interdisciplinary teams are predominantly structured as research studios, creative collectives, or research centers with relatively loose internal arrangements. Team cohesion relies on professional norms, shared creative experience, and individual academic or artistic reputation, resulting in open yet relatively stable boundaries. This organizational pattern supports flexibility and creative autonomy in artistic exploration; however, it is highly dependent on individual leadership and personal influence, rendering such teams difficult to standardize or replicate through formal administrative mechanisms.

Operational effectiveness is primarily reflected in the quality of artistic production, the depth of cultural expression, and sustained engagement with regional and ethnic cultural contexts. Outputs typically accumulate as academic contributions and are further translated into exhibitions and performances. Nevertheless, deep integration with engineering, technological, or industrial systems remains limited, indicating an internally driven model of interdisciplinary development.



Figure 2.2 Guangxi Art University Image source: Baidu.

Guangxi Normal University is a comprehensive institution with a strong tradition in teacher education, encompassing education, humanities, social sciences, natural sciences, engineering, and the arts. Although art disciplines do not occupy a central position in the university's institutional hierarchy, their functional role is clearly defined in relation to educational practice, cultural research, and social service. Interdisciplinary teams are commonly generated through projects linked to art education curriculum reform, initiatives integrating local culture into school education, and regional cultural resource research. These teams are typically activated by university-level platforms, inter collegiate collaboration mechanisms, or earmarked funding, reflecting a strong policy and organizational foundation. Organizationally, interdisciplinary teams are embedded within formal structures such as inter faculty agreements, university level research institutes, or commissioned projects from education authorities. Team structures are relatively standardized, with clearly delineated roles, task allocations, and procedural workflows. Emphasis is

placed on goal alignment and risk control, contributing to a higher level of operational stability compared to professional arts institutions. Performance outcomes are evident in teaching reform achievements, curriculum cluster development, cultural service reports, and teacher education program design. These outputs are readily integrated into existing educational systems and demonstrate strong scalability and transferability, representing an institutionally coordinated model of interdisciplinary collaboration.



Figure 2.3 Guangxi Normal University Image source: Baidu.

Guilin University of Technology is an engineering and application oriented institution, in which engineering and applied sciences occupy the central position in the disciplinary structure. Art-related programs are primarily concentrated in applied fields such as product design, digital media, and environmental art, and their institutional presence is largely contingent upon the needs of engineering, technology, and industry. Interdisciplinary teams are typically initiated temporarily through projects involving digital product design, virtual simulation, intelligent manufacturing display, or university, industry collaboration. Within these projects, art

faculty commonly participate as providers of visual communication and user experience expertise, assuming a supportive role within engineering-led research groups. These teams operate predominantly under a project-based management model, characterized by clearly defined budgets, timelines, milestones, and evaluation criteria. While organizational boundaries are explicit, team continuity is relatively weak. Structurally, emphasis is placed on task allocation and progress management, with collaboration between art and engineering disciplines primarily framed as functional complementarity. Although this model facilitates short-term technological transfer and application-oriented outcomes, it provides limited conditions for the development of sustained interdisciplinary academic communities or deeper integrative research. Performance outcomes are mainly reflected in applied patents, prototype development, externally funded industry projects, and graduate employment rates. However, interdisciplinary knowledge integration and the advancement of art based scholarly inquiry remain relatively constrained, indicating an embedded model of interdisciplinary engagement.



Figure 2.4 Guilin University of Technology Image source: Baidu.

Comparative analysis of the three cases reveals three distinct logics of interdisciplinary team formation involving art disciplines: “art-led and internally driven”, “institutionally coordinated and project-driven,” and “engineering-led and technologically embedded.” Correspondingly, organizational forms exhibit a sequential shift from loosely structured academic communities to standardized collaborative units, and further to temporary project teams. In terms of outcomes, the three models demonstrate differentiated emphases on artistic depth, educational dissemination, and industrial transformation, respectively. These differences are not primarily attributable to variations in overall resource endowment or individual faculty capacity, but rather to the relative institutional positioning of art disciplines within each university’s governance structure, specifically, whether art occupies a core strategic position, whether it holds agenda-setting authority in interdisciplinary collaboration, and whether it can secure sustained organizational and institutional support. Taken together, the three cases constitute a structural continuum of interdisciplinary art practices in Guangxi’s higher education institutions, providing comparable empirical cases and an interpretive framework for interdisciplinary governance and policy design in ethnically diverse regions.

National and Regional Policy Context (New Liberal Arts, Interdisciplinarity, Ethnic-Area Development)			
Core research object: Art-based interdisciplinary teams			
	Guangxi ArtsUniversity	Guangxi Normal University	Guilin University of Technology
Institutional Position of Art Disciplines	specialized art university	comprehensive university	engineering-oriented university
Institutional Position	Core / flagship discipline → development logic dominates	Functionally important discipline → collaborative development unit	Embedded support discipline → demand-driven
Generation Logic	Endogenous expansion	Institutional coordination	Project embedding
Organizational Form	Studio / research group (loose yet stable)	Inter-college platform (clear structure)	Project-based team (highly temporary)
Operational Outcomes	High artistic depth, low replicability	Strong generalizability, balanced development	Strong application & transfer, weak academic integration

Figure 2.5 Table about the universities

Related Research

Kahn et al. (1964) proposed in role theory that individual behavior within organizations is strongly influenced by role expectations communicated by others in the organizational system. They argued that when expectations from supervisors, colleagues, and the organization are inconsistent or unclear, individuals may experience role conflict or role ambiguity. Such conditions can generate stress and reduce work effectiveness, highlighting the importance of clearly defined roles in organizational settings.

Rubin, Plovnick, and Fry (1977) proposed the GRPI model of team effectiveness, which highlights four fundamental elements for successful teamwork: clearly defined goals, well-specified roles, structured processes, and constructive interpersonal relationships. The model suggests that clarity in objectives and responsibilities, combined with coordinated procedures and trust-based interactions, forms the foundation of effective team functioning.

Katz and Kahn (1978) further suggested that clearly defined role structures are essential for maintaining organizational effectiveness. Their work in organizational psychology emphasizes that when members understand their responsibilities and how their roles relate to those of others, coordination becomes more efficient. Clear role expectations therefore help reduce confusion and enable smoother cooperation within teams.

Biddle (1986) emphasized that role theory highlights the importance of individuals' positions within social structures in shaping behavior. He argued that roles provide behavioral guidelines that influence how individuals interact with others in organizational contexts. When role expectations are clearly communicated and widely accepted, individuals are better able to perform their responsibilities and contribute to collective goals.

Peter M. Senge (1990) argued in his theory of the learning organization that shared vision represents a collectively constructed image of the future among organizational members. Such a vision provides direction for the organization and stimulates intrinsic motivation among its members. Senge suggested that when individuals share a common understanding of the organization's future, they are more likely to commit resources voluntarily and maintain cooperative efforts even when facing challenges.

Bernard M. Bass and Bruce J. Avolio (1994) systematized the theory of transformational leadership and argued that transformational leadership influences employee behavior through four core dimensions: idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration. Idealized influence establishes trust among followers by demonstrating ethical role modeling.

Inspirational motivation strengthens collective identity by articulating an appealing vision of the future. Intellectual stimulation encourages employees to challenge existing assumptions and explore novel solutions. Individualized consideration focuses on addressing individual developmental needs and providing personalized support. The theory suggests that when leaders simultaneously enact these four behaviors, team members are more likely to develop innovative motivation and actively participate in organizational change.

Bass and Avolio (1995) further emphasized that intellectual stimulation, a key dimension of transformational leadership, encourages team members to challenge existing assumptions and explore innovative approaches to problem-solving. Such leadership behaviors are particularly valuable in interdisciplinary contexts where complex issues require creative thinking and knowledge integration.

Tushman (1977) emphasized that boundary spanners play a crucial role in organizations by linking different knowledge domains and facilitating the flow of information across organizational or disciplinary boundaries. His research on communication networks in research and development settings shows that individuals who maintain connections with external knowledge sources can help organizations access new information and technological developments. These boundary-spanning individuals therefore serve as important intermediaries in the transfer of knowledge and the diffusion of innovation.

Aldrich and Herker (1977) argued that boundary-spanning activities allow organizations to access external resources and knowledge. Their work highlights that individuals who engage with actors outside their immediate organizational unit can bring new information, technologies, and opportunities into the organization. Such activities enhance organizational adaptability and provide important inputs for innovation and strategic development.

Amabile (1998) emphasized that leadership practices that provide mentoring, autonomy, and supportive feedback can significantly enhance employees' intrinsic motivation and creativity, thereby improving individual and organizational performance.

Leithwood, Jantzi, and Steinbach (1999), in the context of educational organizations, argued that transformational leadership involves establishing a shared vision, fostering collective commitment to institutional goals, and maintaining high performance expectations among staff members. These leadership practices help guide organizational change and promote collaborative engagement within universities.

Amy Edmondson (1999) first systematically introduced the concept of psychological safety in organizational learning research. She defined psychological safety as a shared belief among team members that the team environment is safe for interpersonal risk-taking, meaning that individuals can express differing opinions, admit mistakes, or ask questions without fear of negative consequences. Edmondson argued that in environments lacking psychological safety, members tend to remain silent to avoid potential risks, which inhibits team learning and knowledge sharing. In contrast, teams with high psychological safety are more likely to openly discuss problems and learn from errors, thereby improving overall team performance.

Kirkman and Rosen (1999) suggested that shared vision enhances team members' sense of responsibility and commitment to collective tasks. Their research on empowered teams indicates that when members internalize the team's goals as part of their own professional identity, they tend to demonstrate stronger task engagement and greater accountability for team outcomes. In such circumstances, team members are more likely to coordinate their actions proactively and invest additional effort in achieving collective objectives, thereby improving overall team performance.

From the perspective of group dynamics, Dion (2000) conceptualized team cohesion as a multidimensional construct consisting of both task cohesion and social cohesion. Task cohesion reflects members' shared commitment to achieving collective goals, while social cohesion refers to the interpersonal bonds that develop among team members. Together, these two dimensions play a critical role in sustaining motivation and coordination within collaborative teams.

Beauchamp and Bray (2001) found that role clarity facilitates team coordination and reduces interpersonal conflict among members. Their research indicates that when team members clearly understand their own roles as well as the roles of others, they are better able to coordinate their activities and avoid duplication of effort. This clarity also reduces misunderstandings that might otherwise lead to conflict within the team.

Marks, Mathieu, and Zaccaro (2001) argued that clear team roles are essential for effective teamwork, particularly in complex or dynamic environments. Their research on team processes suggests that role clarity supports the development of effective coordination mechanisms and enables team members to adapt their behaviors to changing task demands. As a result, teams with clearly defined roles are more likely to achieve coordinated and high-quality performance.

Kezar and Eckel (2002) noted that effective transformation in higher education institutions requires leadership approaches that integrate formal organizational structures with collaborative processes, thereby enabling cross-disciplinary cooperation and collective knowledge creation.

West (2002) indicated that shared goals and shared vision function as important mechanisms for promoting collaboration and innovation within teams. His work on team innovation emphasizes that clearly articulated collective objectives help align individual motivations with group priorities. When team members share a common understanding of the desired outcomes, they are better able to coordinate their contributions and integrate diverse perspectives. This alignment not only improves team collaboration but also enhances the team's ability to generate innovative solutions.

Shin and Zhou (2003) argued that transformational leadership promotes employee creativity by cultivating a work environment supportive of innovation. Their research indicates that when leaders encourage innovative thinking, provide resources, and establish trustful relationships, employees are more willing to engage in creative problem-solving processes. The study further suggests that employees'

perceptions of support for innovation mediate the relationship between leadership behavior and creativity.

Jung, Chow, and Wu (2003) emphasized that transformational leadership plays a crucial role in organizational innovation. Their findings indicate that when leaders guide teams through inspiring visions and supportive innovation cultures, employees are more likely to engage in creative behavior and contribute to higher levels of team creativity.

Baer and Frese (2003) argued that a psychological climate supportive of innovation contributes to improved team performance. Their research shows that innovative behaviors are more likely to emerge in environments where members are encouraged to express ideas and experiment with new approaches.

Pearce and Ensley (2004) argued that shared vision plays a crucial role in strengthening trust and cooperation among team members. Their study on leadership and team creativity suggests that when leaders effectively communicate a compelling collective vision, team members develop a shared understanding of the team's long-term goals and priorities. This shared understanding fosters mutual trust and reduces uncertainty in collaborative processes. As a result, members become more willing to exchange ideas and support one another in creative problem solving, which ultimately enhances the team's innovation capability.

Carlile (2004) suggested that interdisciplinary collaboration often requires the use of boundary objects to facilitate knowledge translation and mutual understanding. According to his framework of knowledge boundaries, differences in disciplinary perspectives can create syntactic, semantic, and pragmatic barriers to collaboration. Boundary objects such as shared models, diagrams, or prototypes—serve as tools that help team members negotiate meaning and coordinate their work despite differences in expertise.

Drugovich, M., Saatcioglu, A., & Bilimoria, D. (2004. as cited in ICICKM 2018): Transforming academic institutions demands leaders capable of integrating traditional bureaucratic frameworks with cooperative, team oriented approaches to knowledge

creation. In the cited work, they advocate for a leadership style that harmonizes hierarchical structures with collaborative efforts to drive academic reform.

Rhoten and Parker (2004) argued that institutional support plays a crucial role in facilitating interdisciplinary research. Their study indicates that interdisciplinary collaboration often requires significant coordination across departments and disciplines. Without supportive institutional structures, such collaborations may face administrative barriers and resource constraints. Therefore, universities must provide appropriate policies, funding mechanisms, and organizational arrangements to support interdisciplinary initiatives.

The National Academy of Sciences (2005) emphasized that institutional support is essential for the development of interdisciplinary research programs. Their report highlights that interdisciplinary research often requires additional resources, including flexible funding structures, collaborative infrastructure, and supportive evaluation systems. Institutions that create such enabling environments are more likely to foster successful interdisciplinary collaboration.

Levina and Vaast (2005) argued that boundary spanners promote knowledge integration by building relationships across different communities of practice. Their study of information systems projects indicates that individuals who operate across organizational or professional boundaries often develop hybrid expertise that allows them to understand the perspectives of multiple groups. By translating specialized knowledge into forms that can be understood by others, boundary spanners help reduce communication barriers and facilitate collaboration between diverse knowledge communities.

Boyatzis and McKee (2005) suggested that shared vision can stimulate emotional commitment among team members and strengthen long-term collaboration. Their research on resonant leadership highlights that a compelling vision not only provides strategic direction but also inspires emotional engagement among followers. When individuals feel emotionally connected to a shared purpose, they are more likely to remain motivated during challenging periods and maintain sustained cooperation toward long-term goals.

Fullan (2007) noted that educational institutions often experience significant resistance to change due to entrenched organizational routines and cultural norms. Consequently, effective leadership is required to foster a learning-oriented environment, articulate a shared purpose, and guide institutions through processes of innovation and adaptation.

Liao and Chuang (2007) demonstrated that transformational leadership can shape employees' work attitudes and behaviors by fostering a positive organizational climate and aligning individual motivations with broader organizational objectives. Through this process, employees are more likely to engage in discretionary efforts that extend beyond formal job requirements.

Fleming and Waguespack (2007) found that key individuals within interdisciplinary networks often function as connectors between otherwise separate knowledge communities. Their research on collaborative networks demonstrates that individuals occupying central positions in knowledge networks are able to facilitate the recombination of diverse ideas. This recombination process is considered a critical mechanism for generating novel solutions and advancing innovation.

Detert and Burris (2007) found that psychological safety significantly promotes employee voice behavior. When employees believe that expressing different opinions will not result in negative evaluation, they are more willing to propose suggestions for improvement, thereby supporting organizational learning and innovation.

Avolio, Walumbwa, and Weber (2009) summarized transformational leadership as comprising four central dimensions: idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration. These components enable leaders to inspire collective commitment, stimulate innovative thinking, and provide individualized support, thereby fostering cohesive and high-performing teams.

Gumusluoglu and Ilsev (2009) found that transformational leadership significantly enhances organizational innovation performance. Their empirical study suggests that leaders can foster knowledge sharing and innovative behavior by

creating open communication environments and encouraging employee participation in decision-making.

Jacobs and Frickel (2009) suggested that universities can promote interdisciplinary collaboration by establishing interdisciplinary research centers and encouraging cross-departmental cooperation. Their research indicates that organizational structures designed to facilitate interaction between disciplines can help overcome traditional academic boundaries and stimulate new research partnerships.

Börner et al. (2010) argued that interdisciplinary research requires collaborative networks supported by institutional resources. Their work highlights the importance of developing research infrastructures that allow scholars from different fields to share data, tools, and expertise. Such institutional networks enable the integration of diverse knowledge and support large-scale collaborative research.

Klein (2010) emphasized that the long-term development of interdisciplinary research depends on institutionalized support systems. These systems include appropriate research policies, evaluation frameworks that recognize interdisciplinary outputs, and administrative structures that facilitate collaboration across disciplinary boundaries.

Herrington, Reeves, and Oliver (2010) argued that learning environments based on authentic tasks those reflecting complex real-world situations enable students to develop higher-order competencies such as collaboration, communication, and problem-solving. By engaging with realistic challenges, learners are encouraged to integrate knowledge and work collectively toward meaningful solutions.

Carmeli, Reiter-Palmon, and Ziv (2010) demonstrated that psychological safety positively influences team learning behaviors and creativity. Their findings indicate that when members are able to discuss problems in a safe environment, they are more likely to integrate knowledge and develop innovative solutions.

Zhang and Bartol (2010) argued that transformational leadership enhances employee creativity through psychological empowerment. When employees

experience higher levels of autonomy and competence, they are more likely to engage in creative tasks and propose innovative ideas.

Wang and Rode (2010) suggested that transformational leadership promotes employee creativity by strengthening trust in leadership and increasing job autonomy. When employees feel supported and trusted, they are more willing to experiment with new approaches and generate innovative ideas.

Troth, Jordan, and Lawrence (2012) found that emotional intelligence and effective communication skills are important predictors of team cohesion. Teams in which members demonstrate strong interpersonal awareness and open communication tend to experience higher levels of trust, cooperation, and collective effectiveness.

Brynjolfsson and McAfee (2014) argued that the rapidly evolving digital economy increasingly requires workers to develop advanced cognitive and collaborative capabilities, including analytical reasoning, interdisciplinary thinking, and adaptive communication. These meta-skills are essential for addressing complex problems in knowledge-intensive environments.

Harvey (2014) found that shared vision facilitates the integration of diverse ideas in group creativity processes. When team members are aligned around common goals, they are more capable of combining diverse perspectives to develop more creative solutions.

Carton, Murphy, and Clark (2014) argued that shared vision helps teams manage complex tasks by developing a common cognitive framework that guides coordinated action. Their research suggests that shared vision operates as a collective mental model that enables team members to interpret information in a similar way and make consistent decisions. This shared interpretive framework reduces ambiguity in complex work environments and facilitates more efficient communication, thereby improving coordination in teams dealing with multifaceted or interdisciplinary tasks.

Hsu, Y.-C. (2016): Within higher education institutions, leaders who adopt a transformational approach function as mentors and guides, fostering learning aptitudes that subsequently elevate the creative potential and work output of their

staff. In *The Journal of Human Resource and Adult Learning*, Hsu frames transformational leadership as a developmental method that boosts individual creativity through mentorship.

Li et al. (2017) found that transformational leadership significantly enhances team creativity in culturally diverse teams by stimulating intrinsic motivation and strengthening team identification. Their study indicates that members in culturally diverse teams often possess different knowledge bases and cognitive perspectives, which may lead to communication barriers if leadership coordination is absent. However, transformational leaders can transform such diversity into an innovative advantage by constructing a shared vision and encouraging open communication, thereby facilitating knowledge sharing and the integration of diverse viewpoints.

Mathieu et al. (2017), in their review of team research, emphasized that shared goals and collective cognition constitute essential foundations for effective teamwork. When team members reach a shared understanding of task objectives, they are better able to coordinate activities and integrate resources efficiently.

Newman, Donohue, and Eva (2017), in a comprehensive review, concluded that psychological safety enhances team innovation performance by promoting open communication and knowledge sharing. Their research highlights the particular importance of psychological safety in knowledge-intensive teams.

Frazier et al. (2017), through a meta-analysis, found significant positive relationships between psychological safety and team learning, innovative behavior, and job performance.

Hughes et al. (2018), in a systematic review of leadership and innovation research, concluded that transformational leadership has a consistent and significant positive influence on team creativity. They argue that transformational leadership supports innovation by cultivating an organizational culture that encourages knowledge sharing, fostering psychological engagement among team members, and creating a social environment conducive to creative collaboration.

Hall et al. (2018) argued in their review of team science that psychological safety is a critical condition for collaboration and knowledge integration in

interdisciplinary research teams. Because different disciplines often involve distinct epistemological perspectives and cognitive frameworks, psychological safety helps members overcome hesitation when expressing divergent views, thereby enabling effective integration of multidisciplinary knowledge.

Salas, Reyes, and McDaniel (2018) argued that shared vision helps team members develop a common understanding of tasks, thereby reducing coordination costs and improving collaborative efficiency. When team members possess aligned goal perceptions, they are more capable of coordinating their actions and forming effective collaborative relationships.

Al-Husseini, S., El-Beltagi, A., & Moizer, J. (2019): Leaders who engage in individualized consideration bolster the sense of psychological safety within teams by offering guidance to faculty members, attending to personal requirements, and establishing an atmosphere that supports creative risk-taking. In the *International Journal of Leadership in Education*, they associate a central element of transformational leadership with the development of psychological safety in academic groups.

Chen et al. (2019) found that shared vision enhances team cohesion and aligns individual efforts with collective goals in research and development teams. Their study indicates that when team members clearly understand and identify with common goals, they are more willing to share knowledge and participate actively in innovative activities.

Buil, Martínez, and Matute (2019) demonstrated through empirical analysis that the effect of transformational leadership on employee performance primarily operates through psychological mechanisms. Their findings suggest that when leaders express trust and encourage employees to participate in decision-making, employees develop stronger organizational identification and higher levels of work engagement. Once employees form emotional attachment to organizational goals, they are more willing to invest time and effort in complex tasks and exhibit higher levels of proactive and innovative behaviors.

Gong, Huang, and Farh (2019) further argued that transformational leadership promotes employee creativity by fostering learning orientation and enhancing creative self-efficacy. Their research shows that when leaders encourage employees to experiment with new approaches and tolerate moderate levels of failure, employees are more likely to engage in exploratory learning behaviors. Such a learning-oriented environment not only stimulates individual creativity but also contributes to the development of sustained innovative capacity at the team level.

Al-Husseini, S., El-Beltagi, A., & Moizer, J. (2019): In the context of higher education, transformational leadership drives innovation by encouraging an environment where information is freely shared, especially when leaders demonstrate idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration. In *International Journal of Leadership in Education*, they relate all four aspects of the transformational leadership model to innovation via the practice of sharing knowledge.

Klaic, Burtcher, and Jonas (2020) introduced the concept of team-focused transformational leadership, emphasizing leadership behaviors that promote collective identity, shared goals, and strong relational bonds among team members. Such leadership practices strengthen teamwork processes and enhance cooperative performance within knowledge-intensive groups.

Brazill, J. (2020): Educators who demonstrate cultural humility and genuine behavior establish secure environments where relational confidence and cooperative education can thrive through the mutual exchange of personal backgrounds and valuable insights. In *Educational Research: Theory and Practice*, Brazill associates transformational actions with culturally responsive teaching methods and inclusive classroom atmospheres.

Tran, T. T., & Vu, H. T. (2021): A focus on teamwork has been shown to lead to beneficial results for the group and serves as a possible link between leadership and team performance in both educational and corporate settings. In the *Asian Academy of Management Journal*, they establish teamwork orientation as a significant mediating variable in leadership studies.

Ratnaningtyas, D. et al. (2021): Work engagement serves as a complete pathway through which transformational leadership influences productivity, with psychological empowerment acting as a vital mechanism within educational and project-focused groups. In *The International Journal of Social Sciences World*, they demonstrate that engagement and empowerment direct leadership efforts into concrete performance improvements.

Rad, M., & Shahi, S. (2021): In school settings, the combination of knowledge management and transformational leadership propels organizational innovation, with a unified vision serving as the connection between high-level strategy and practical classroom application. In *Education and Self Development*, they present shared vision as the integrative force linking macro-level planning to micro-level execution.

Setyaningsih, R., & Sunaryo, Y. (2021): Within universities, transformational leadership boosts the self-assurance and inventive capacity of instructors by establishing a supportive atmosphere where a collective vision and cooperative dialogue are deeply embedded. In *Pegem Journal of Education and Instruction*, they highlight the institutionalization of communication as a prerequisite for ongoing innovation.

Al-Husseini, S., El-Beltagi, A., & Moizer, J. (2021): Essential elements of transformational leadership, specifically a shared vision and the ability to inspire, are paramount for synchronizing faculty ambitions with the institution's goals for innovation. In *International Journal of Leadership in Education*, they identify these two key dimensions as strategic instruments for achieving alignment within universities.

Schmalenbach, M. et al. (2022): Learners in peer-support programs often found it difficult to harmonize leading with ensuring fairness among the group, revealing a lack of comprehension regarding how common objectives and distributed guidance can function together in cooperative environments. In the *Journal of Leadership & Education*, they expose the friction between leadership roles and equity in student-managed collaborations.

Molinari, L., & Grazia, V. (2022): How educators perceive the organizational atmosphere—influenced by the physical setting, administrative structures, and social liberty—is notably enhanced by transformational leadership, which subsequently boosts self-assurance and team-based innovation. In the *European Journal of Psychology of Education*, they link leadership to the perception of climate and its subsequent effects on teacher agency.

Rais, M., Rubini, B., & Herfina, H. (2022): When work engagement and collaboration are bolstered alongside transformational leadership, they activate teachers' internal drive, receptiveness to novel concepts, and the creation of inventive instructional methods. In *Pegem Journal of Education and Instruction*, they underscore the combined impact of engagement and cooperation in driving pedagogical innovation.

Rais, M., Rubini, B., & Herfina, H. (2022): The level of resource interdependence among teachers rises when transformational leaders encourage an environment of information exchange, reciprocal backing, and group-based problem resolution. In *Pegem Journal of Education and Instruction*, they illustrate how leadership fosters interdependence as a valuable collaborative asset.

Siswanto, B., & Yuliana, T. (2022): Confidence and group unity serve as the connecting links between transformational leadership and job contentment, establishing a communicative atmosphere where shared resources are coordinated efficiently. In *Journal of Management Development*, they identify trust and cohesion as primary mediators that facilitate the effective management of interdependent resources.

Zou, L., & Merritt, D. J. (2022): The alignment between an individual and their organization, as well as between an individual and their supervisor, mediates the connection between transformational leadership and teacher creativity, implying that value congruence fortifies creative involvement. In the *International Journal of Sociological and Anthropologies Science Reviews*, they identify the matching of values as a key psychological mechanism connecting leadership to innovation.

Schmalenbach, M. et al. (2022): Students indicated that exchanging concepts within their groups led to superior solutions, illustrating how cooperative interaction strengthens collective confidence and the capacity to solve problems. In *Service Learning in Higher Education*, they provide empirical proof that open communication directly improves cognitive outcomes at the team level.

Rais, M., Rubini, B., & Herfina, H. (2022): A transformational leadership style that prioritizes serving as a role model, encouraging intellectual exploration, and providing personalized attention can boost the creativity of educators, especially when paired with robust collaboration and deep involvement in work. In the *Pegem Journal of Education and Instruction*, they indicate that leadership drives innovation solely when it is situated within supportive interpersonal environments.

El-Hage, M., & Sidani, Y. (2023): To make change lasting within an institution, transformational leaders are required to engage faculty in the joint creation of a common vision, utilizing intellectual stimulation to increase a sense of ownership and consistency with the organization's aims. In *Tuning Journal for Higher Education*, they stress the importance of collaborative vision-building as essential for sustainable change in higher education.

Aslam, S., Tahir, M., & Mehmood, K. (2023): Within academic groups, transformational leadership alleviates the detrimental effects of interpersonal, task-related, and procedural disputes on team output by cultivating emotional awareness and constructive methods of resolving conflicts. In *Journal of Management Sciences*, they portray transformational leadership as a safeguard against team dysfunction through the regulation of social-emotional dynamics.

Nik Ramli, N., & Norhajawati, H. (2023): In educational settings, the ability to inspire and stimulate intellect, two aspects of transformational leadership, significantly boost the innovative work practices of teachers, particularly when bolstered by a positive outlook on cooperation. In *Journal of Management Sciences*, they identify a focus on teamwork as a crucial moderator of how leadership influences innovation.

Nik Ramli, N., & Norhajawati, H. (2023): Cooperative climates in schools prosper when teachers participate in joint decision-making, offer mutual support, and engage in open dialogue, all of which are fostered by transformational leadership. In *Journal of Management Sciences*, they describe how transformational leaders develop the relational foundation necessary for enduring collaboration.

El-Hage, M., & Sidani, Y. (2023): When embedding change within a university, intellectual stimulation and the ability to inspire, two fundamental elements of transformational leadership, are vital for overcoming opposition and encouraging faculty participation in accreditation procedures. In *Tuning Journal for Higher Education*, they identify these leadership actions as essential for securing support during extensive institutional reforms.

Han, L. (2023): By intellectually stimulating employees to question established thinking and embrace new concepts, transformational leaders establish a communicative atmosphere that cherishes innovation and candid exchange. In *Service Science and Management*, he positions intellectual stimulation as a trigger for psychological safety and creative interaction.

Aslam, S., Tahir, M., & Mehmood, K. (2023): The clarity of roles within academic teams is reinforced when transformational leaders specify expectations, match duties with group aims, and decrease confusion during times of dispute. In *Journal of Management Sciences*, they position leadership as a stabilizing force that clarifies roles in the midst of uncertainty.

Aslam, S., Tahir, M., & Mehmood, K. (2023): Team psychological safety is strengthened when transformational leaders demonstrate emotional intelligence and inclusive actions, permitting team members to voice differing opinions without apprehension during conflicts. In *Journal of Management Sciences*, they connect leader modeling to the emergence of psychological safety in high-stakes team interactions.

Nik Ramli, N., & Norhajawati, H. (2023): Inspirational motivation significantly impacts the innovative behavior of teachers by generating excitement and clearly communicating shared visions and collective objectives. In *Journal of Management*

Sciences, they isolate inspirational motivation as a primary driver of teacher innovation through emotional and cognitive alignment.

Kou, Y., Wang, L., & Jiang, X. (2024): Team psychological safety in academic departments is bolstered when transformational leaders uphold the psychological contract, empowering faculty to take intellectual risks and contribute to innovation. In *International Journal of Learning, Teaching and Educational Research*, they link leadership integrity to the development of a safe climate for scholarly risk-taking.

Reyes, A., & Apostol, L. (2024): The transformational leadership of school principals improves teachers' self-regulation through the intermediary function of teamwork skills, highlighting the significance of collaboration, communication, and common objectives in public school environments. In *European Journal of Education Studies*, they demonstrate how leadership indirectly influences teacher agency by building collaborative capacity.

Zhu, Y., & Tabajen, R. (2024): By utilizing a participatory strategy, transformational leaders in higher education can surmount opposition to new ideas by establishing trust and obtaining faculty agreement to necessary changes. In *International Journal of Education and Humanities*, they characterize participatory involvement as fundamental to lasting reform in academic institutions.

Robinson and Held (2024) reported that psychological safety plays an important role in promoting knowledge sharing and collaboration efficiency in online interdisciplinary student teams. Their study found that members in interdisciplinary teams often experience communication barriers due to differences in professional backgrounds. Psychological safety reduces anxiety associated with expressing opinions, encouraging members to share their disciplinary knowledge and engage more actively in collaborative problem solving.

Clausen et al. (2025) found that psychological safety significantly enhances participation and knowledge exchange in problem-based learning (PBL) teams. When students believe their ideas will be respected, they are more willing to express differing opinions and participate in discussions. Such open interaction enables teams to examine problems from multiple perspectives and develop more comprehensive solutions.

Chapter 3

Research Methodology

This research focuses on the following research purposes: 1) To study the current situation of managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi, 2) To develop the model for developing managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi, 3) To evaluate the models for developing managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi. In order to address the issues mentioned in Chapter 1 and achieve the above research objectives, to address the research questions systematically and rigorously, the study is organized into the following three distinct phases:

1. The population / Sample group
2. Research Instruments
3. Data Collection
4. Data analysis

Phase 1: To study the current situation of managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi.

The Population / Sample Group

The Population

The population of this phase was 1269 administrators and teachers from 3 art disciplines of universities in ethnic minority regions.

The Sample Group

Based on Krejcie and Morgan's (1970) sample-size table, 297 administrators and teachers across 3 art disciplines at universities in ethnic minority regions were

recruited for this phase, through stratified random sampling and simple random sampling.

The Sample Strategy

Selection of Sample Universities

Driven by the “New Liberal Arts” initiative, the development ecology of art disciplines in Guangxi exhibits pronounced structural stratification. To ensure comprehensiveness, this study adopts a dual-selection logic based on institutional positioning and interdisciplinary performance, establishing Guangxi Arts University, Guangxi Normal University, and Guilin University of Technology as subjects. These three constitute typical archetypes of interdisciplinary art practice, with the rationale reflected in three dimensions:

They occupy the core ecological niches of higher art education in Guangxi, forming a complete structural continuum. Guangxi Arts University represents the ontological core of professional art education; Guangxi Normal University represents the backbone of normal art education as a provincially key university; and Guilin University of Technology represents the applied engineering-oriented frontier. Together, they form a continuum from artistic core to educational synergy and engineering application, ensuring sample comprehensiveness.

They exhibit differentiated logics of team formation, providing typical polarized samples. Guangxi Arts University is “Art-led and Endogenously Driven,” with loosely structured communities aiming for deep integration. Guangxi Normal University is “Education-oriented and Institutionally Coordinated,” utilizing U-G-S mechanisms for standardized, stable organization. Guilin University of Technology is “Engineering-embedded and Technology-driven,” adopting a project management model emphasizing functional complementarity.

All possess substantive outcomes backed by authoritative platforms, ensuring validity. Relying on national and provincial platforms like the National Experimental Teaching Demonstration Center (Guangxi Arts University), Ministry of Education Virtual Teaching Offices (Guangxi Normal University), and the Guangxi Rural Revitalization Design Research Institute (Guilin University of Technology), they demonstrate mature

operational mechanisms. Through comparative analysis of this differentiated sample, the study reveals the formation logic and effectiveness mechanisms of interdisciplinary teams, providing a theoretical framework for cross-boundary governance in ethnic minority regions.

Questionnaire Distribution

After determining the three sample universities, to facilitate target participants' access to the questionnaire, the survey was distributed via the "Wenjuanxing" (Questionnaire Star) platform. Initially, the questionnaires were sent to administrators and teachers at each sampled university, who then distributed them to faculty members through departmental groups or forwarded them to colleagues. This approach ensured that target participants could access the questionnaire in a timely manner while maintaining the representativeness of the selected sample universities.

To ensure that the selected cases not only reflect the diversity of interdisciplinary team building in Guangxi's art institutions but also provide statistically significant data, we calculated the sample size for each university based on the table provided by Krejcie and Morgan (1970), by using sample random sampling, the sample for this research comprised 297 administrators and teachers from the 3 undergraduate universities offering art majors.

For a comprehensive overview and detailed information, please refer to Table 3.1.

Table 3.1 Lists of universities and sample size

No	Private university in Guangxi	Population	Sample group
1	Guangxi Arts University	970	225
2	Guangxi Normal University	201	48
3	Guilin University of Technology	98	24
Total		1269	297

According to table 3.1, it showed that the research samples indicates that the three universities are located in Nanning and Guilin two cities that serve as Guangxi's economic and cultural centers and concentrate the most advanced educational models for art disciplines thus enabling the study, through the selection of research teams and samples from these institutions, to more effectively reflect the actual circumstances of interdisciplinary team building in art-related higher education across Guangxi while ensuring the accuracy, validity, and representativeness of the data.

Research Instruments

Questionnaire

A questionnaire was adopted as the research instrument for Objective 1, which investigates the current status of interdisciplinary teamwork management effectiveness among art-focused universities in Guangxi. This questionnaire was developed around six dimensions of interdisciplinary teamwork: 1) Transformational leadership, 2) Team psychological safety, 3) Shared vision, 4) Interdisciplinary boundary spanning, 5) Role negotiation and clarity, and 6) Institutional support for interdisciplinarity. This questionnaire was structured into two sections:

Part 1: Survey about personal information of respondents, classified by gender and educational background.

Part 2: An investigation into the managerial effectiveness of interdisciplinary teamwork in art programs at Guangxi ethnic minority regional universities. The criteria for data interpretation based on a five-point Likert's scale, as follows:

5 refers to the level of managerial effectiveness of interdisciplinary teamwork at the highest level

4 refers to the level of managerial effectiveness of interdisciplinary teamwork at a high level

3 refers to the level of managerial effectiveness of interdisciplinary teamwork at a medium level

2 refers to the level of managerial effectiveness of interdisciplinary teamwork at a low level

1 refers to the level of managerial effectiveness of interdisciplinary teamwork at the lowest level

The data interpretation for average value is based on Rensis Likert (1932). The data interpretation is as follows:

4.50 – 5.00 refers to the highest level

3.50 – 4.49 refers to high level

2.50 – 3.49 refers to medium level

1.50 – 2.49 refers to low level

1.00 – 1.49 refers to the lowest level

Constructing a questionnaire process

The questionnaire was developed in the following steps:

Step 1: This study reviews and analyzes relevant literature, core concepts, foundational theories, and existing research on the managerial effectiveness of interdisciplinary teamwork.

Step 2: Based on the above literature review, a questionnaire was developed to investigate the current status of interdisciplinary teamwork management effectiveness in art disciplines of universities in ethnic minority regions of Guangxi. Subsequently, the preliminary questionnaire framework was submitted to the thesis supervisors for review, and relevant revisions were made in accordance with their feedback.

Step 3: The index of objective congruence (IOC) of the questionnaire was examined by five experts. The questionnaire's IOC value was 0.8-1.00.

Step 4: Revise the questionnaire based on the experts' suggestions.

Step 5: The questionnaires were distributed to 30 administrators and teachers in art disciplines of universities in ethnic minority regions in Guangxi for a try-out. The reliability of the questionnaire was obtained by Cronbach's Alpha Coefficient. Yielding 0.934, indicating a high level of reliability.

Step 6: A total of 297 administrators and teachers majoring in art disciplines at universities in Guangxi's ethnic minority regions participated in the questionnaire survey.

Data Collection

The data collection for objective 1: to study the current situation of managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi, as follows:

Step 1: Prior to data collection, official approval was acquired from the Graduate School of Bansomdejchaopraya Rajabhat University to survey 297 administrators and teachers majoring in art disciplines at universities in Guangxi's ethnic minority areas.

Step 2: Questionnaires were distributed to 297 administrators and teachers, with all 297 questionnaires returned, resulting in a 100% response rate. All returned questionnaires were checked for completeness before data analysis.

Data Analysis

The data collected from the questionnaire were analyzed using SPSS Descriptive statistics, including means and standard deviations, were employed to summarize the data, following the procedures outlined below:

Step 1: Frequency and percentage analyses were performed on respondents' personal characteristics in terms of gender and educational background.

Step 2: The current situation of managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi. in six following aspects: 1) Transformational leadership, 2) Team psychological safety, 3) Shared vision, 4) Interdisciplinary boundary spanning, 5) Role negotiation and clarity, and 6) Institutional support for interdisciplinarity. was analyzed by Mean and standard deviation.

Phase 2: To develop the model for developing managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi.

This study aims to construct a management model tailored to a specific context, art disciplines in universities located in ethnic minority regions of Guangxi. To

achieve this, it is necessary to obtain in-depth and authoritative insights from experts who possess strong theoretical knowledge and extensive practical experience, in order to understand the underlying causes and mechanisms behind complex phenomena. Therefore, semi-structured in-depth interviews were employed as a key research method.

The interviewees

Purposive sampling was employed, and a total of six experts were interviewed. The determination of the sample size followed the principle of data saturation, meaning that sampling ceased when interviews no longer generated new themes or information.

This study recruited six senior administrators and teachers from art disciplines of universities in ethnic minority regions of Guangxi as interviewees. All participants met the following eligibility criteria: 1) possessing no less than six years of senior administrative work experience, 2) holding a professional art skill certification, and 3) holding a master's degree or higher academic qualification.

Research Instruments

Semi-Structured In-depth Interview

The instrument to collect the data for objective 2, to develop the model for developing managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi, is to formulate the model for developing the innovative leadership of middle-level administrators in art disciplines of universities in ethnic minority regions in Guangxi. The semi-structured interview was designed based on the current situation of innovative leadership of middle-level administrators in private universities and managerial effectiveness of interdisciplinary teamwork in six following aspects: 1) Transformational leadership, 2) Team psychological safety, 3) Shared vision, 4) Interdisciplinary boundary spanning, 5) Role negotiation and clarity, and 6) Institutional support for interdisciplinarity. The semi-structured interview protocol consisted of two sections:

Part 1: This section presents the demographic and basic information of the interviewees, including interviewee profile, interviewer information, educational background, work experience, as well as the specific date and time of each interview.

Part 2: The questions about suggestions for developing the current situation of managerial effectiveness of interdisciplinary teamwork on six aspects: 1) Transformational leadership, 2) Team psychological safety, 3) Shared vision, 4) Interdisciplinary boundary spanning, 5) Role negotiation and clarity, and 6) Institutional support for interdisciplinarity, for administrators in art disciplines of universities in ethnic minority regions in Guangxi.

Data Collection

The expert interviews in this study adhered to a rigorous implementation process. First, in terms of sample selection, two experts were selected from each of the three sample universities, constituting a total of six interviewees to ensure the balance and representativeness of the sample sources. Second, during the implementation phase, targeted in-depth interviews were conducted closely guided by the analysis results of the Phase 1 questionnaire, yielding detailed and representative interview records. Finally, through the systematic organization and induction of the interview records, specific improvement measures corresponding to the six dimensions of interdisciplinary team construction were ultimately extracted.

Objective 2 aims to develop a developmental model for the managerial effectiveness of interdisciplinary teamwork among art disciplines at universities in Guangxi's ethnic minority regions. The data collection procedures for this objective are outlined below:

Step 1: Official ethical and research approval was granted by the Graduate School of Bansomdejchaopraya Rajabhat University for conducting interviews with senior administrators across three art disciplines in Guangxi's ethnic minority regional universities.

Step 2: A structured interview outline was constructed to gather suggestions for improving the managerial effectiveness of interdisciplinary teamwork based on six

dimensions: 1) Transformational leadership, 2) Team psychological safety, 3) Shared vision, 4) Interdisciplinary boundary spanning, 5) Role negotiation and clarity, and 6) Institutional support for interdisciplinarity. The outline was then sent to the thesis advisors for review and revised according to their feedback.

Step 3: The researcher conducted one-on-one interviews with senior administrators via online platforms or in-person, based on each interviewee's availability and convenience.

Step 4: The interview content was systematically organized to form the outline for the interdisciplinary team construction model.

Data Analysis

The data collected from structured interviews regarding the developmental model of interdisciplinary teamwork management effectiveness in art disciplines at universities in Guangxi's ethnic minority regions was analyzed through thematic analysis.

Phase 3: To evaluate the model for developing the managerial effectiveness model of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi.

In Phase 3, focus groups were selected as the method for model validation and adaptability assessment. By bringing together frontline management experts from various types of universities, the focus groups utilized a group interaction mechanism to conduct a deep contextualized examination of the theoretical model, effectively mitigating the risk of recommendations being unimplementable due to detachment from specific institutional environments. This approach not only achieved multiple verifications of the model's feasibility but also directly addressed core contradictions in interdisciplinary collaboration through the collision of ideas and negotiation among experts, ensuring that the final model possesses both theoretical rigor and strong effectiveness for localized implementation.

Focus group

A total of 24 experts from the art disciplines of universities in Guangxi's ethnic minority regions were invited to evaluate the suitability and feasibility of the proposed guidelines. All participating experts met the following eligibility criteria: 1) a minimum of eight years of senior administrative work experience, 2) possession of professional art skill certification, and 3) a master's degree or higher academic qualification.

Research Instruments

Focus Group Discussion:

The instrument used to collect data related to Objective 3, to evaluate the models for developing managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi, was the focus group discussion. The instrument was developed based on the findings of Phase 2, which investigated six core dimensions of interdisciplinary teamwork: 1) Transformational leadership, 2) Team psychological safety, 3) Shared vision, 4) Interdisciplinary boundary spanning, 5) Role negotiation and clarity, and 6) Institutional support for interdisciplinarity.

Step 1: The focus groups discussed the model outline derived from the Phase 2 expert interviews, centering on the six core dimensions of the research model.

Step 2: The draft focus group discussion outline was reviewed by three independent field experts to assess its content validity. The Content Validity Index (CVI) was subsequently calculated to verify the relevance and clarity of all discussion items.

Step 3: The topics of the focus group session focused on evaluating the following aspects: 1) the model's suitability for the institutional environment; 2) the realistic feasibility of implementation; 3) potential advantages and limitations; and 4) required targeted adjustments.

Step 4: The content of the focus group discussions was analyzed and synthesized into a model suitable for interdisciplinary team construction.

Data Collection

Ethical approval was obtained from the Institutional Review Board (IRB) of Bansomdejchaopraya Rajabhat University (Approval No. MHESI 0643.14/1091).

The data collection procedure was conducted as follows:

Step 1: Invitation. An official letter from the Graduate School was issued to invite 24 senior administrators from three universities to participate.

Step 2: Preparation. Participants received the model framework and interview guide in advance to facilitate informed discussion.

Step 3: Focus Group Discussion. The focus group analyzed and examined the model outline derived from Phase 2 expert interviews across six dimensions, during which members shared their opinions and suggestions regarding the construction of the interdisciplinary teamwork model.

Step 4: During the focus group discussion, relevant information and data were systematically recorded for subsequent analysis.

Step 5: Data analysis involved a qualitative content analysis of the data collected from the focus group discussions. Based on the analysis results, the model outline summarized from the expert interview results was further refined and detailed, ultimately forming a model for developing the managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions of Guangxi.

Data Analysis

Qualitative Data Analysis: The qualitative data retrieved from focus group discussions were analyzed via thematic analysis in accordance with standardized systematic procedures:

1. Familiarization with the transcripts
2. Searching for patterns and themes
3. Reviewing and defining themes
4. Reporting findings with supporting expert quotations

Themes focused on model suitability, feasibility, contextual adaptability, strengths, and implementation challenges.

Chapter 4

Results of Analysis

The research was to study the development of a managerial effectiveness model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi. The objectives of this research were 1) 1. To study the current situation of managerial effectiveness of interdisciplinary teamwork in Art Disciplines of Universities in Ethnic Minority Regions in Guangxi;2) To develop the model for developing managerial effectiveness of interdisciplinary teamwork in Art Disciplines of Universities in Ethnic Minority Regions in Guangxi;3) To evaluate the suitability and feasibility of models for developing managerial effectiveness of interdisciplinary teamwork in Art Disciplines of Universities in Ethnic Minority Regions in Guangxi. The data analysis result can be presented as follows:

1. Symbols and abbreviations
2. Presentation of data analysis
3. Results of data analysis

The details are as follows.

Symbol and Abbreviations

N	refers to	the population
n	refers to	the sample group
$\bar{X}$	refers to	Mean
S.D.	refers to	Standard deviation

Presentation of Data Analysis

Part 1: The analysis results about the personal information of the respondents, classified by gender and educational background. The researcher presented the data by frequency and percentage

Part 2: The analysis results about the current situation of the managerial effectiveness for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi. The researcher presented the data by mean and standard deviation.

Part 3: The analysis results of the interview contents about the model for developing managerial effectiveness for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi.

Part 4: The analysis results about the evaluation of the suitability and feasibility of the model for developing managerial effectiveness for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi. The researcher presents the findings based on the analysis of the focus group interview contents.

Results of Data Analysis

The researcher analyzed the data in four parts as follows:

Part 1: The analysis results about the personal information of the respondents, classified by gender and educational background. The researcher presented the data by frequency and percentage.

Table 4.1 Results of the analysis of personal information of the survey respondents
(n = 297)

Personal Information		Frequency	Percentage
Gender	Male	141	47.47
	Female	156	52.53
	Total	297	100
Work experience	1-3 years	81	27.27
	4-7 years	109	36.70
	7-15 years	70	23.57
	Over 15 years	37	12.46
	Total	297	100
Educational background	Master's degree	219	73.74
	Doctor's degree	78	26.26
	Total	297	100
Professional title	Senior Academic Rank	59	19.87
	Associate Academic Rank	238	80.13
	Total	297	100
Affiliation	Guangxi Art University	225	75.76
	Guangxi Normal University	48	16.16
	Guilin University of Technology	24	8.08
	Total	297	100

According to table 4.1, it showed that most respondents were 156 females, accounting for 52.53%, and 141 males, accounting for 47.47%. The educational background of respondents was mainly a master's degree for 219 people, accounting for 73.74%, followed by a doctor's degree for 78 people, accounting for 26.26%. Regarding work experience, the largest group of respondents had 4-7 years of work experience, with 109 people accounting for 36.70%, followed by those with 1-3 years of experience (81 people, 27.27%), 7-15 years of experience (70 people, 23.57%), and the smallest group was those with over 15 years of experience (37 people, 12.46%).

In terms of professional title, the majority of respondents held an Associate Academic Rank, with 238 people accounting for 80.13%, and 59 people held a Senior Academic Rank, accounting for 19.87%. As for affiliation, most respondents were from Guangxi Art University, with 225 people accounting for 75.76%, followed by Guangxi Normal University (48 people, 16.16%) and Guilin University of Technology (24 people, 8.08%). The total number of respondents in all categories was 297, accounting for 100%.

Part 2: The analysis results about the current situation of the managerial effectiveness for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi. The researcher presented the data by mean and standard deviation.

The questionnaire used in this survey was created by the researcher, and the options were designed with reference to relevant literature and the results of the questionnaire. This survey primarily analyzes the current situation of managerial effectiveness for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi. The questionnaire focuses on transformational leadership, team psychological safety, shared vision, interdisciplinary boundary spanning, role negotiation and clarity, and institutional support for interdisciplinarity. The data were analyzed using mean and standard deviation.

This study distributed 297 questionnaires and collected 297 responses, resulting in a response rate of 100%.

Descriptive statistics

There are 6 aspects and 65 items in this study. All scales used Likert 5 scale, with a maximum value of 5 and a minimum value of 1. The items are shown in Table 4.2-4.8.

Table 4.2 Mean and standard deviation of the current situation of the development of managerial effectiveness for interdisciplinary teamwork in six aspects.

(n = 297)

Interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi.					
		$\bar{X}$	S.D.	Level	Order
1	Transformational leadership	3.48	1.07	medium	5
2	Team psychological safety	3.47	1.15	medium	6
3	Shared vision	3.88	0.92	high	1
4	Interdisciplinary boundary spanning	3.71	0.96	High	3
5	Role negotiation and clarity	3.60	1.00	High	4
6	Institutional support for interdisciplinarity	3.81	0.92	High	2
Total		3.65	1.0	high	

According to the questionnaire survey, found that the current situation of developing managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi, in six aspects, was at a high level ($\bar{X}=3.65$). Considering the results of this research, aspects ranged from the highest to the lowest mean were as follows: the highest mean was shared vision ($\bar{X}=3.88$), followed by institutional support for interdisciplinarity ($\bar{X}=3.81$), interdisciplinary boundary spanning ($\bar{X}=3.71$), and role negotiation and clarity ($\bar{X}=3.60$). In contrast, team psychological safety exhibits comparatively lower mean scores ($\bar{X}=3.47$).

Table 4.3 Mean and standard deviation of managerial effectiveness model for interdisciplinary teamwork in transformational leadership

(n = 297)

	Transformational leadership	$\bar{X}$	S.D.	Level	Order
1	University administrators act as ethical role models, demonstrating professional integrity that inspires trust among interdisciplinary team members.	3.26	1.06	medium	10
2	University administrators' behavior reflects consistent values and standards that guide team members in decision-making and collaboration.	3.29	1.09	medium	9
3	University administrators clearly communicate the institution's vision for interdisciplinary collaboration, making goals understandable and motivating.	3.47	1.03	medium	6
4	University administrators encourage team members to commit to collective goals and maintain enthusiasm for long-term collaborative projects.	3.50	1.11	high	5
5	University administrators encourage team members to question assumptions and explore innovative approaches in interdisciplinary research.	3.34	1.11	medium	8
6	University administrators promote critical thinking and reflective discussions to enhance problem-solving and learning within the team.	3.53	1.10	high	4
7	University administrators support experimentation and creative solutions, even when they involve uncertainty or risk.	3.46	1.05	medium	7

Table 4.3 (Continued)

(n = 297)

	Transformational leadership	$\bar{X}$	S.D.	Level	Order
8	University administrators recognize the unique strengths, expertise, and developmental needs of each team member.	3.59	1.07	high	3
9	University administrators provide personalized guidance, mentoring, and support to help team members achieve their professional potential.	3.66	1.08	high	2
10	University administrators adapt their leadership approach to address differences in team members' skills, experiences, and motivations.	3.71	1.02	high	1
Total		3.48	1.07	medium	

According to Table 4.3, found that the current situation in transformational leadership was at medium level. As the results indicated that the level of transformational leadership in art disciplines of universities in ethnic minority regions in Guangxi was at a medium level ($\bar{X}$ =3.48). Considering the results of this research, aspects ranged from the highest to lowest level were as follows: the highest mean was university administrators adapt their leadership approach to address differences in team members' skills, experiences, and motivations ($\bar{X}$ =3.71), followed by university administrators provide personalized guidance, mentoring, and support to help team members achieve their professional potential. ($\bar{X}$ =3.66), the university administrators' behavior reflects consistent values and standards that guide team members in decision-making and collaboration and university administrators act as ethical role models, demonstrating professional integrity that inspires trust among interdisciplinary team members were the lowest mean ($\bar{X}$ =3.26).

Table 4.4 Mean and standard deviation of managerial effectiveness model for interdisciplinary teamwork in team psychological safety.

(n = 297)

	Team psychological safety	$\bar{X}$	S.D.	Level	Order
1	University administrators encourage interdisciplinary team members to express divergent viewpoints without worrying about negative evaluations.	3.37	1.12	medium	8
2	University administrators ensure that team members can question existing teaching norms, research assumptions, or administrative practices in an open and respectful environment.	3.39	1.17	medium	7
3	University administrators normalize constructive debate in team discussions, reducing the psychological risks associated with speaking up.	3.54	1.15	high	3
4	University administrators treat mistakes or unexpected outcomes in interdisciplinary projects as collective learning opportunities.	3.46	1.16	medium	5
5	University administrators provide developmental guidance and supportive feedback when setbacks occur, rather than criticism or blame.	3.34	1.14	medium	9
6	University administrators clearly communicate tolerance for experimentation, emphasizing that innovative attempts may fail but still contribute to team progress.	3.5	1.13	high	4
7	University administrators foster mutual trust within interdisciplinary teams through fair treatment and transparent communication.	3.43	1.16	medium	6

Table 4.4 (Continued)

(n = 297)

	Team psychological safety	$\bar{X}$	S.D.	Level	Order
8	University administrators ensure that team members feel respected for their disciplinary identities and professional expertise.	3.54	1.12	high	3
9	University administrators provide emotional and professional support to members encountering complex teaching or research pressures.	3.58	1.15	high	2
10	University administrators guide collaborative decision-making in a way that promotes inclusion, shared ownership, and equitable participation across disciplines.	3.75	1.15	high	1
Total		3.47	1.15	medium	

According to Table 4.4, it was found that the current situation in team psychological safety was at a medium level ($\bar{X}=3.47$). Considering the results of this research, aspects ranged from the highest to lowest level were as follows: The highest mean was university administrators guide collaborative decision-making in a way that promotes inclusion, shared ownership, and equitable participation across disciplines ($\bar{X}=3.75$), followed by university administrators provide emotional and professional support to members encountering complex teaching or research pressures ($\bar{X}=3.58$), the university administrators provide developmental guidance and supportive feedback when setbacks occur, rather than criticism or blame were the lowest mean ($\bar{X}=3.34$).

Table 4.5 Mean and standard deviation of managerial effectiveness model for interdisciplinary teamwork in shared vision.

(n = 297)					
	Shared vision	$\bar{X}$	S.D.	Level	Order
1	University administrators clearly articulate the organization's long-term goals in a way that all members can easily understand.	3.75	0.98	high	9
2	University administrators ensure that the organization's vision is logically structured, coherent, and communicated with sufficient detail.	3.79	0.93	high	8
3	University administrators translate broad strategic goals into concrete priorities and actionable expectations for interdisciplinary teams.	3.96	0.88	high	3
4	University administrators provide consistent explanations of the organization's direction so that members can align their work with institutional priorities.	3.86	0.93	high	6
5	University administrators communicate the organization's future direction in a way that inspires enthusiasm and collective commitment.	3.72	1.00	high	10
6	University administrators present a vision that motivates members to invest extra effort in achieving shared institutional goals.	3.89	0.90	high	5
7	University administrators articulate a development vision that encourages members to pursue continuous professional growth.	3.81	0.94	high	7

Table 4.5 (Continued)

(n = 297)

	Shared vision	$\bar{X}$	S.D.	Level	Order
8	University administrators promote a vision that aligns well with members' personal values and professional beliefs.	3.95	0.88	high	4
9	University administrators foster strong value resonance by linking the organization's vision with members' sense of purpose and identity.	4.00	0.87	high	2
10	University administrators encourage members to support the organization's vision because they perceive it as meaningful and personally relevant.	4.03	0.85	high	1
	Total	3.88	0.92	high	

According to Table 4.5, it was found that the current situation in shared vision was at a high level ($\bar{X}=3.88$). Considering the results of this research, aspects ranged from the highest to lowest level were as follows: The highest mean was university administrators encourage members to support the organization's vision because they perceive it as meaningful and personally relevant ($\bar{X}=4.03$), followed by university administrators foster strong value resonance by linking the organization's vision with members' sense of purpose and identity ($\bar{X}=4.00$), the university administrators communicate the organization's future direction in a way that inspires enthusiasm and collective commitment. were the lowest mean ($\bar{X}=3.72$).

Table 4.6 Mean and standard deviation of managerial effectiveness model for interdisciplinary teamwork in interdisciplinary boundary spanning.

(n = 297).

	Interdisciplinary boundary spanning	$\bar{X}$	S.D.	Level	Order
1	University administrators demonstrate the ability to integrate concepts, methods, and insights drawn from multiple academic disciplines.	3.56	1.05	high	8
2	University administrators actively seek knowledge outside their primary academic background to address complex institutional challenges.	3.60	0.98	high	7
3	University administrators value interdisciplinary reasoning and incorporate diverse disciplinary logics into decision-making processes.	3.81	0.98	high	3
4	University administrators can translate specialized disciplinary language into accessible concepts that interdisciplinary teams can collectively understand.	3.68	1.00	high	6
5	University administrators proactively build communication channels that connect members from different disciplinary backgrounds.	3.51	0.99	high	9
6	University administrators foster mutual understanding and trust by encouraging open dialogue across disciplinary boundaries.	3.73	0.92	high	5
7	University administrators effectively mediate disciplinary differences and resolve conflicts arising during interdisciplinary collaboration.	3.68	0.91	high	6

Table 4.6 (Continued)

(n = 297).

	Interdisciplinary boundary spanning	$\bar{X}$	S.D.	Level	Order
8	University administrators act as social connectors who strengthen relational networks across academic units.	3.78	0.95	high	4
9	University administrators identify institutional barriers that hinder interdisciplinary collaboration and work proactively to address them.	3.88	0.92	high	2
10	University administrators advocate for structural or procedural reforms that facilitate long-term interdisciplinary collaboration.	3.89	0.89	high	1
Total		3.71	0.96	high	

According to Table 4.6, found that the current situation in interdisciplinary boundary spanning was at a high level ($\bar{X}$ =3.71). Considering the results of this research, aspects ranged from the highest to lowest level were as follows: The highest mean was university administrators advocate for structural or procedural reforms that facilitate long-term interdisciplinary collaboration ($\bar{X}$ =3.89), followed by university administrators identify institutional barriers that hinder interdisciplinary collaboration and work proactively to address them ($\bar{X}$ =3.88), the university administrators proactively build communication channels that connect members from different disciplinary backgrounds ($\bar{X}$ =3.51).

Table 4.7 Mean and standard deviation of managerial effectiveness model for interdisciplinary teamwork in role negotiation and clarity.

(n = 297)

	Role negotiation and clarity	$\bar{X}$	S.D.	Level	Order
1	University administrators clearly understand their own responsibilities and expected contributions within interdisciplinary teams.	3.46	1.05	medium	9
2	University administrators have a clear understanding of the responsibilities and task boundaries of other team members.	3.50	1.03	high	8
3	University administrators clearly communicate team goals, task expectations, and performance standards to all members.	3.72	0.98	high	3
4	University administrators ensure that all team members share a common understanding of roles, workflows, and coordination requirements.	3.58	0.99	high	6
5	University administrators actively participate in discussions to adjust role allocations based on emerging team needs or project demands.	3.41	1.03	medium	10
6	University administrators effectively negotiate and resolve disagreements related to responsibilities or task ownership.	3.62	0.93	high	5
7	University administrators adjust role assignments by considering individual strengths, expertise, and workload balance.	3.54	1.03	high	7
8	University administrators establish transparent mechanisms that allow team members to renegotiate roles when tasks evolve.	3.66	0.99	high	4

Table 4.7 (Continued)

(n = 297)					
	Role negotiation and clarity	$\bar{X}$	S.D.	Level	Order
9	University administrators adapt their responsibilities proactively when team priorities or project conditions change.	3.74	0.97	high	2
10	University administrators help maintain team performance by reallocating tasks or reorganizing workflows during periods of change.	3.79	0.96	high	1
Total		3.60	1.00	high	

According to Table 4.7, found that the current situation in role negotiation and clarity was at high level ($\bar{X}$ =3.60). Considering the results of this research, aspects ranged from the highest to lowest level were as follows: The highest mean was university administrators help maintain team performance by reallocating tasks or reorganizing workflows during periods of change ($\bar{X}$ =3.79), followed by university administrators adapt their responsibilities proactively when team priorities or project conditions change ($\bar{X}$ =3.74), the university administrators actively participate in discussions to adjust role allocations based on emerging team needs or project demands ($\bar{X}$ =3.41).

Table 4.8 Mean and standard deviation of managerial effectiveness model for interdisciplinary teamwork in institutional support for interdisciplinarity.

(n = 297)

	Institutional support for interdisciplinarity	$\bar{X}$	S.D.	Level	Order
1	University administrators ensure that interdisciplinary research receives adequate, stable, and strategically allocated funding.	3.66	0.95	high	9
2	University administrators provide the necessary equipment, facilities, and digital infrastructure required for interdisciplinary projects.	3.71	1.00	high	8
3	University administrators offer timely technical, administrative, and logistical support to sustain interdisciplinary research activities.	3.92	0.89	high	3
4	University administrators ensure that interdisciplinary teams have equitable access to institutional resources compared with single-discipline units.	3.80	0.90	high	6
5	University administrators develop clear policies that explicitly recognize and reward interdisciplinary research contributions.	3.63	0.97	high	10
6	University administrators implement performance evaluation standards that incorporate interdisciplinary outcomes as key indicators.	3.85	0.92	high	5
7	University administrators establish incentive mechanisms—such as grants, awards, or workload adjustments—to encourage faculty participation in interdisciplinary collaboration.	3.73	0.96	high	7

Table 4.8 (Continued)

(n = 297)

	Institutional support for interdisciplinarity	$\bar{X}$	S.D.	Level	Order
8	University administrators establish interdisciplinary platforms, centers, or research hubs that facilitate sustained collaboration.	3.87	0.91	high	4
9	University administrators design clear, standardized, and easy-to-follow procedures that support interdisciplinary collaboration and project management.	3.96	0.84	high	2
10	University administrators coordinate across institutional units to remove procedural bottlenecks that hinder interdisciplinary teamwork.	3.97	0.88	high	1
Total		3.81	0.92	high	

According to Table 4.8, found that the current situation in institutional support for interdisciplinarity was at high level ($\bar{X}=3.81$). Considering the results of this research, aspects ranged from the highest to lowest level were as follows: The highest mean was university administrators coordinate across institutional units to remove procedural bottlenecks that hinder interdisciplinary teamwork ($\bar{X}=3.97$), followed by university administrators design clear, standardized, and easy-to-follow procedures that support interdisciplinary collaboration and project management ($\bar{X}=3.96$), the university administrators develop clear policies that explicitly recognize and reward interdisciplinary research contributions ($\bar{X}=3.63$).

Part 3: The analysis results of the interview contents about the model. interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi.

Table 4.9 Personal information of the interviewee

Interviewee	Personal information	Interview Date	Interview time
Interviewee 1	Education: Master's degree Position: Academic Leader of Art Discipline Work experience: 10 years	Jan 11 st , 2026	9:00 am GMT +8 40 minutes
Interviewee 2	Education: Doctor's degree Position: Dean of the Art Department Work experience: 9 years	Jan 11 st , 2026	15:40 am GMT +8 35 minutes
Interviewee 3	Education: Master's degree Position: Program Director Work experience: 10 years	Jan 12 nd , 2026	10:00 pm GMT +8 39 minutes
Interviewee 4	Education: Master's degree Position: Program Director Work experience: 9 years	Jan 12 nd , 2026	14:00 am GMT +8 30 minutes
Interviewee 5	Education: Master's degree Position: Dean of the Art Department Work experience: 8 years	Jan 12 nd , 2026	17:00 am GMT +8 35 minutes
Interviewee 6	Education: Master's degree Position: Academic Leader of Art Discipline Work experience: 9 years	Jan 13 rd , 2026	16:00 am GMT +8 30 minutes

The researcher conducted 6 face-to-face interviews. Each interview was conducted one-on-one in a more private location, ensuring that the interviewees were not disturbed by other factors.

The experts agree with the model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi in the digital era in 6 aspects, which contain 67 measures. There are 10 measures to cultivate transformational leadership; 12 measures to foster team psychological safety; 11 measures to forge shared vision; 12 measures to expand interdisciplinary boundary spanning; 10 measures to clarify role negotiation and clarity; 12 measures to refine institutional support for interdisciplinarity.

By organizing the interview content of the 6 interviewees mentioned above, the answers to the 6 aspects are summarized as follows:

Table 4.10 Outline for developing the managerial effectiveness for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi.

Factor	How to develop
To cultivate transformational leadership	1. Establish communication mechanisms to break down barriers and build a shared language. 2. Implement dual-leadership to balance power between different disciplines. 3. Adopt an outcome-oriented approach to align standards and values. 4. Design personalized career paths and provide targeted training resources. 5. Foster informal interaction to build emotional bonds across disciplines. 6. Offer sabbaticals and flexible work to reduce pressure and boost motivation. 7. Leaders should learn from other fields to demonstrate respect and reduce bias. 8. Provide seed funds to support early-stage experimentation.

Table 4.10 (Continued)

Factor	How to develop
	9. Invite external experts to offer objective views when consensus stalls. 10. Create a dedicated unit to coordinate collaboration and resolve conflicts.
To foster team psychological safety	1. Treat setbacks as learning opportunities through structured reviews. 2. Prohibit negative language to create a safe atmosphere for brainstorming. 3. Use anonymous channels to ensure free expression for all members. 4. Bring in third parties to objectively resolve internal conflicts. 5. Focus critiques on issues, not individuals, to protect dignity. 6. Rotate speaking rights to ensure every voice is heard. 7. Protect and publicly acknowledge constructive opposing views. 8. Highlight success stories to show that failure is acceptable. 9. Provide counseling to support members' mental well-being. 10. Hold team-building activities to strengthen trust and harmony. 11. Use charters and communication to build mutual trust. 12. Set up procedures to mediate conflicts promptly.
To forge shared vision	1. Combine top-down and bottom-up input to co-create the vision. 2. Visualize the roadmap to clarify goals and next steps. 3. Use storytelling to emotionally engage and motivate members. 4. Break the vision into actionable task lists. 5. Meet regularly to correct deviations and maintain focus.

Table 4.10 (Continued)

Factor	How to develop
	6. Use external standards to drive internal consensus. 7. Celebrate milestones to reinforce confidence in the vision. 8. Link collective goals to personal benefits to drive engagement. 9. Regularly assess progress and adjust the vision. 10. Use new media to expand the vision's reach. 11. Share updates regularly to keep everyone informed.
To expand interdisciplinary boundary spanning	1. Use project-based models to regulate cross-disciplinary inputs. 2. Standardize workflows to reduce communication costs. 3. Appoint liaisons to bridge gaps and translate terminology. 4. Require co-produced outputs to ensure genuine integration. 5. Integrate workspaces to force high-frequency interaction. 6. Find common focal points, like user needs, to merge knowledge. 7. Use prototyping to build consensus on shared artifacts. 8. Document problems and solutions to build organizational memory. 9. Create platforms for sharing cross-disciplinary knowledge. 10. Develop integrated curricula to train cross-disciplinary talent. 11. Build labs and centers to support research. 12. Run structured programs to cultivate interdisciplinary skills.
To clarify role negotiation and clarity	1. Let members claim tasks based on their interests and expertise. 2. Convert teamwork time into recognized workload credits. 3. Allow dual affiliations to resolve role conflicts. 4. Shift leadership based on the project stage to avoid power

Table 4.10 (Continued)

Factor	How to develop
	struggles.
	5. Sign agreements to clarify duties and benefits upfront.
	6. Hold weekly meetings to fine-tune task allocation.
	7. Allow flexible participation to suit individual strengths.
	8. Assign mentors to help with role adaptation.
	9. Maintain a talent pool for ready expertise.
	10. Reward high-performing teams to sustain cooperation.
To refine	1. Create funds for high-risk, exploratory projects.
institutional	2. Recognize diverse outputs like patents in evaluations.
support for	3. Assemble diverse panels to ensure fair reviews.
interdisciplinarity	4. Provide sustained funding for high-performing teams.
	5. Allow teams to keep revenue for reinvestment.
	6. Quantify contributions to ensure fair rewards.
	7. Grant special privileges to key interdisciplinary platforms.
	8. Concentrate resources on strategic interdisciplinary frontiers.
	9. Build infrastructure like labs to support research.
	10. Run training programs for interdisciplinary talent.
	11. Standardize management for effective oversight.
	12. Use exhibitions to increase the visibility of results.

According to Table 4.10, the researchers propose a model for developing the managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi. This model comprises six dimensions encompassing a total of 67 measures. Specifically:

To cultivate transformational leadership consists of 10 measures aimed at constructing an institutionalized leadership ecosystem grounded in moral consensus, shared vision, continuous innovation, and humanistic care. This ecosystem is

designed to enhance organizational adaptability, innovation capability, and core cohesion within complex environments.

To foster team psychological safety comprises 12 measures intended to establish an institutional environment characterized by de-penalization, low power distance, and high emotional support. Such an environment significantly strengthens members' psychological safety to take risks, voice opinions, and express their authentic selves, ultimately stimulating learning behaviors and innovation performance within interdisciplinary teams.

To forge shared vision includes 11 measures designed to build an actionable vision ecosystem that is translatable, perceivable, and beneficial. This approach reinforces members' psychological identification, emotional resonance, and commitment to action, ensuring that the shared vision functions as an intrinsic engine driving interdisciplinary change.

To expand interdisciplinary boundary spanning contains 12 measures aimed at fostering a cross-boundary ecosystem marked by cognitive interoperability, institutional mutual recognition, and social integration. This system enhances the depth of knowledge integration, the density of interpersonal networks, and the speed of innovation response between disciplines, thereby realizing high-quality interdisciplinary collaborative innovation.

To clarify role negotiation and clarity involves 10 measures focused on constructing a dynamic, equitable, transparent, and supportive role governance system. This system enhances collaborative agility in complex environments, fosters trust among members, and improves the efficiency of innovative outputs.

To refine interdisciplinary institutional support comprises 12 measures designed to establish an enabling support system defined by resource stability, risk controllability, technological openness, and responsive agility. This system bolsters the resource security, innovative audacity, and collaborative efficacy of interdisciplinary teams, ensuring that institutional support catalyzes innovation.

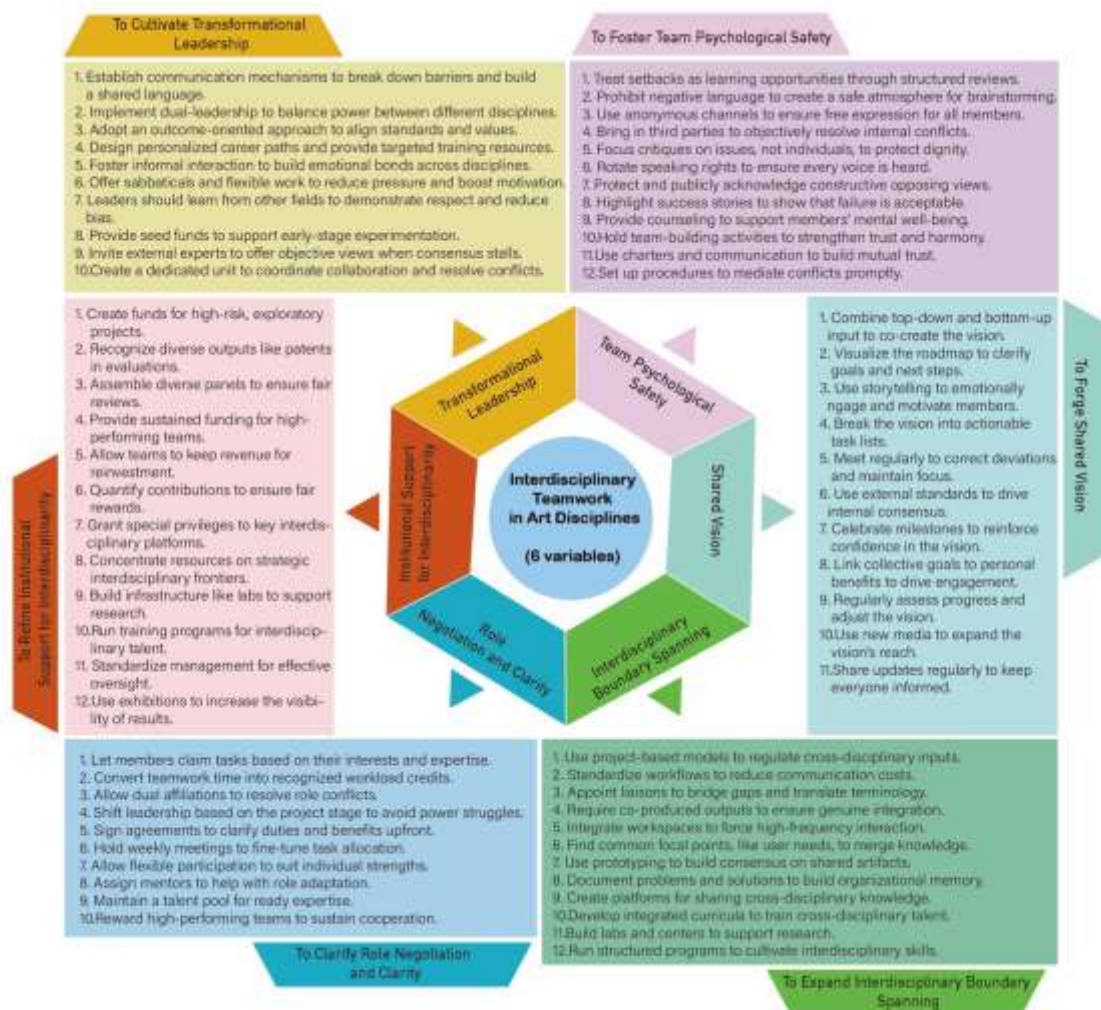


Figure 4.1 Outline of developing the managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic regions in Guangxi.

To cultivating transformational leadership

Idealized Influence

Individualized Consideration

Intellectual Stimulation

Inspirational Motivation

1. Establish communication mechanisms to break down barriers and build a shared language.
2. Implement dual-leadership to balance power between different disciplines.
3. Adopt an outcome-oriented approach to align standards and values.
4. Design personalized career paths and provide targeted training resources.
5. Foster informal interaction to build emotional bonds across disciplines.
6. Offer sabbaticals and flexible work to reduce pressure and boost motivation.
7. Leaders should learn from other fields to demonstrate respect and reduce bias.
8. Provide seed funds to support early-stage experimentation.
9. Invite external experts to offer objective views when consensus stalls.
10. Create a dedicated unit to coordinate collaboration and resolve conflicts.

Figure 4.2 Outline of transformational leadership

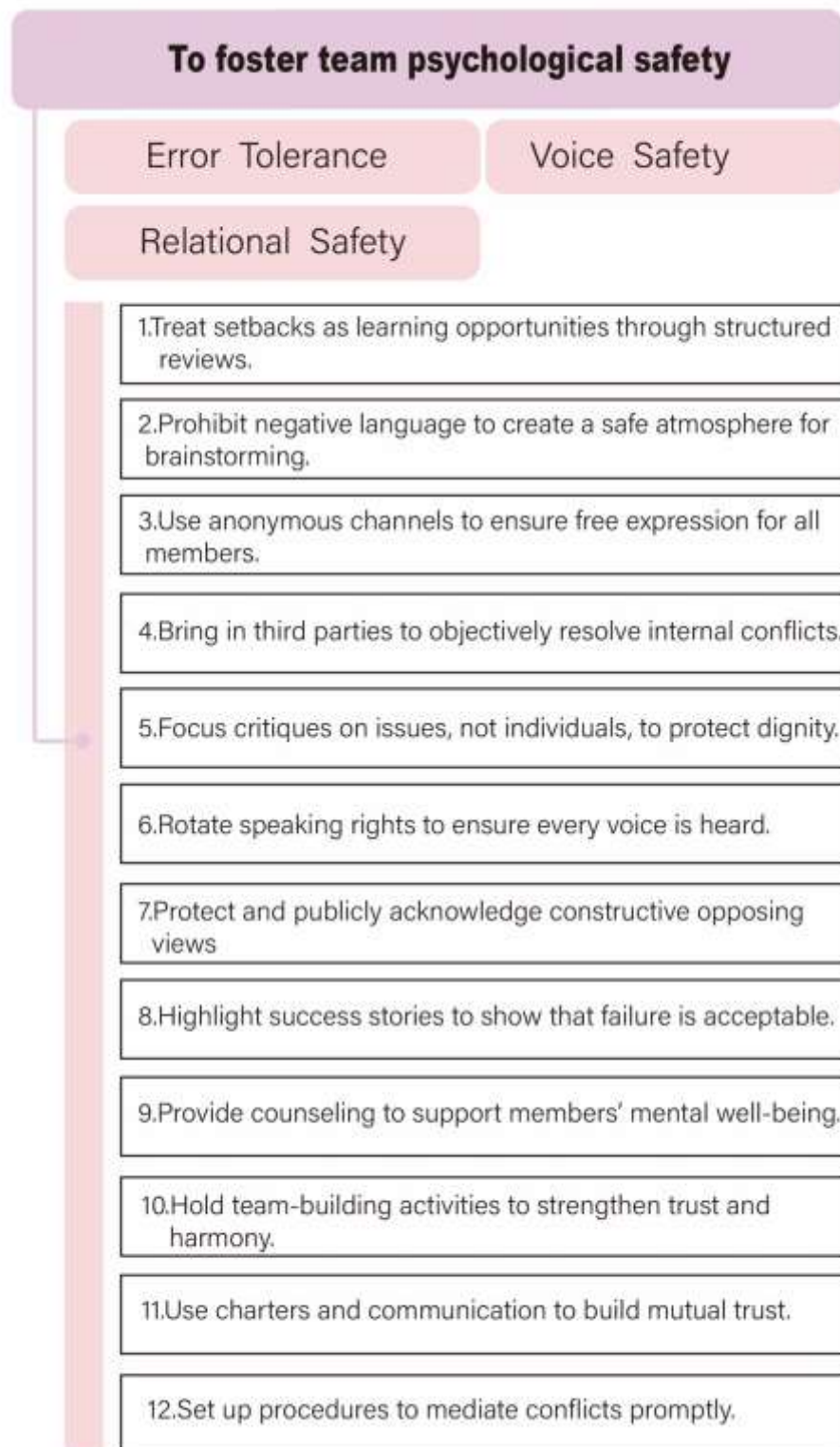


Figure 4.3 Outline of team psychological safety

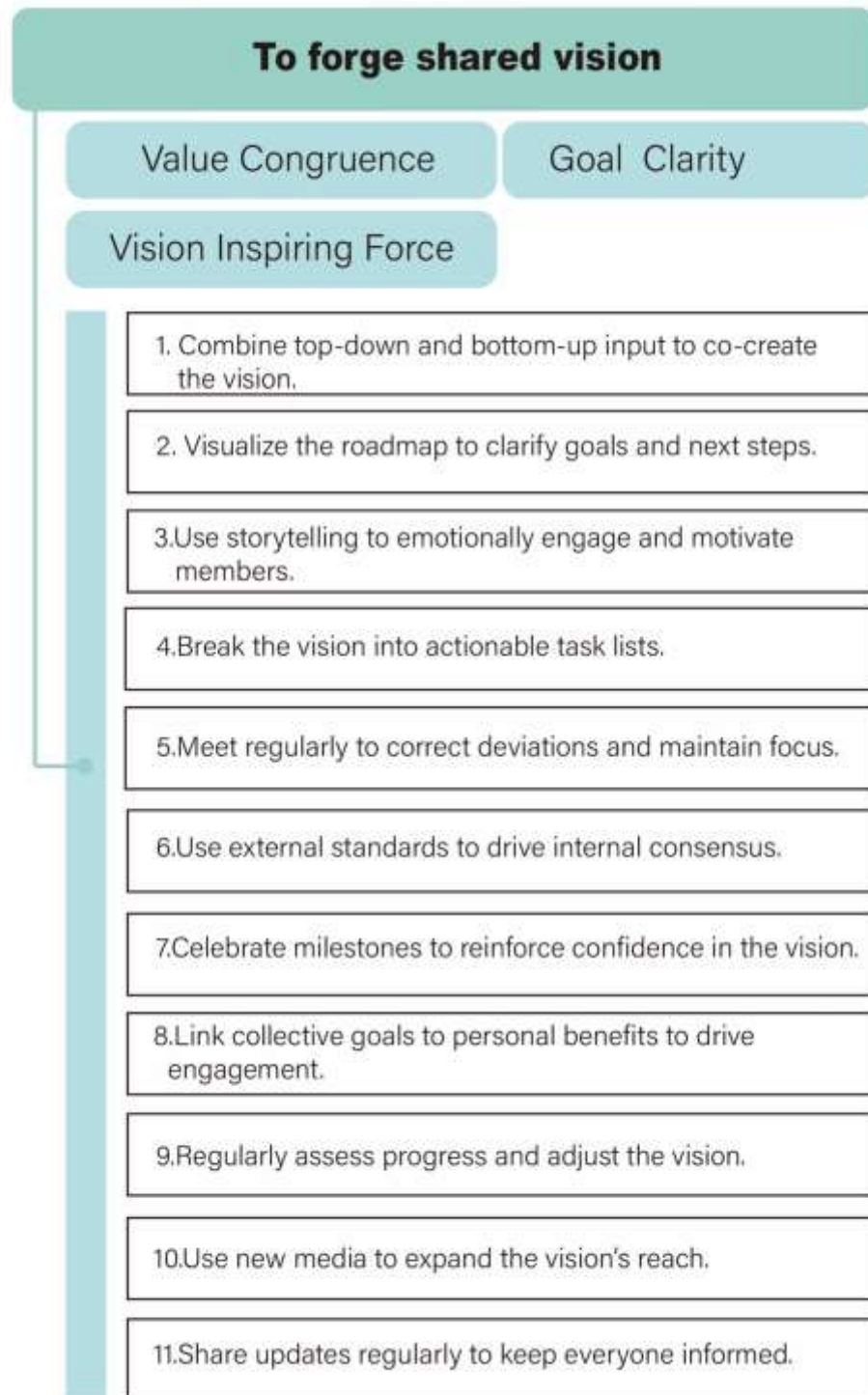


Figure 4.4 Outline of shared vision



Figure 4.5 Outline of interdisciplinary boundary spanning

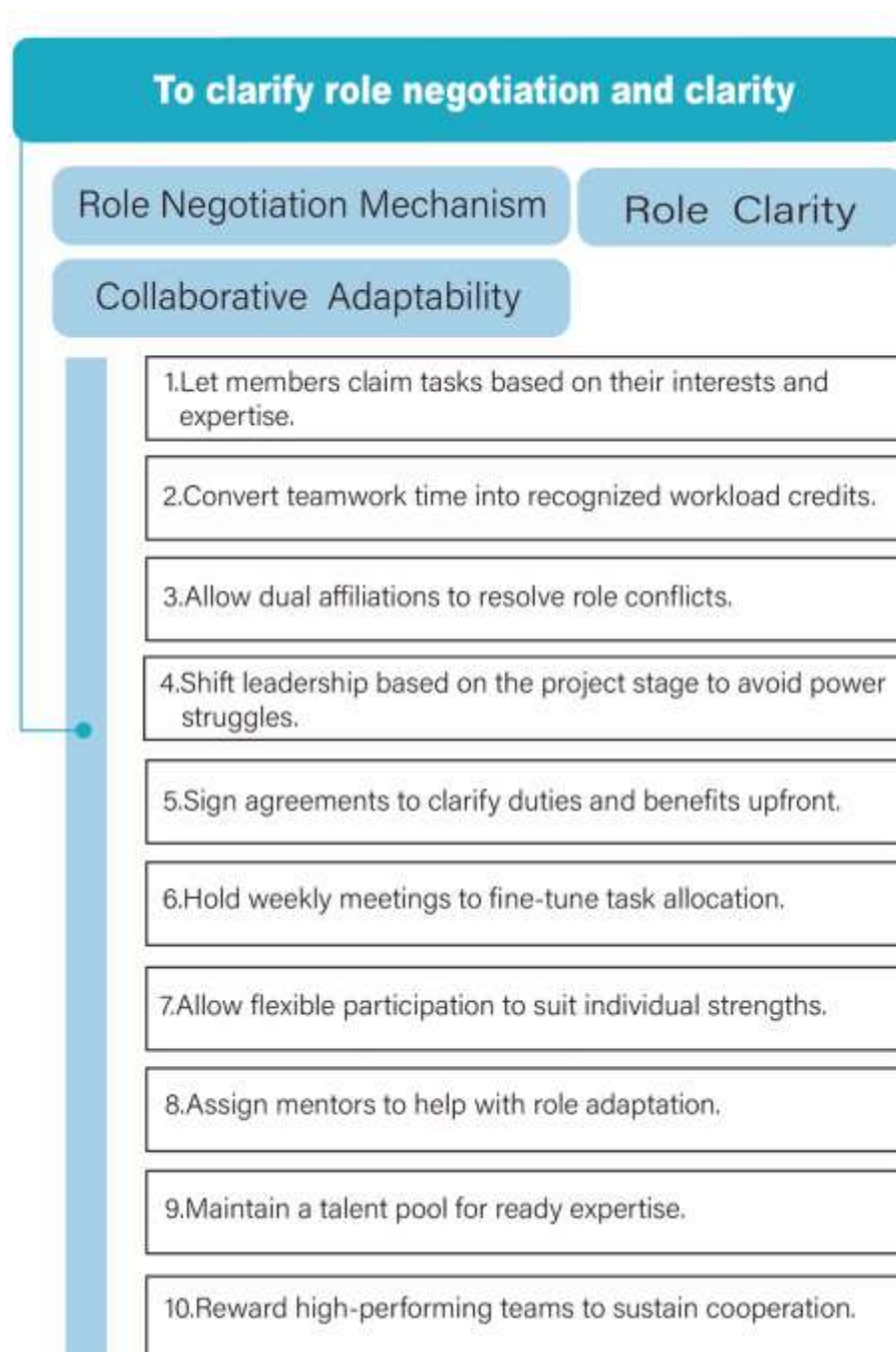


Figure 4.6 Outline of role negotiation and clarity

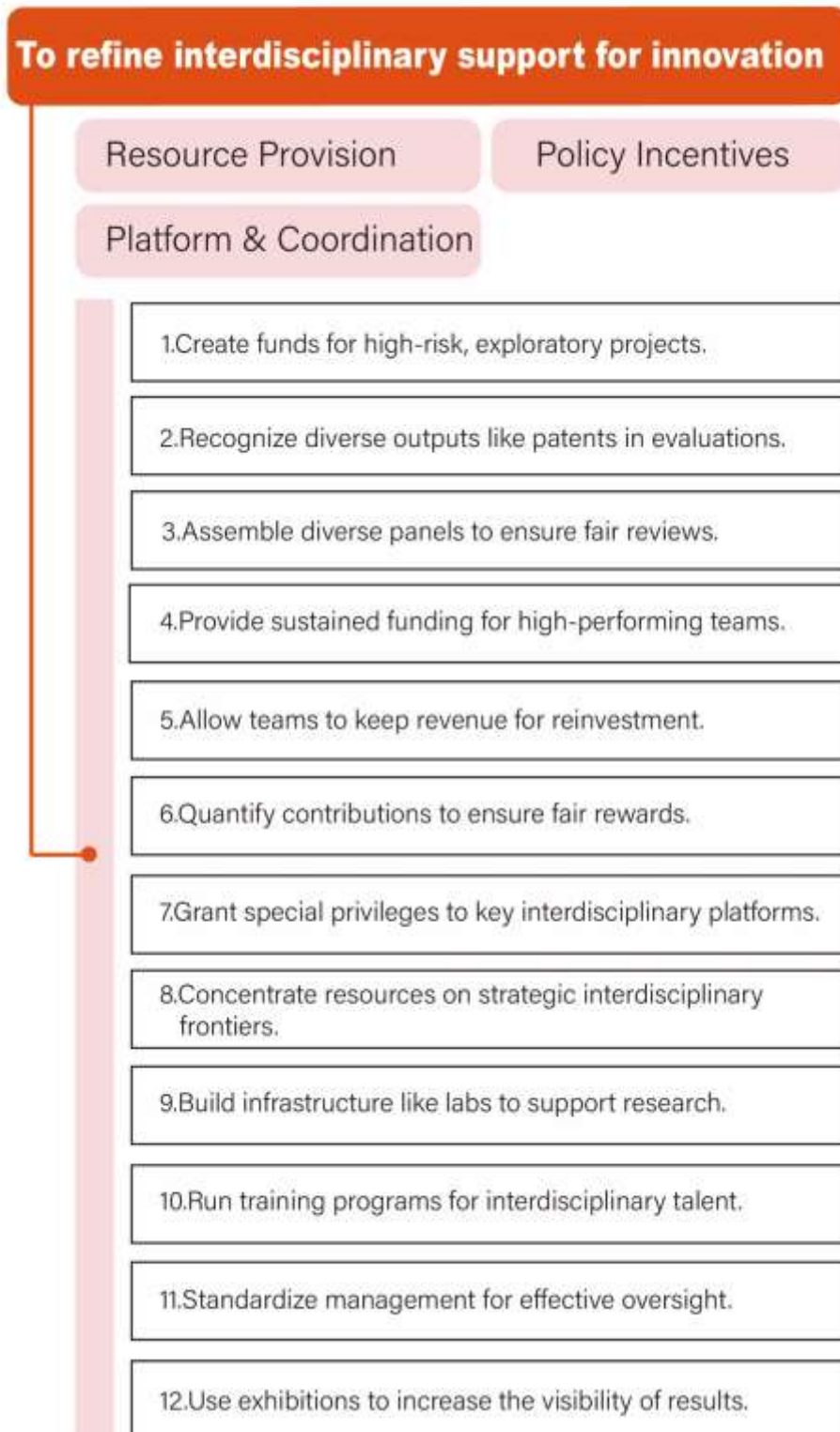


Figure 4.7 Outline of institutional support for interdisciplinarity

Part 4: The analysis results of the evaluation of the suitability and feasibility of the model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi. The researcher presented the data through the focus seminar.

Through a systematic synthesis of the seminar discussions conducted by three expert groups, comprising a total of 24 participants, responses across the six dimensions were consolidated and analyzed. The integration of focus group data from the three universities revealed that, despite substantial differences in institutional type, disciplinary structure, and educational mission, their operational logic across the six core variables demonstrated a high degree of structural convergence. Furthermore, the focus group experts expressed strong consensus regarding the suitability and feasibility of the measures proposed by the interview expert panel. Building upon this evaluation, the experts also advanced the following recommendations concerning the panel's proposals:

To cultivate transformational leadership in the three universities do not exhibit the classic model centered on a strong vision and intellectual stimulation. Instead, leadership behaviors are highly embedded within specific institutional contexts: art academies focus on maintaining artistic academic autonomy, indirectly influencing interdisciplinary collaboration through resource allocation and platform support; comprehensive normal universities prioritize the teaching mission and only activate interdisciplinary activities when they clearly serve educational objectives; engineering-oriented universities evaluate primarily based on technological transformation and industrial applications, granting instrumental recognition to the arts. This indicates that, in these three institutions, Transformational leadership functions primarily as a mechanism for contextual adjustment and boundary management rather than as a core driver of deep interdisciplinary integration.

To foster team psychological safety in the three schools presents a highly consistent yet structurally constrained state. Team members generally maintain high interpersonal relationship safety, with conflicts often being downplayed or internalized. However, when it comes to key issues such as research methods,

evaluation criteria, and academic legitimacy, there is a notable lack of safety in expressing opinions. The sources of these constraints vary among different schools: art colleges are constrained by aesthetic authority and the master-apprentice structure; normal universities are constrained by normativity and policy orientation; and engineering schools are constrained by technical rationality and efficiency logic. Nevertheless, the outcome is highly consistent: the teams as a whole exhibit a psychological safety structure of “low conflict – low risk – low breakthrough,” which is conducive to stable collaboration but unfavorable to cognitive innovation.

To forge shared vision exhibits notable common characteristics across the three schools. These are reflected in institutional strategies such as “Art + Technology,” “Integration of Art and Education,” and “Design Empowering Industry.” These interdisciplinary visions receive high recognition at the value level, providing a legitimacy foundation for the involvement of art disciplines in cross-sector collaboration. However, this recognition mainly remains at a symbolic and directional level, making it difficult to translate into stable behavioral constraints or rigid evaluation standards. In actual practice, each discipline still assesses the value of outcomes according to its own core criteria, resulting in the shared vision functioning more as a symbolic mobilization and legitimization tool rather than as a substantive integrative constraint on individual behaviors.

To expand interdisciplinary boundary spanning, the collaboration challenges among the three universities are not primarily about inconsistencies at the goal level, but rather are manifested in differences in the authority to define problems and in the logic of outcome evaluation. During the implementation stage, interdisciplinary collaboration can often be maintained through a division of labor and cooperation; however, at the stage of presenting and evaluating results, disciplinary differences become more pronounced, and collaboration tends to degenerate into mere ‘juxtaposition’ rather than genuine integration. Although focus groups generally recognize the key role of the translator in interdisciplinary work, this role in all three universities still relies heavily on individual experience and has yet to be supported by an institutionalized cultivation mechanism.

To clarify role negotiation and clarity further reinforced the structural characteristics mentioned above. All three schools improved the efficiency and stability at the early stage of collaboration by predefining roles, such as positioning art teachers as creative leaders, curriculum supporters, or execution-focused designers. However, this role clarity also compressed the space for dynamic negotiation. When art teachers attempted to engage in problem definition, methodological choices, or technical pathway decisions, they often encountered implicit resistance, which in turn created path dependence and limited the flexibility and potential for deepening interdisciplinary collaboration.

To refine interdisciplinary support institutions in the three universities, exhibit a highly consistent characteristic of being project-friendly but team-unfriendly. Existing systems generally tend to support short-term, outcome-oriented interdisciplinary projects, while lacking sustained investment in the long-term and stable development of interdisciplinary teams. Once a project ends, related support is quickly withdrawn, making it difficult to form cumulative advantages and positive feedback mechanisms. This institutional orientation further reinforces the short-term and fragmented nature of interdisciplinary collaboration.

The three universities present a comprehensive picture of structural consistency with contextual differentiation across six variables: leadership is primarily regulatory; psychological safety is stable but limited; vision is strong in symbolism but weak in behavioral constraint; boundaries are crossable but hard to integrate; roles are clear yet rigid; institutional support leans toward projects rather than the organization. This common structure provides an empirical basis for the subsequent construction of a unified cross-university explanatory model and lays a solid analytical framework for explaining the differences in interdisciplinary collaboration outcomes among different universities.

Table 4.11 Model for developing the managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic regions in Guangxi.

Factor	How to develop
To cultivate transformational leadership	1 Institutionalize regular and structured mechanisms for interdisciplinary communication and coordination. 2 Establish shared leadership and power-balancing governance structures for interdisciplinary projects. 3 Implement outcome-oriented interdisciplinary governance aligned with differentiated incentives and career systems. 4 Provide institutionalized trial-and-error space for early-stage interdisciplinary exploration. 5. Establish monitoring and feedback mechanisms for interdisciplinary leadership effectiveness.
To foster team psychological safety	1 Institutionalize failure-learning, reflection, and psychological support mechanisms within interdisciplinary teams. 2 Establish non-judgmental and inclusive communication norms to protect early-stage innovation. 3 Use procedural safeguards and third-party mechanisms to ensure equal voice and reduce authority pressure. 4 Use procedural safeguards and third-party mechanisms to ensure equal voice and reduce authority pressure. 5. Develop structured onboarding programs for new interdisciplinary team members.
To forge shared vision	1 Co-create shared interdisciplinary visions through multi-level participatory processes. 2 Translate shared visions into actionable roadmaps and task systems. 3 Sustain shared vision through narrative-based and multi-channel communication.

Table 4.11 (Continued)

Factor	How to develop
To expand interdisciplinary boundary spanning	4 Establish regular mechanisms for vision alignment and dynamic adjustment.
	5 Leverage external references to reinforce internal consensus and legitimacy.
	6. Develop visual and digital tools to enhance vision communication and monitoring.
	1 Use project-based structures as the primary unit of interdisciplinary integration.
	2 Establish shared interdisciplinary languages, frameworks, and working tools.
	3 Institutionalize boundary-spanning and knowledge-translation roles.
	4 Define substantive co-produced interdisciplinary output standards.
To clarify role negotiation and clarity	5 Promote deep collaboration through co-location and high-frequency interaction.
	6 Promote deep collaboration through co-location and high-frequency interaction.
	7. Encourage interdisciplinary problem-driven research initiatives.
	1 Establish flexible and structured mechanisms for role negotiation and task allocation.
To clarify role negotiation and clarity	2 Institutionalize fair recognition of interdisciplinary workload and contributions.
	3 Mitigate role and identity conflicts through institutional appointment arrangements.
	4 Clarify authority and responsibility across different project phases.

Table 4.11 (Continued)

Factor	How to develop
	5 Formalize contribution and attribution rules at the project outset.
	6 Support long-term interdisciplinary talent development and mobility.
	7. Establish transparent documentation systems for role evolution.
To refine institutional support for interdisciplinarity	1.Establish interdisciplinary seed funding and risk-tolerant support mechanisms. 2.Reform evaluation systems to formally recognize interdisciplinary outputs. 3.Ensure fairness through pluralistic and independent review mechanisms. 4.Provide sustained support through rolling and medium- to long-term funding schemes. 5.Create incentive loops linking interdisciplinary inputs with tangible returns. 6.Build stable interdisciplinary platforms and foundational support infrastructures. 7 Establish transparent documentation systems for role evolution. 8 Strengthen external partnerships with industry and society.

The table (Table 4.11) presents a framework of measures developed through the synthesis and integration of recommendations proposed by interview experts and further refined based on focus group discussions. It aims to illustrate a structured development model for enhancing the managerial effectiveness of interdisciplinary teams in art disciplines at universities in ethnic minority regions of Guangxi. Organized by key influencing factors, the table systematically outlines the corresponding

developmental pathways for each dimension, reflecting a set of consensus-based measures derived from the integration of expert recommendations and group deliberation. See the table for details.



Figure 4.8 Model for developing managerial effectiveness. interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi.



Figure 4.9 Model for transformational leadership



Figure 4.10 Model for team psychological safety

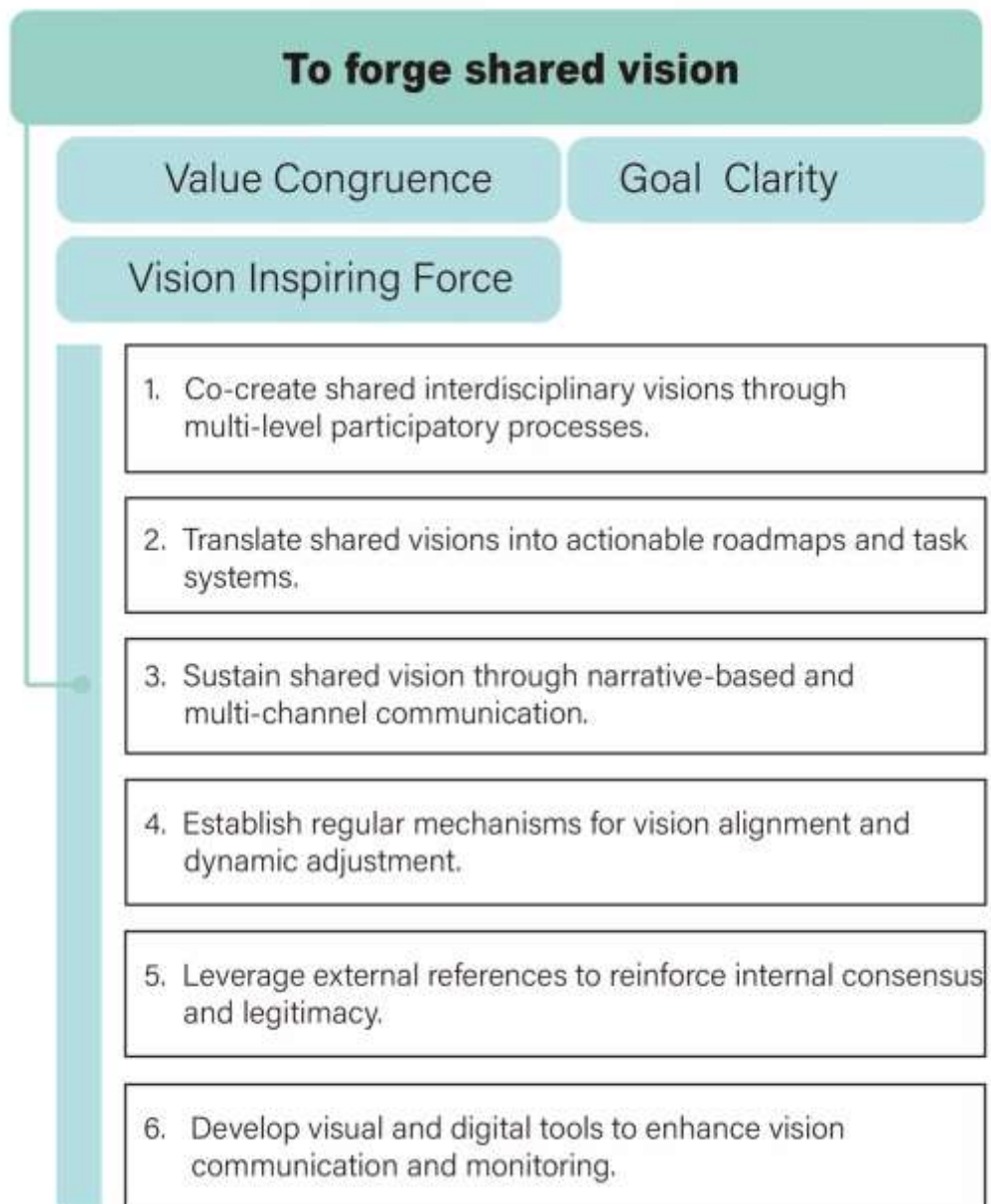


Figure 4.11 Model for shared vision

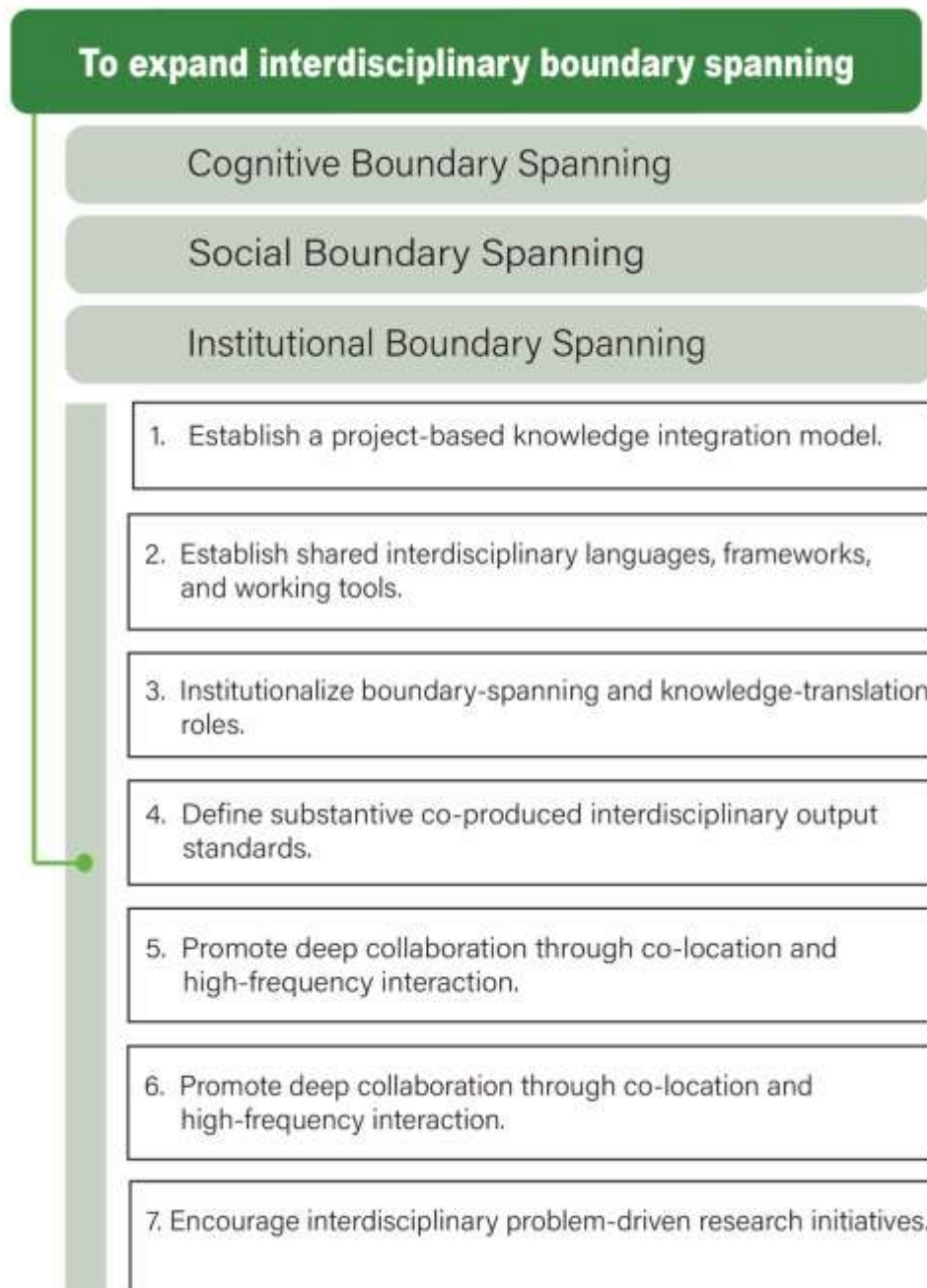


Figure 4.12 Model for interdisciplinary boundary spanning

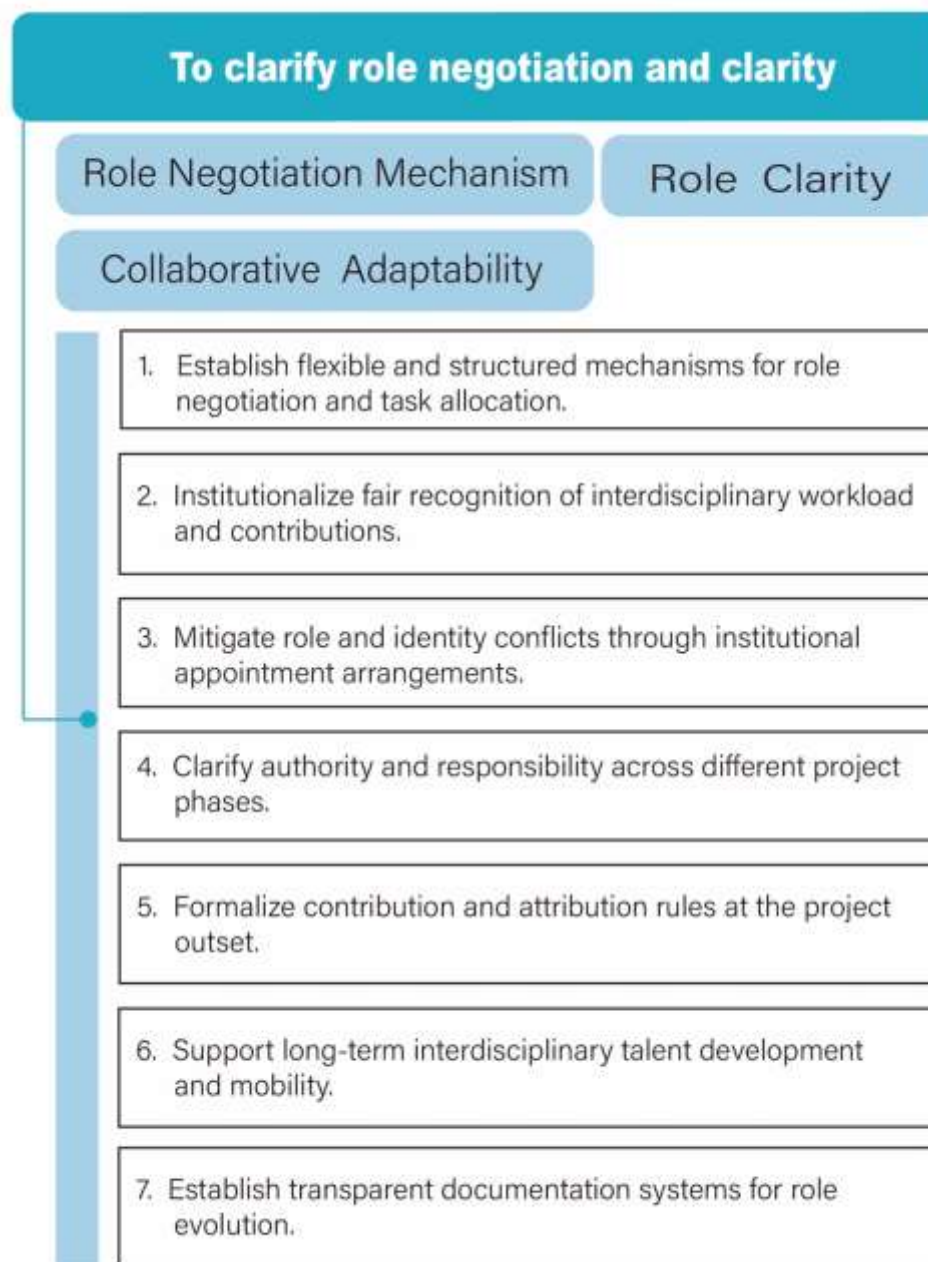


Figure 4.13 Model for role negotiation and clarity



Figure 4.14 Model for institutional support for interdisciplinarity

The model establishes a systematic and actionable implementation framework, transforming abstract management concepts into concrete action paths covering six dimensions. It effectively addresses core challenges in interdisciplinary team construction, including difficulties in disciplinary integration, a lack of psychological safety, blurred role boundaries, and lagging incentive mechanisms. Through localized institutional design and safeguards, the model provides a scientific practical guide for enhancing the governance efficacy and sustainable development of interdisciplinary teams in art disciplines at universities in ethnic minority regions of Guangxi.

Chapter 5

Conclusion, Discussion, and Recommendations

This research develops a model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi. This research has three objectives: 1) To study the level of managerial effectiveness of interdisciplinary teamwork in Art Disciplines of Universities in Ethnic Minority Regions in Guangxi, 2) To develop the model for developing managerial effectiveness of interdisciplinary teamwork in Art Disciplines of Universities in Ethnic Minority Regions in Guangxi, and 3) To evaluate the suitability and feasibility of models for developing managerial effectiveness of interdisciplinary teamwork in Art Disciplines of Universities in Ethnic Minority Regions in Guangxi. The developing managerial effectiveness of interdisciplinary teamwork in Art Disciplines of Universities in Ethnic Minority Regions in Guangxi includes six aspects: 1) Transformational leadership, 2) Team psychological safety, 3) Shared vision, 4) Interdisciplinary boundary spanning, 5) Role negotiation and clarity, and 6) Institutional support for interdisciplinarity. The details are as follows.

Conclusion

The purpose of this study is to develop a model for improving the interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi, as well as to evaluate the suitability and feasibility of the model for improving the interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi. Through investigation and analysis, the following conclusions were drawn:

Part 1: The current situation of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi.

Part 2: Model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi.

Part 3: The suitability and feasibility of the model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi.

Part 1: The current situation of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi.

According to the questionnaire survey, found that the current situation of developing managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi was at a high level in six aspects. Considering the results of this research, aspects ranged from the highest to the lowest mean were as follows: the highest mean was shared vision, followed by institutional support for interdisciplinarity, interdisciplinary boundary spanning, role negotiation, and clarity. In contrast, transformational leadership and team psychological safety exhibit comparatively lower mean scores.

Transformational leadership: The result showed that the current situation in transformational leadership was at a medium level. The overall proficiency level of transformational leadership was found to be in the lower-middle range, ranking fifth among the six variables. This reveals a pattern of imbalanced development characterized by relatively strong “individualized consideration” alongside significant weaknesses in “ethical leadership” and “intellectual stimulation.” While administrators possess a certain foundation in adapting leadership styles to accommodate individual differences and providing personalized guidance, significant deficiencies remain in core dimensions such as acting as ethical role models to foster trust, practicing consistent values, and encouraging critical questioning and challenges. These limitations restrict the depth and breadth of leadership efficacy.

Team psychological safety: the result showed that the current situation in team psychological safety was at a medium level. Team psychological safety currently ranks last among the six variables, constituting the most significant bottleneck to organizational development. Data indicate that while the foundation for relational safety is acceptable, with relatively strong performance in inclusive collaboration and emotional support, there are severe deficiencies in expressive

safety and error-tolerance safety. Specifically, there are marked gaps in the encouragement of divergent viewpoints, the cultivation of an environment open to questioning, and the provision of supportive feedback following setbacks. This state of “relational harmony with expressive stagnation” creates a precarious situation prone to trapping the team in an innovation dilemma.

Shared vision: The overall level of shared vision is high, ranking first among the six variables, yet it exhibits characteristics of “high personal value identification with a need for improvement in goal transmission and motivational efficacy.” Data indicate that support derived from the meaningfulness of the vision is high, and the vision effectively establishes connections with individual identities and purposes. However, relatively weak performance is observed in clearly communicating long-term goals and stimulating enthusiasm and collective commitment. This suggests that while the vision has been internalized as an individual driver, a disconnection exists regarding clear transmission at the organizational level and the maintenance of sustained emotional engagement.

Interdisciplinary boundary spanning: Interdisciplinary boundary spanning is currently at a high level overall, ranking third among the six variables, yet it exhibits characteristics of uneven development characterized by “strong institutional impetus alongside lagging cognitive and social connections.” Data indicate that while the dimension of institutional spanning received the highest score, with outstanding performance in identifying barriers and driving reform, relative weaknesses exist in the proactive exploration of external knowledge, language translation, and the active establishment of communication channels. This state of “disconnection between hard institutional guarantees and soft cognitive connections” tends to result in collaboration becoming a mere formality.

Role negotiation and clarity: Role negotiation and clarification is currently at a high level overall, ranking fourth among the six variables, yet it exhibits a structural contradiction characterized by “strong collaborative adaptability alongside insufficient clarity and proactivity in role definition.” Data indicate that while the team performs relatively well in redistributing tasks and proactively adjusting

individual responsibilities during periods of change, there are relative weaknesses in proactively adjusting role allocations according to new demands and clearly understanding the responsibilities of others. This state of “being agile in response but lagging in planning, and having strong self-perception but weak cognition of others” is liable to result in role ambiguity and delayed responsiveness.

Institutional support for interdisciplinarity: Interdisciplinary institutional support is currently at a high level overall, ranking second among the six variables, yet it exhibits structural characteristics characterized by “clear procedural norms alongside insufficient stability in incentives and safeguards.” Data indicate that while process support received the highest score, incentive recognition and basic safeguards are relatively weak. This suggests that while institutional and procedural operations are relatively smooth, significant shortcomings remain in the continuity of resource supply and the intensity of policy incentives, which are inadequate to fully sustain long-term interdisciplinary exploration.

Part 2: Model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi.

The researcher proposed a model for improving managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi was six aspects, containing 67 measures. There are 10 measures to cultivate transformational leadership, 12 measures to foster team psychological safety, 11 measures to forge shared vision, 12 measures to expand interdisciplinary boundary spanning, 10 measures to clarify role negotiation and clarity, and 12 measures to refine institutional support for interdisciplinarity.

Based on the expert interview findings, this study developed a model to enhance the managerial effectiveness of interdisciplinary teamwork in art disciplines at universities in ethnic minority regions of Guangxi. The expert interviews, together with the literature review and questionnaire results, confirmed that effective interdisciplinary collaboration in art disciplines requires integrated governance across leadership practices, team climate, shared vision, boundary-spanning mechanisms, role clarification, and institutional support.

The expert interviews further contributed to refining the internal structure of the model by clarifying the operational focus of each dimension, resulting in a comprehensive set of actionable strategies. However, the significance of the expert interviews in this study lies not in the individual measures themselves, but in their role in substantiating the conceptual completeness and contextual relevance of the proposed model. The finalized model, as presented in Chapter 4, was subsequently evaluated in a focus group to assess its suitability and feasibility across diverse institutional contexts.

To cultivate transformational leadership contains 10 measures, and they are as follows: 1) Establish communication mechanisms to break down barriers and build a shared language. 2) Implement dual-leadership to balance power between different disciplines. 3) Adopt an outcome-oriented approach to align standards and values. 4) Design personalized career paths and provide targeted training resources. 5) Foster informal interaction to build emotional bonds across disciplines. 6) Offer sabbaticals and flexible work to reduce pressure and boost motivation. 7) Leaders should learn from other fields to demonstrate respect and reduce bias. 8) Provide seed funds to support early-stage experimentation. 9) Invite external experts to offer objective views when consensus stalls. 10) Create a dedicated unit to coordinate collaboration and resolve conflicts.

To foster team psychological safety contains 12 measures, and they are as described below: 1) Treat setbacks as learning opportunities through structured reviews. 2) Prohibit negative language to create a safe atmosphere for brainstorming. 3) Use anonymous channels to ensure free expression for all members. 4) Bring in third parties to objectively resolve internal conflicts. 5) Focus critiques on issues, not individuals, to protect dignity. 6) Rotate speaking rights to ensure every voice is heard. 7) Protect and publicly acknowledge constructive opposing views. 8) Highlight success stories to show that failure is acceptable. 9) Provide counseling to support members' mental well-being. 10) Hold team-building activities to strengthen trust and harmony. 11) Use charters and communication to build mutual trust. 12) Set up procedures to mediate conflicts promptly.

To forge shared vision contains 11 measures, and they are as described below: 1) Combine top-down and bottom-up input to co-create the vision. 2) Visualize the roadmap to clarify goals and next steps. 3) Use storytelling to emotionally engage and motivate members. 4) Break the vision into actionable task lists. 5) Meet regularly to correct deviations and maintain focus. 6) Use external standards to drive internal consensus. 7) Celebrate milestones to reinforce confidence in the vision. 8) Link collective goals to personal benefits to drive engagement. 9) Regularly assess progress and adjust the vision. 10) Use new media to expand the vision's reach. 11) Share updates regularly to keep everyone informed.

To expand interdisciplinary boundary spanning contains 12 measures, and they are as described below: 1) Use project-based models to regulate cross-disciplinary inputs. 2) Standardize workflows to reduce communication costs. 3) Appoint liaisons to bridge gaps and translate terminology. 4) Require co-produced outputs to ensure genuine integration. 5) Integrate workspaces to force high-frequency interaction. 6) Find common focal points, like user needs, to merge knowledge. 7) Use prototyping to build consensus on shared artifacts. 8) Document problems and solutions to build organizational memory. 9) Create platforms for sharing cross-disciplinary knowledge. 10) Develop integrated curricula to train cross-disciplinary talent. 11) Build labs and centers to support research. 12) Run structured programs to cultivate interdisciplinary skills.

To clarify role negotiation and clarity contains 10 measures, and they are as described below: 1) Let members claim tasks based on their interests and expertise. 2) Convert teamwork time into recognized workload credits. 3) Allow dual affiliations to resolve role conflicts. 4) Shift leadership based on the project stage to avoid power struggles. 5) Sign agreements to clarify duties and benefits upfront. 6) Hold weekly meetings to fine-tune task allocation. 7) Allow flexible participation to suit individual strengths. 8) Assign mentors to help with role adaptation. 9) Maintain a talent pool for ready expertise. 10) Reward high-performing teams to sustain cooperation.

To refine institutional support for interdisciplinarity contains 12 measures, and they are as described below: 1) Create funds for high-risk, exploratory projects. 2) Recognize diverse outputs like patents in evaluations. 3) Assemble diverse panels to ensure fair reviews. 4) Provide sustained funding for high-performing teams. 5) Allow teams to keep revenue for reinvestment. 6) Quantify contributions to ensure fair rewards. 7) Grant special privileges to key interdisciplinary platforms. 8) Concentrate resources on strategic interdisciplinary frontiers. 9) Build infrastructure, like labs, to support research. 10) Run training programs for interdisciplinary talent. 11) Standardize management for effective oversight. 12) Use exhibitions to increase the visibility of results.

Part 3: The suitability and feasibility of the model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi.

Based on data collected through focus group seminars and expert consultations, this study evaluated the suitability and feasibility of the proposed interdisciplinary teamwork model for art disciplines in universities situated in ethnic minority regions of Guangxi. Overall, the focus group experts affirmed that the model demonstrates a high level of suitability and practical feasibility in supporting interdisciplinary collaboration.

To cultivate transformational leadership: Experts consistently affirmed that transformational leadership is both contextually suitable and operationally feasible for interdisciplinary teamwork in art disciplines in ethnic minority regions of Guangxi, noting that decentralized coordination, informal communication spaces, intellectual stimulation, and interdisciplinary “bilingual” mechanisms align with artistic autonomy while expert recommendations refined its application to include preservation of artistic ontology, balanced integration of industry engagement, and the adoption of standardized project-management tools in engineering-oriented units. This conclusion is supported by recent leadership research showing that transformational leadership enhances team creativity and innovation capacity (Chen et al., 2019; Gong et al., 2019), positively facilitates knowledge sharing and integration within diverse teams (Li et al., 2017), and strengthens collaborative engagement and performance in

knowledge-intensive organizational contexts, including higher education institutions (Buil et al., 2019; Hughes et al., 2018). These findings further suggest that transformational leadership fosters an empowering and trust-based climate that enables members from different disciplinary backgrounds to exchange knowledge and co-create innovative outcomes, thereby positioning transformational leadership in this model as a core governance mechanism integrating cultural identity, academic autonomy, and regional strategy.

To foster team psychological safety: Experts affirmed that team psychological safety is highly suitable and practically feasible for interdisciplinary collaboration in art disciplines, emphasizing that psychological safety mechanisms such as signed-but-protected feedback channels, creative protection periods, and explicit non-retaliation norms are essential to mitigate disciplinary evaluation anxiety and promote risk-taking in idea expression; they also noted the need for culturally calibrated protocols to ensure psychological safety evolves through structured interaction rather than ad hoc goodwill, and that such mechanisms must be supported by institutional commitment to collaborative norms that value openness and mutual respect. This assessment aligns with recent research demonstrating that psychological safety enhances team learning behaviors, knowledge sharing, and innovation commitment in higher education teams (Elshanhaby et al., 2026), is validated in interdisciplinary student teams where safe communication climates facilitate knowledge exchange and collaborative problem-solving (Robinson & Held, 2024), and is empirically associated with improved team learning, creativity, and collaborative engagement in higher education project teams (Clausen et al., 2025), thereby positioning team psychological safety in this model as the socio-emotional foundation that enables cross-boundary dialogue, collaborative risk-taking, and sustainable innovation.

To forge shared vision: Experts regarded shared vision as a strategic anchor that is highly appropriate and feasible when grounded in collaboratively defined goals and measurable indicators, noting that vision statements must transcend rhetorical symmetry and be operationalized through inclusive planning sessions,

co-developed milestones, and mutual accountability structures. They also stressed that in ethnic minority regions, the shared vision must explicitly incorporate cultural heritage preservation, social impact objectives, and alignment with regional aesthetic education priorities, and that institutionalizing vision discourse is necessary to sustain long-term team commitment. This evaluation is supported by higher education and organizational research indicating that shared vision strengthens collective commitment and coordination when embedded in collaborative practices and institutional routines (Carton, Murphy, & Clark, 2014), that shared vision enhances knowledge exchange and collaborative engagement within teams working on complex tasks (Hu, Erdogan, Jiang, Bauer, & Liu, 2018), and that shared vision facilitates integrative teaming processes and collective performance by aligning individual goals with broader organizational objectives (van der Vegt & Bunderson, 2005), thereby positioning shared vision in this model as the coordinating principle that aligns individual motivations, collective goals, and institutional priorities. Shared strategic goals facilitate integrative collaboration and collective performance in knowledge-intensive teams (Lemoine, Hartnell, & Leroy, 2019), thereby positioning shared vision in this model as the coordinating principle that aligns individual motivations, collective goals, and institutional priorities.

To expand interdisciplinary boundary spanning: Experts widely recognized interdisciplinary boundary spanning mechanisms such as milestone-based coordination, co-created curriculum design, joint demonstration sessions, and communication platforms as suitable and feasible tools for managing knowledge heterogeneity and facilitating collaboration, while also recommending explicit roles for ethics reviews, shared glossaries, and boundary objects to reduce terminological and epistemic barriers between artistic and technical domains. They emphasized that formalizing these mechanisms through documented protocols, interoperable digital tools, and periodic boundary-crossing events would enhance trust and reduce friction. This perspective aligns with empirical research indicating that interdisciplinary collaboration and knowledge integration depend on coordinated interaction patterns and structured collaborative networks within teams (Hall et al., 2018), that effective

cross-disciplinary integration requires deliberate processes that bridge epistemic differences across fields (O'Rourke et al., 2016), and that such boundary-spanning coordination can ultimately facilitate creative synthesis and collaborative innovation in knowledge-intensive teams (Harvey, 2014). These findings position interdisciplinary boundary spanning in this model as the connective mechanism that transcends disciplinary silos while enabling coherent co-production of hybrid knowledge.

To clarify role negotiation and clarity: Experts unanimously affirmed that dynamic role negotiation and clarification, especially milestone-based role transitions, project manager responsibility systems, and collaboratively agreed contribution standards, are suitable and feasible, noting that clear role expectations reduce ambiguity and conflict in interdisciplinary teams. They recommended outcome-oriented workload frameworks, mentorship pairing between disciplines, and explicit contribution matrices to ensure fairness. They also highlighted that integrating these practices into contractual agreements, evaluation rubrics, and periodic role review sessions would mitigate uncertainty and support team coherence. This assessment is consistent with empirical research showing that role clarity reduces role conflict and enhances coordination in knowledge-intensive teams (Rizzo, House, & Lirtzman, 1970; reconfirmed in later team research), that clearly defined responsibilities facilitate collaboration and improve performance in project-based teams (Mathieu, Hollenbeck, van Knippenberg, & Ilgen, 2017), and that structured role systems are associated with improved coordination and innovation outcomes in interdisciplinary teamwork settings (Salas, Reyes, & McDaniel, 2018). These findings position role negotiation and clarification in this model as a governance mechanism that aligns individual contributions with collective goals and reduces role confusion.

To refine institutional support for interdisciplinarity: Experts broadly agreed that institutional support mechanisms—including rolling performance evaluation, seed funding, flexible work arrangements, and revenue reinvestment models—are highly suitable and feasible for sustaining interdisciplinary teamwork, while recommending context-specific safeguards such as dual-track evaluation systems that protect pure artistic research, explicit audit and fault-tolerance policies

for pilot funds, quantitative workload credit systems, and transparent revenue sharing ratios to ensure fairness and compliance. They further emphasized that embedding interdisciplinary mandates in promotion criteria, establishing dedicated administrative support units, and providing targeted professional development would strengthen systemic adoption. This perspective is consistent with higher education and organizational research indicating that institutional structures and incentive systems significantly shape interdisciplinary collaboration and knowledge integration outcomes (Bammer, 2017), that supportive organizational climates and leadership practices enhance knowledge sharing and resilience within collaborative research teams (Salazar, Lant, & Fiore, 2012; reaffirmed in later team science research), and that integrated evaluation, funding, and governance systems facilitate sustained interdisciplinary engagement in academic organizations (Bozeman & Boardman, 2014). These findings position institutional support in this model as the macro-structural backbone that aligns policy frameworks, incentive mechanisms, and academic practice to sustain interdisciplinary teamwork.

Discussion

This research was to develop a model for developing managerial effectiveness of interdisciplinary teamwork in Art Disciplines of Universities in Ethnic Minority Regions in Guangxi. The researcher summarizes the discussion into 3 parts, as follows:

Part 1: The current situation of developing managerial effectiveness of interdisciplinary teamwork in Art Disciplines of Universities in Ethnic Minority Regions in Guangxi

Part 2: The model for developing managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi.

Part 3: The suitability and feasibility of the model for developing managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi.

Part 1: The current situation of developing managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi.

The findings of this study reveal a differentiated pattern in the managerial effectiveness of interdisciplinary teamwork within art disciplines at universities in the Guangxi Zhuang Autonomous Region. Among the six examined dimensions, shared vision achieved the highest mean score, followed by institutional support, whereas interdisciplinary boundary spanning, role negotiation and clarity, transformational leadership, and team psychological safety remained at comparatively moderate levels. This configuration indicates that universities in Guangxi have begun to establish a relatively solid strategic orientation and institutional foundation for interdisciplinary collaboration in art disciplines. However, the behavioral and socio-psychological mechanisms necessary for sustaining deep collaborative engagement appear to be less developed. In essence, while the current governance environment provides conceptual guidance and structural support for interdisciplinary initiatives, the micro-level leadership practices and team interaction dynamics required to fully activate these institutional arrangements still require further strengthening. From a theoretical perspective, these findings can be interpreted through the lens of the Science of Team Science (SciTS) framework, which conceptualizes interdisciplinary collaboration as a multilevel system shaped by interactions among macro-level institutional structures, meso-level team processes, and micro-level individual behaviors (Stokols et al., 2008; Hall et al., 2018). Within this framework, institutional support mechanisms such as funding systems, administrative coordination, and organizational policies constitute the macro-level structural infrastructure that enables interdisciplinary collaboration. Shared vision, by contrast, functions at the team level as a cognitive and motivational mechanism that aligns collective goals and facilitates coordination among members from diverse disciplinary backgrounds. Meanwhile, transformational leadership and psychological safety operate primarily at the interpersonal level, influencing whether team members feel sufficiently motivated and secure to engage in open dialogue, challenge disciplinary

assumptions, and participate in exploratory knowledge exchange. The present results therefore, suggest that interdisciplinary collaboration in Guangxi universities has advanced more substantially at the structural and strategic levels than at the behavioral and cultural levels, reflecting a developmental pattern frequently observed in organizational change processes within higher education institutions. The prominence of shared vision further indicates that university administrators in the region increasingly recognize the importance of articulating collective goals and aligning interdisciplinary initiatives with broader institutional missions. Existing research in interdisciplinary team science suggests that a shared vision serves as a cognitive anchor that reduces uncertainty, enhances mutual understanding, and facilitates coordination among collaborators from different disciplinary traditions (Stokols et al., 2008; Pearce & Ensley, 2019). This function may be particularly salient in art disciplines, where creative processes are often characterized by ambiguity, experimentation, and subjective interpretation. A clearly articulated vision can therefore help integrate diverse artistic, cultural, and technological perspectives into a coherent collaborative direction. The relatively strong performance in institutional support also suggests that universities in Guangxi have begun to develop structural mechanisms that facilitate interdisciplinary collaboration. Institutional initiatives such as seed funding programs, cross-departmental coordination structures, and administrative support systems can significantly reduce the organizational barriers that traditionally separate academic disciplines. Previous studies on university governance highlight that interdisciplinary collaboration is highly sensitive to institutional contexts, particularly with regard to resource allocation mechanisms, evaluation systems, and administrative coordination processes (Rafols et al., 2021; Leahey et al., 2017). Without such structural support, interdisciplinary initiatives often remain temporary experiments driven by individual enthusiasm rather than sustainable institutional practices. Nevertheless, the comparatively lower levels of transformational leadership and team psychological safety reveal an important developmental challenge. Although institutional structures may create favorable conditions for collaboration, the effectiveness of interdisciplinary teams ultimately

depends on leaders' capacity to cultivate trust, encourage intellectual exploration, and support constructive risk-taking. Transformational leadership has long been identified as a key driver of innovation in knowledge-intensive organizations such as universities (Bass & Riggio, 2006). Likewise, psychological safety has been widely recognized as a foundational condition for team learning and creativity, enabling members to express divergent perspectives and question established assumptions without fear of negative consequences (Frazier et al., 2017). When these socio-psychological mechanisms are insufficiently developed, interdisciplinary collaboration may remain largely coordinative in nature, rather than evolving into deeper forms of knowledge integration. These findings also highlight a structural imbalance between institutional readiness and collaborative capability. While universities in Guangxi have begun to establish the institutional infrastructures necessary to support interdisciplinary collaboration, the development of leadership competencies, communication norms, and collaborative cultures appears to lag behind. Such asymmetry is not uncommon in higher education reform processes, where structural adjustments typically precede deeper cultural transformation (Kezar & Holcombe, 2017). Consequently, the current results may reflect an intermediate developmental stage in the evolution of interdisciplinary collaboration within art disciplines in Guangxi universities. Furthermore, the regional and disciplinary context provides an important lens for interpreting these findings. Universities located in ethnic minority regions often operate at the intersection of cultural heritage preservation, artistic innovation, and emerging digital technologies. In such contexts, interdisciplinary collaboration frequently involves integrating traditional artistic knowledge with contemporary technological tools and industrial applications. This complexity increases the demands placed on leadership and team dynamics, as administrators must navigate not only disciplinary boundaries but also cultural and institutional diversity. Strengthening leadership development and fostering psychologically safe collaborative environments may therefore be particularly critical for enabling interdisciplinary teamwork in art disciplines to progress from initial coordination toward deeper creative integration. Taken together, the results suggest that the

interdisciplinary management environment within art disciplines in Guangxi universities is characterized by a relatively strong strategic orientation and institutional infrastructure, accompanied by emerging but uneven leadership and team interaction dynamics. Theoretically, this study contributes to the growing literature on interdisciplinary collaboration by illustrating how different dimensions of team effectiveness may evolve unevenly across institutional, cognitive, and socio-psychological levels within a specific regional and disciplinary context. Practically, the findings imply that future efforts should move beyond strengthening institutional support structures alone and instead place greater emphasis on cultivating transformational leadership, fostering psychological safety, and developing collaborative cultures that enable sustained interdisciplinary integration and innovation.

Transformational leadership: University administrators appear to demonstrate a relatively strong orientation toward individualized consideration, as reflected in their efforts to provide mentoring, professional guidance, and developmental support tailored to the diverse expertise and career trajectories of team members. Such practices suggest that leaders are attentive to differences in disciplinary background and professional experience, and they actively facilitate reflective dialogue and collaborative learning within interdisciplinary teams. However, behaviors associated with the more symbolic and visionary dimensions of transformational leadership particularly idealized influence and intellectual stimulation appear to be comparatively less developed. From the perspective of transformational leadership theory, idealized influence refers to leaders' ability to act as ethical role models whose consistent values and professional integrity foster trust and collective commitment among followers. In interdisciplinary contexts, where collaboration often involves negotiating diverse epistemological perspectives and professional norms, the presence of value-based leadership becomes particularly important for establishing shared standards of conduct and decision-making. Empirical research in organizational behavior has shown that ethical leadership significantly strengthens trust relationships within teams and facilitates knowledge

exchange and creative collaboration (Javed et al., 2018). The comparatively weaker manifestation of this leadership dimension in the present findings therefore suggests that administrators' capacity to cultivate trust through consistent value demonstration may still require further development, particularly in complex interdisciplinary environments. Similarly, intellectual stimulation another core component of transformational leadership appears to be only partially realized in the current context. Intellectual stimulation involves encouraging team members to question conventional assumptions, explore alternative perspectives, and experiment with innovative approaches to problem solving. In knowledge-intensive environments such as universities, this leadership behavior is widely regarded as a key driver of creativity and innovation. Studies in higher education leadership have demonstrated that transformational leadership practices, particularly those emphasizing intellectual stimulation, can significantly enhance knowledge sharing and innovative behavior among academic staff (Al-Husseini et al., 2019). When leaders actively encourage experimentation and support exploratory thinking, interdisciplinary teams are more likely to integrate diverse knowledge resources and generate novel solutions to complex problems. The limited manifestation of intellectual stimulation observed in the present study may partly reflect the structural and cultural constraints commonly faced by university administrators. Leadership research suggests that even when leaders endorse innovation conceptually, institutional pressures such as performance evaluation systems, administrative workload, and risk-averse organizational cultures may restrict their capacity to actively promote experimentation and challenge established practices. Nevertheless, empirical evidence indicates that transformational leadership remains a critical determinant of innovation in academic organizations, as it directly shapes the psychological climate that enables collaborative creativity and knowledge integration (Azim et al., 2024). In the context of art disciplines, where creative exploration and cross-boundary experimentation are central to knowledge production, the development of stronger intellectual stimulation practices may therefore be particularly important. Another implication of the findings concerns the role of trust and collaborative norms in

sustaining interdisciplinary teamwork. Leadership studies have consistently demonstrated that transformational leadership contributes to the development of trust-based relationships within teams, which in turn strengthen cooperative behavior and collective engagement in innovation processes (Gao et al., 2024). In interdisciplinary environments characterized by diverse disciplinary cultures, such trust-building processes are essential for enabling open dialogue and reducing the perceived risks associated with challenging disciplinary assumptions. Without such relational foundations, interdisciplinary collaboration may remain limited to superficial coordination rather than evolving into deeper forms of knowledge integration. Taken together, the results suggest that strengthening the transformational leadership capacities of university administrators represents an important pathway for enhancing the effectiveness of interdisciplinary collaboration in art disciplines. In particular, leadership development initiatives that emphasize ethical role modeling, intellectual stimulation, and trust-building practices may help administrators create collaborative environments that encourage experimentation, dialogue, and cross-disciplinary learning. Research on leadership and innovation further suggests that when institutions simultaneously provide supportive organizational climates and empower leaders to encourage risk-taking, interdisciplinary teams are more likely to develop sustained innovative capabilities (Hoang et al., 2023). Consequently, the advancement of interdisciplinary collaboration in art disciplines may depend not only on structural reforms but also on the cultivation of leadership practices that legitimize creativity, tolerate uncertainty, and support exploratory knowledge exchange across disciplinary boundaries.

Team psychological safety: University administrators are generally perceived to guide collaborative decision-making in ways that promote inclusion, shared ownership, and equitable participation across disciplines, while also providing emotional and professional support to members facing complex teaching or research pressures. Administrators are also seen to foster respect for team members' disciplinary identities and professional expertise and to normalize constructive

debate within team discussions, thereby reducing the psychological risks associated with speaking up. However, practices such as encouraging interdisciplinary team members to express divergent viewpoints without concern about negative evaluation and offering developmental guidance and supportive feedback in response to setbacks, rather than criticism or blame, appear to be less evident. From the perspective of team psychological safety, the findings indicate that administrators in art disciplines in universities located in ethnic minority regions of Guangxi have begun to demonstrate practical elements of psychological safety in facilitating interdisciplinary collaboration, although its implementation remains uneven. Specifically, administrators appear to have established a relatively solid foundation of relational safety, whereas voice safety and error tolerance remain comparatively underdeveloped. This suggests that while interpersonal trust and respect are present, mechanisms that support deeper forms of collaborative engagement still require strengthening. With regard to voice safety, although administrators demonstrate a basic level of tolerance toward divergent viewpoints, the institutional and interpersonal conditions that encourage team members to openly question existing norms and actively participate in debate have not yet been fully established. Psychological safety research suggests that when team members perceive the interpersonal risks of speaking up to be low, they are more likely to engage in voice behavior, share knowledge, and contribute novel ideas (Frazier et al., 2017; Newman et al., 2017). In interdisciplinary contexts where problem solving depends heavily on integrating diverse disciplinary perspectives the ability to express critical viewpoints without fear of negative evaluation becomes particularly important for fostering team learning and innovation. The relatively cautious communication climate observed in the present study, therefore, indicates that psychological safety mechanisms supporting open expression may still require further institutional and leadership support. In terms of error tolerance, the findings suggest that administrators exhibit a certain willingness to view mistakes as learning opportunities; however, they appear to provide limited developmental guidance and supportive feedback when setbacks occur. Such limitations may restrict the team's capacity for experiential learning and

adaptive improvement. For art disciplines, which rely heavily on experimentation, reflective practice, and creative exploration, insufficient tolerance for errors may discourage risk-taking and reduce the depth of interdisciplinary collaboration. Empirical research on error management climate demonstrates that teams operating in environments characterized by open error communication, learning-oriented feedback, and tolerance for mistakes tend to generate higher levels of creative performance and innovative problem-solving outcomes (Nießen et al., 2022). These findings highlight the importance of cultivating an error-tolerant climate that supports experimentation and iterative learning within interdisciplinary teams. In contrast, the results reveal a relatively strong level of relational safety. Administrators appear capable of providing emotional and professional support while guiding inclusive decision-making processes that acknowledge the expertise and disciplinary identities of team members. Such practices contribute to the development of trust-based relationships, which represent a fundamental prerequisite for effective teamwork. Psychological safety scholarship conceptualizes this relational dimension as the shared belief that the team environment is safe for interpersonal risk-taking, built upon mutual respect and trust among members (Edmondson & Bransby, 2023). Nevertheless, an excessive emphasis on relational harmony without corresponding encouragement of voice and error tolerance may inadvertently produce a collaborative climate that is harmonious but intellectually restrained. Overall, the findings suggest that strengthening administrators' capacities in promoting voice safety and error tolerance represents an important pathway for enhancing the effectiveness of interdisciplinary teamwork. Leadership development initiatives that encourage open dialogue, normalize constructive disagreement, and frame mistakes as opportunities for learning may help create more supportive environments for interdisciplinary collaboration. When such leadership practices are reinforced by institutional mechanisms that legitimize experimentation and reduce the perceived risks of speaking up, interdisciplinary teams are more likely to engage in deeper forms of knowledge exchange, creativity, and collaborative innovation.

To forge shared vision: University administrators are widely perceived to encourage members to support the organization's vision by framing it as meaningful and personally relevant, and they actively foster value resonance by connecting the organizational vision with members' sense of purpose and identity. Administrators are also seen to translate broad strategic goals into clear priorities and actionable expectations for interdisciplinary teams. By comparison, practices such as clearly articulating long-term organizational goals in ways that are easily understood by all members and communicating the organization's future direction in a manner that inspires enthusiasm and collective commitment appear to be less prominent. From the theoretical perspective of shared vision, the findings indicate that administrators in art disciplines in universities located in ethnic minority regions of Guangxi have begun to demonstrate practical characteristics of shared vision in facilitating interdisciplinary collaboration, although its implementation remains uneven. Specifically, administrators appear to perform relatively well in value congruence, while goal clarity and vision-inspiring force remain comparatively less developed. This pattern suggests that while the alignment between organizational values and members' personal beliefs has been established, further improvement is needed in translating strategic intentions into clear and motivating directions. In terms of goal clarity, although administrators demonstrate the capacity to structure and interpret strategic objectives, the articulation of long-term goals is not always sufficiently clear or inspiring for all members. Research on interdisciplinary teamwork indicates that a shared cognitive framework particularly a clear understanding of collective goals and directions plays a crucial role in reducing uncertainty and coordinating collaborative efforts across disciplinary boundaries (Hall et al., 2018). When members possess a consistent understanding of the team's goals and priorities, interdisciplinary collaboration becomes more coherent and purposeful. The current findings suggest that administrators may be relatively effective in translating strategies into operational tasks but less effective in clearly communicating the fundamental direction and long-term purpose of the organization. With regard to vision inspiring force, the results suggest that administrators are able to connect organizational vision

with members' professional development to some extent; however, their capacity to mobilize enthusiasm and motivate members to exert additional effort remains limited. For disciplines such as art and design where intrinsic motivation, passion, and creative engagement are central to professional practice the inspirational dimension of vision communication becomes particularly important. Research on innovation teams has shown that a clearly articulated shared vision not only aligns goals but also enhances members' motivation to contribute creatively and collaboratively to collective objectives (Pearce & Ensley, 2019). Without such inspirational leadership, interdisciplinary collaboration may rely primarily on formal coordination rather than proactive engagement. In contrast, the dimension of value congruence demonstrates the strongest performance. Administrators appear to be effective in aligning organizational vision with members' personal values, professional identities, and beliefs. Such alignment fosters a sense of collective identity and shared commitment, which constitutes an important psychological foundation for teamwork. Studies on multidisciplinary teams have shown that value alignment and shared identification among members can significantly enhance team cohesion and collaborative performance, particularly when members come from diverse disciplinary backgrounds (van der Vegt & Bunderson, 2005). In interdisciplinary contexts, where differences in epistemological perspectives and professional cultures are common, the existence of strong value congruence can help sustain cooperation and mutual trust. Overall, the findings suggest that enhancing administrators' capacities in articulating clear long-term goals and communicating an inspiring organizational vision represents an important pathway for strengthening interdisciplinary teamwork. Leadership research further indicates that visionary leadership, particularly within transformational leadership frameworks, plays a crucial role in fostering organizational commitment and motivating collaborative effort (Banks et al., 2016). By combining the existing strengths in value alignment with clearer strategic communication and stronger inspirational messaging, administrators may further enhance the effectiveness and sustainability of interdisciplinary collaboration within art disciplines across diverse institutional contexts.

Interdisciplinary boundary spanning: University administrators are generally perceived to advocate structural and procedural reforms that support sustained interdisciplinary collaboration, while actively identifying institutional barriers that impede such collaboration and taking initiative to address them. Administrators are also seen to value interdisciplinary reasoning by incorporating diverse disciplinary perspectives into decision-making processes and demonstrating the capacity to integrate concepts, methods, and insights from multiple academic fields. In addition, efforts to establish communication channels that connect members from different disciplinary backgrounds are evident, although these practices appear comparatively less prominent. From the theoretical perspective of interdisciplinary boundary spanning, the findings indicate that administrators in art disciplines in universities located in ethnic minority regions of Guangxi have begun to demonstrate practical characteristics of interdisciplinary boundary spanning in facilitating interdisciplinary teamwork, although the extent of its manifestation remains uneven. Specifically, administrators appear to have established a foundation in institutional boundary spanning, while the levels of cognitive boundary spanning and social boundary spanning remain comparatively limited. This pattern suggests that although organizational structures supporting collaboration have begun to emerge, the human and knowledge integration processes necessary for deeper interdisciplinary cooperation still require further development. In the dimension of cognitive boundary spanning, although administrators demonstrate a basic ability to integrate concepts and methods from multiple disciplines, the expansion of knowledge boundaries and the development of comprehensive interdisciplinary perspectives remain relatively limited. Research on interdisciplinary collaboration indicates that effective boundary spanning requires the ability to translate specialized knowledge across disciplinary communities and to synthesize diverse conceptual frameworks to address complex problems (Akkerman & Bakker, 2011). When leaders are able to understand and reinterpret disciplinary knowledge in ways that are accessible to diverse team members, they facilitate deeper intellectual integration and support the emergence of innovative solutions. The findings of the present study suggest that

administrators' capacities as knowledge translators and interdisciplinary integrators may still need to be strengthened. About social boundary spanning, the results show that although administrators function as social connectors within existing networks, their proactive efforts in establishing new communication channels across disciplinary groups appear relatively limited. Interdisciplinary collaboration research highlights the importance of building relational networks that enable frequent communication and knowledge exchange among members from different disciplinary backgrounds (Cummings & Kiesler, 2005). Without proactive social bridging activities, interdisciplinary teams may experience fragmented communication patterns and information silos, which can weaken the relational foundations necessary for sustained collaboration. In disciplines such as art and design, where tacit knowledge exchange and dialogic interaction play a crucial role in creative practice, the absence of strong social spanning behaviors may significantly constrain collaborative depth. In contrast, the dimension of institutional boundary spanning demonstrates relatively strong performance. Administrators appear capable of identifying structural barriers and advocating organizational reforms that facilitate interdisciplinary cooperation. Such efforts contribute to the development of supportive institutional environments that provide policies, resources, and structural incentives for collaboration. Research in the science of team science literature emphasizes that institutional support structures are critical for enabling interdisciplinary research and teamwork, particularly when they reduce administrative barriers and encourage cross-departmental cooperation (Hall et al., 2018; Stokols et al., 2008). Nevertheless, institutional mechanisms alone cannot guarantee effective collaboration. Without corresponding cognitive and social boundary-spanning capabilities among leaders and team members, formal structures may exist without generating substantive knowledge integration. The findings suggest that enhancing administrators' capacities in cognitive boundary spanning and social boundary spanning represents a key pathway for improving the effectiveness of interdisciplinary teamwork. Leadership development programs that strengthen interdisciplinary knowledge integration skills, cross-disciplinary communication competencies, and proactive relationship-building

practices may help administrators act as effective boundary spanners. When such leadership capabilities complement existing institutional support structures, interdisciplinary teams are more likely to achieve deeper collaboration, knowledge integration, and innovative outcomes across diverse academic contexts.

Role negotiation and clarity: University administrators are generally perceived to sustain team performance by reallocating tasks or reorganizing workflows in response to changing circumstances, and they tend to adjust their responsibilities proactively when team priorities or project conditions shift. Administrators are also perceived to communicate team goals, task expectations, and performance standards clearly to members while maintaining a clear understanding of their own roles and expected contributions within interdisciplinary teams. In addition, they are observed to engage in discussions to refine role allocations in accordance with emerging team needs or project demands, although such practices appear relatively less prominent. From the perspective of role negotiation and clarification, the findings indicate that administrators in art disciplines in universities located in ethnic minority regions of Guangxi have begun to demonstrate practical characteristics of role negotiation and clarification in facilitating interdisciplinary teamwork, although the extent of its manifestation remains uneven. Specifically, administrators appear to have established a certain foundation in collaborative adaptability and role negotiation mechanisms, while the level of role clarity remains comparatively limited. This suggests that although adaptive behaviors are present, the cognitive structure required to guide collaborative work still requires further strengthening. In the dimension of role clarity, although administrators demonstrate a basic ability to understand their own responsibilities and communicate team goals, the clarity regarding the roles and boundaries of other members is not yet fully established. This suggests that a shared understanding of role expectations across team members remains insufficient. In interdisciplinary collaboration, where diverse expertise must be coordinated precisely, a clear understanding of responsibilities and task boundaries is essential for ensuring effective coordination and minimizing potential misunderstandings. Research on team design and effectiveness suggests

that clearly defined roles and task structures help members coordinate their contributions more efficiently and reduce confusion in complex collaborative environments (Humphrey et al., 2007). When such clarity is lacking, teams may experience inefficiencies in task coordination and decision-making processes, particularly when complex collaborative tasks require tightly aligned contributions from multiple disciplines. In the dimension of role negotiation mechanisms, the findings suggest that although administrators have established relatively transparent mechanisms for role reallocation, their proactive involvement in negotiating role adjustments in response to emerging needs appears limited. Effective teamwork often requires continuous negotiation and refinement of responsibilities as project conditions evolve. Research on team dynamics suggests that collaborative coordination is strengthened when team members actively communicate expectations, exchange feedback, and adjust responsibilities through ongoing interaction processes (de Jong et al., 2016). Without such proactive negotiation processes, interdisciplinary teams may find it difficult to fully align members' expertise with collective goals, thereby limiting their responsiveness to complex project demands. Reviews of team effectiveness research further indicate that flexible role coordination and adaptive collaboration mechanisms are essential for managing interdependent tasks in dynamic team environments (Mathieu et al., 2008). With regard to collaborative adaptability, the results indicate relatively strong performance. Administrators appear capable of adjusting their own responsibilities and maintaining team operations when circumstances change. Adaptability has been widely recognized as a crucial capability for teams operating in dynamic environments, requiring both behavioral and cognitive adjustments to respond effectively to emerging challenges (Burke et al., 2006). Subsequent research also highlights that team adaptability is closely associated with the capacity to reorganize roles and coordination patterns when faced with changing project demands or environmental uncertainty (Maynard et al., 2012). However, adaptability alone does not guarantee effective coordination. Without clear role frameworks and structured communication mechanisms, adaptive responses may occur in ways that lack

precision, potentially leading to fragmented efforts rather than coordinated action. The findings suggest that strengthening administrators' capacities in promoting role clarity and facilitating proactive role negotiation represents an important pathway for enhancing interdisciplinary teamwork. Leadership development initiatives that emphasize clear communication of responsibilities, collaborative role adjustment, and structured coordination practices may help establish a more stable operational foundation for interdisciplinary collaboration. When these practices are combined with the existing strengths in collaborative adaptability, interdisciplinary teams are more likely to achieve both flexibility and coordinated effectiveness across diverse institutional contexts.

Institutional support for interdisciplinarity: University administrators are widely perceived to coordinate across institutional units to eliminate procedural barriers that impede interdisciplinary teamwork, and they are seen to establish clear, standardized, and accessible procedures to facilitate interdisciplinary collaboration and project management. Administrators also tend to provide timely technical, administrative, and logistical assistance to sustain interdisciplinary research activities and to ensure that such research receives stable and strategically allocated funding. In comparison, efforts to formulate explicit policies that formally recognize and reward interdisciplinary research contributions appear to be relatively less prominent. From the theoretical perspective of institutional support for interdisciplinarity, the findings indicate that the academic vision of middle-level administrators in art disciplines in universities located in ethnic minority regions of Guangxi is relatively strong in fostering an enabling environment for teamwork, although the structural depth of this support remains uneven. Specifically, administrators appear to have established a solid foundation in operational coordination and procedural design, whereas the development of explicit policy incentives remains comparatively limited. This pattern suggests that although operational conditions for collaboration are largely in place, institutional mechanisms that sustain long-term motivation for interdisciplinary work still require further development. In the dimension of operational coordination, which represents the highest mean, administrators

demonstrate strong capabilities in coordinating across institutional units to remove procedural bottlenecks that hinder interdisciplinary teamwork. Such practices indicate the presence of proactive managerial behaviors aimed at resolving logistical barriers and facilitating smoother collaborative processes. Research on interdisciplinary research collaboration highlights that coordination across administrative units and institutions is essential for reducing structural barriers and improving team efficiency in complex research environments (Cummings & Kiesler, 2007). In interdisciplinary contexts where projects often involve multiple departments and administrative systems, effective operational coordination plays a crucial role in ensuring that collaborative activities proceed without unnecessary procedural obstacles. In the dimension of procedural design, administrators also appear to perform well, demonstrating a strong commitment to designing clear and accessible procedures that guide interdisciplinary collaboration and project management. The presence of standardized procedures can enhance teams' capacity for organized execution by clarifying operational steps and reducing administrative ambiguity. Studies within the science of team science literature indicate that structured communication protocols and clearly defined collaboration processes can significantly improve interdisciplinary teamwork by reducing coordination difficulties and enhancing decision-making efficiency (Hall et al., 2018). For art disciplines, which frequently involve non-linear creative processes and diverse project requirements, accessible procedural guidance can provide a stable framework that supports interdisciplinary cooperation while allowing sufficient flexibility for creative exploration. In the dimension of incentive policy, which reflects the lowest mean, the findings suggest that the development of formal policies recognizing interdisciplinary research contributions remains relatively limited. Although administrators demonstrate a high level of academic vision, the institutional mechanisms necessary to reward interdisciplinary collaboration are not yet fully established. Previous research has shown that interdisciplinary research often faces structural disadvantages within traditional academic evaluation systems, where disciplinary criteria dominate performance assessment and funding allocation (Rhoten

& Parker, 2004). Without explicit recognition and reward mechanisms, scholars may perceive interdisciplinary engagement as risky in terms of career advancement, which may weaken long-term motivation to participate in collaborative research. Furthermore, organizational studies on interdisciplinary research highlight that successful interdisciplinary initiatives often rely on institutional environments that combine structural support, recognition mechanisms, and opportunities for knowledge exchange (Blasiak et al., 2020). When institutions establish supportive policies and provide visible recognition for interdisciplinary achievements, researchers are more likely to sustain long-term collaboration and pursue innovative cross-disciplinary projects. The findings suggest that strengthening administrators' efforts in developing explicit incentive policies represents an important pathway for enhancing the sustainability of interdisciplinary teamwork. By translating the existing strengths in operational coordination and procedural support into concrete institutional reward mechanisms that formally recognize interdisciplinary contributions, universities may further strengthen the long-term vitality and collaborative impact of art disciplines across diverse institutional contexts.

Part 2: The model for developing managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi.

Based on the expert interview findings, this study proposes a model for enhancing the managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi. Rather than treating expert suggestions as isolated managerial techniques, the model integrates them into a coherent governance framework that addresses leadership, team dynamics, vision alignment, boundary spanning, role coordination, and institutional support in an interconnected manner.

To cultivate transformational leadership, the measures of transformational leadership include establishing communication mechanisms to break down disciplinary barriers and build a shared language; implementing dual-leadership structures to balance authority between different disciplines; adopting an outcome-

oriented approach to align standards and values; designing personalized career development pathways and providing targeted training resources; fostering informal interaction to build emotional bonds across disciplines; offering sabbaticals and flexible work arrangements to reduce pressure and enhance motivation; encouraging leaders to learn from other fields in order to demonstrate respect and reduce disciplinary bias; providing seed funding to support early-stage experimentation; inviting external experts to provide objective perspectives when consensus becomes difficult; and creating dedicated coordination units to manage collaboration and resolve conflicts. These measures reflect the understanding that interdisciplinary collaboration requires leadership mechanisms that extend beyond individual influence and become institutionalized organizational practices. The proposed strategies embed communication structures, distributed authority, and outcome-oriented coordination into formal governance arrangements to reduce dependence on individual leaders, mitigate disciplinary bias, and stabilize collaborative processes. By fostering shared language, emotional trust, flexible work arrangements, and individualized support, these practices enhance motivation, adaptability, and team cohesion. Institutional tools such as coordination units, seed funding, and external consultation further strengthen organizational resilience and enable sustainable interdisciplinary collaboration, particularly in contexts where resources are constrained. This perspective is consistent with the foundational theory of transformational leadership, which emphasizes idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration as the core dimensions through which leaders inspire and guide organizational change (Bass, 1985). These dimensions are particularly relevant in interdisciplinary environments, where leaders must articulate a compelling vision, encourage innovative thinking, and support the diverse needs of team members. The proposed measures also align with research on psychological safety in collaborative work environments, which highlights that open communication and mutual respect enable individuals to share ideas and learn across disciplinary boundaries without fear of negative consequences (Edmondson, 1999). In addition, the design of dual-leadership structures reflects the

logic of shared leadership, where leadership responsibilities are distributed across team members to improve coordination and collective problem solving in complex team settings (Hoch & Kozlowski, 2014). Furthermore, digital leadership research demonstrates that modern leadership increasingly relies on technology-enabled communication and flexible organizational arrangements to enhance collaboration and individualized support for employees (Bartsch et al., 2021). In interdisciplinary teams that operate across organizational boundaries, digital tools and flexible working arrangements can significantly improve communication efficiency and knowledge exchange. Finally, studies on team adaptation emphasize that teams operating in uncertain and complex environments must continuously adjust their coordination mechanisms and behavioral strategies in response to changing conditions (Burke et al., 2006). In interdisciplinary collaboration, such adaptability requires clear coordination structures, flexible leadership arrangements, and supportive institutional mechanisms to maintain alignment between diverse expertise and evolving project goals.

To foster team psychological safety, the measures for fostering team psychological safety include treating setbacks as learning opportunities through structured reviews; prohibiting negative language to create a safe atmosphere for brainstorming; using anonymous communication channels to ensure that all members can express their views freely; introducing neutral third parties to resolve internal conflicts objectively; focusing critiques on issues rather than individuals in order to protect personal dignity; rotating speaking opportunities to ensure that every voice is heard; protecting and publicly acknowledging constructive opposing views; highlighting success stories to demonstrate that failure is acceptable; providing counseling support to safeguard members' psychological well-being; organizing team-building activities to strengthen trust and interpersonal harmony; using team charters and transparent communication practices to establish mutual trust; and setting up formal procedures to mediate conflicts promptly. These measures reflect the understanding that team psychological safety provides a fundamental condition for sustained collaboration and knowledge integration in interdisciplinary teams. In art-

related interdisciplinary contexts, substantial differences in disciplinary paradigms and evaluation standards increase the psychological risks associated with expressing divergent views or engaging in innovative experimentation. The proposed measures, therefore, institutionalize communication norms, conflict mediation procedures, and failure-tolerant practices to reduce defensive behaviors and latent tensions. By reframing failure as a learning opportunity and ensuring equal participation in discussions, these mechanisms strengthen trust, reduce risk avoidance, and create a secure environment that supports open dialogue and creative exploration. Such institutional arrangements also contribute to emotional well-being and equitable participation, which are particularly important in organizational contexts where hierarchical traditions may discourage open disagreement. This perspective is consistent with research on team learning and psychological safety, which demonstrates that individuals are more willing to report errors, ask questions, and share novel ideas when they feel safe from interpersonal risk (Edmondson, 1999). Psychological safety allows teams to treat mistakes as opportunities for collective learning rather than sources of blame, thereby enhancing experimentation and knowledge sharing. Subsequent studies further show that high-quality interpersonal relationships and mutual respect within teams can strengthen learning behaviors and encourage open communication among members (Carmeli et al., 2009). In addition, comprehensive reviews of psychological safety research indicate that this construct plays a central role in enabling the expression of diverse perspectives and supporting innovation within collaborative teams (Newman et al., 2017). When team members perceive a safe environment for dialogue, they are more likely to contribute unique disciplinary knowledge and engage in constructive debate, which is essential for interdisciplinary integration. Finally, leadership studies in digital and crisis contexts also highlight the importance of supportive communication, empathy, and individualized attention in strengthening employees' psychological security and sense of belonging (Bartsch et al., 2021). Together, these findings suggest that institutionalizing practices that protect interpersonal trust and encourage open participation is essential for enabling effective interdisciplinary collaboration.

To forge shared vision, the measures for fostering shared vision include combining top-down and bottom-up inputs to co-create the vision; visualizing strategic roadmaps to clarify goals and next steps; using storytelling to emotionally engage and motivate members; translating the vision into actionable task lists; holding regular meetings to correct deviations and maintain strategic focus; using external benchmarks to facilitate internal consensus; celebrating milestones to reinforce confidence in the vision; linking collective goals to individual benefits to strengthen engagement; periodically assessing progress and revising the vision when necessary; using digital media to expand the reach of the vision; and sharing updates regularly to ensure transparency and alignment. These measures reflect the understanding that a shared vision provides essential directional guidance and value integration for interdisciplinary teams, particularly in contexts where disciplinary paradigms and professional priorities differ substantially. By constructing the vision through both top-down and bottom-up processes, the proposed practices align organizational objectives with the developmental needs of individual members, thereby strengthening commitment and identification with interdisciplinary collaboration. Operationalizing the vision through strategic roadmaps, phased goals, and alignment mechanisms transforms it from an abstract aspiration into a practical framework that facilitates coordination and reduces value conflicts across disciplinary boundaries. Treating vision construction as a dynamic and negotiated process allows teams to develop minimal consensus while accommodating diverse disciplinary perspectives. In learning organization theory, shared vision is considered a fundamental element that motivates members to pursue common goals beyond their individual interests and fosters collective learning within organizations (Senge, 1990). When individuals participate in shaping the vision, they are more likely to internalize collective goals and contribute actively to collaborative initiatives. Empirical research also suggests that shared vision plays a central role in facilitating innovation and cooperation in collaborative teams. In particular, studies of innovation teams demonstrate that a clearly articulated and collectively endorsed vision strengthens commitment, improves coordination, and enhances team creativity

(Pearce & Ensley, 2004). When members understand the broader purpose of their collaborative efforts, they are more willing to align their expertise with shared objectives and sustain engagement throughout complex projects. Research on vision-based leadership further highlights that a compelling organizational vision can integrate diverse values and provide long-term direction for collective action (Kantabutra & Avery, 2010). A well-communicated vision helps guide decision-making and promotes alignment across organizational units, which is particularly important in interdisciplinary environments where professional perspectives and evaluation standards may differ. More recent organizational research also indicates that vision clarity contributes to employees' understanding of organizational purpose and improves strategic alignment across teams (Carton et al., 2014). When members clearly understand how their work contributes to broader organizational goals, they are more likely to demonstrate initiative and maintain commitment to collaborative tasks. Studies on job crafting and sustainable employability show that when organizational goals are clearly connected to employees' personal development opportunities, individuals are more likely to actively shape their work roles and remain committed to long-term organizational objectives (Gürbüz et al., 2022). By linking collective vision with individual aspirations, organizations can strengthen motivation and sustain engagement in interdisciplinary collaboration. These findings suggest that building and sustaining a shared vision requires both strategic clarity and continuous communication. Through participatory vision development, structured implementation pathways, and mechanisms that link collective goals with personal development, interdisciplinary teams can strengthen alignment, maintain motivation, and sustain collaboration in complex institutional environments.

To expand interdisciplinary boundary spanning, The measures for expanding interdisciplinary boundary spanning include using project-based models to regulate cross-disciplinary inputs; standardizing workflows to reduce communication costs; appointing liaison roles to bridge gaps and translate disciplinary terminology; requiring co-produced outputs to ensure genuine integration; integrating workspaces to encourage high-frequency interaction; identifying shared focal points, such as user

needs, to integrate diverse knowledge; employing prototyping to build consensus around shared artifacts; documenting problems and solutions to develop organizational memory; creating platforms for sharing cross-disciplinary knowledge; developing integrated curricula to cultivate interdisciplinary talent; establishing laboratories and research centers to support collaborative research; and implementing structured programs to strengthen interdisciplinary skills. These measures reflect the understanding that interdisciplinary collaboration is often constrained not by resource limitations but by communication breakdowns, cognitive differences, and collaborative frictions arising from disciplinary boundaries. The proposed strategies therefore establish structured project workflows, boundary-spanning roles, and shared working frameworks that reduce communication costs and facilitate knowledge integration. By introducing shared language, intermediary coordination, and jointly produced outputs, these mechanisms transform disciplinary boundaries from barriers into productive sources of innovation. Research on knowledge boundaries suggests that effective interdisciplinary collaboration requires mechanisms that enable teams to translate and integrate knowledge across different epistemic communities. Structured processes, shared representations, and collaborative problem-solving tools help reduce misunderstandings and enable knowledge to move across disciplinary boundaries (Carlile, 2004). When such mechanisms are institutionalized, interdisciplinary collaboration becomes less dependent on individual expertise and more embedded within organizational practices. Studies on boundary-spanning competence further indicate that individuals occupying intermediary roles can facilitate communication between groups with different professional backgrounds by translating knowledge, negotiating meanings, and aligning perspectives (Levina & Vaast, 2005). These boundary spanners play a crucial role in coordinating interdisciplinary collaboration, particularly when participants possess diverse conceptual frameworks and specialized technical languages. In addition, research on multi-institutional collaboration demonstrates that coordination mechanisms and structured communication processes are essential for managing complex interdisciplinary projects. Without such coordination structures,

teams may experience increased communication costs and reduced project performance (Cummings & Kiesler, 2007). Formalized collaboration procedures and clearly defined workflows therefore help maintain efficiency in interdisciplinary environments. Network research also highlights that actors occupying brokerage positions between otherwise disconnected groups often play a critical role in facilitating innovation. By connecting distinct knowledge domains, these intermediaries enable the recombination of ideas and the generation of novel solutions (Fleming & Waguespack, 2007). In interdisciplinary contexts, such brokerage mechanisms support knowledge integration and stimulate creative collaboration. Taken together, these findings indicate that institutionalizing boundary-spanning mechanisms through project structures, liaison roles, shared tools, and collaborative platforms can transform disciplinary diversity into a productive resource for innovation. In art-related interdisciplinary environments, integrative practices such as prototyping, design thinking, and project-based collaboration further help bridge differences between artistic and technological perspectives, enabling interdisciplinary collaboration to become both concrete and sustainable.

To clarify role negotiation and clarity, the measures of clarity in role negotiation include allowing members to claim tasks based on their interests and expertise; converting teamwork time into recognized workload credits; permitting dual affiliations to reduce role conflicts; shifting leadership responsibilities according to project stages to avoid power struggles; establishing formal agreements that clarify duties and benefits; holding regular meetings to fine-tune task allocation; allowing flexible participation that accommodates individual strengths; assigning mentors to support role adaptation; maintaining a talent pool to provide expertise when needed; and rewarding high-performing teams to sustain collaborative motivation. These measures reflect the understanding that role ambiguity and unclear responsibilities often generate conflict, inefficiency, and identity tension within interdisciplinary teams. The proposed strategies therefore establish flexible yet structured mechanisms such as modular task allocation, phased leadership rotation, and formal contribution agreements to ensure that role boundaries remain clear

while allowing dynamic adjustments according to project needs and individual competencies. Continuous role negotiation enables teams to align responsibilities with expertise, strengthen perceptions of procedural fairness, and support equitable participation, particularly in interdisciplinary contexts where contributions may be difficult to evaluate through standardized metrics. Recent organizational research highlights that role clarity is a critical factor influencing employees' proactive behavior and engagement. When individuals clearly understand their responsibilities, authority, and expected outcomes, they are more likely to take initiative and contribute actively to team objectives (Lan et al., 2025). Conversely, role ambiguity can reduce engagement and hinder collaborative performance because individuals become uncertain about expectations and accountability (Caillier, 2021). Studies on distributed and interdisciplinary teamwork further demonstrate that role clarity plays a mediating role in coordinating task interdependence and improving team performance. Clear definitions of responsibilities allow team members to understand how their work relates to others, facilitating smoother coordination and reducing misunderstandings across disciplinary or organizational boundaries (Krumm et al., 2021). In complex project environments, insufficient role definition can also lead to identity tensions and conflicting expectations, particularly when individuals occupy hybrid or boundary-spanning positions. Research on agile and hybrid project structures shows that unclear role definitions create tensions between managerial authority and collaborative responsibilities, which can undermine team effectiveness if not addressed through explicit role negotiation mechanisms (Lundin & Söderlund, 2024). Interdisciplinary team research suggests that structured role clarification processes such as formal role descriptions, regular communication, and coordination mechanisms are essential for integrating diverse expertise and preventing duplication of tasks. These practices enable teams to develop a shared understanding of responsibilities and maintain coordination across different professional domains (Henson et al., 2020). Taken together, these findings indicate that establishing adaptive mechanisms for role negotiation such as workload recognition, mentoring systems, flexible participation structures, and performance incentives can reduce

identity conflicts and improve collaborative efficiency. By balancing structural clarity with flexibility, interdisciplinary teams can maintain stable coordination while still adapting to evolving project demands.

To refine institutional support for interdisciplinarity, the measures for refining institutional support for interdisciplinarity include creating funding programs for high-risk exploratory projects; recognizing diverse outputs such as patents, artistic works, and applied innovations within evaluation systems; assembling diverse review panels to ensure balanced and fair assessments; providing sustained funding for high-performing interdisciplinary teams; allowing teams to retain revenue for reinvestment; quantifying individual contributions to ensure equitable rewards; granting strategic privileges to key interdisciplinary platforms; concentrating resources on priority interdisciplinary research areas; building infrastructure such as laboratories and research centers to support collaboration; organizing training programs for interdisciplinary talent; standardizing management procedures for effective oversight; and increasing the visibility of interdisciplinary outcomes through exhibitions and public dissemination. These measures reflect the understanding that institutional support provides the structural conditions necessary for interdisciplinary collaboration to evolve from short-term experimentation into sustained and routinized practice. The proposed strategies, therefore, establish stable funding mechanisms, diversified evaluation systems, and collaborative infrastructure that create a supportive environment and incentive structure for interdisciplinary teams. Such institutional arrangements reduce reliance on individual administrative efforts, enhance long-term sustainability, and embed interdisciplinary collaboration within routine university governance structures. Research on scientific collaboration demonstrates that large-scale interdisciplinary research often depends on institutional frameworks capable of coordinating resources, infrastructures, and collaborative networks across organizational boundaries. Stable governance mechanisms and long-term institutional support enable interdisciplinary teams to maintain continuity and overcome coordination challenges that commonly arise in complex collaborative projects (Wagner et al., 2019). Open research infrastructures

also play a critical role in enabling interdisciplinary collaboration. Studies on global data-sharing practices indicate that standardized data management systems and digital research infrastructures significantly improve knowledge exchange and facilitate collaboration across disciplinary communities (Tenopir et al., 2021). These systems provide the informational foundation required for integrating heterogeneous knowledge and evaluating collaborative outcomes. Innovation system research further highlights the importance of institutional coordination mechanisms that connect universities, research organizations, and broader knowledge ecosystems. Institutionalized collaboration platforms and coordinated research infrastructures can enhance knowledge flow and strengthen the capacity for interdisciplinary innovation (Leydesdorff & Ivanova, 2021). Evaluation systems represent another crucial institutional factor shaping interdisciplinary collaboration. Traditional disciplinary assessment models often fail to capture the integrative nature of interdisciplinary work, leading to potential biases in funding and promotion decisions. Empirical studies, therefore emphasize the importance of adapting research evaluation systems to recognize diverse outputs and collaborative contributions (Abramo et al., 2020). In addition, governance research on peer review highlights that diversified evaluation panels and transparent review procedures help improve fairness and legitimacy within academic evaluation systems (Langfeldt & Kyvik, 2021). Taken together, these findings indicate that institutional reforms in funding structures, evaluation mechanisms, and research infrastructures are essential for sustaining interdisciplinary collaboration. By embedding interdisciplinary support within university governance systems, institutions can create stable environments in which leadership practices, psychological safety, and collaborative mechanisms operate effectively, enabling interdisciplinary research to become a routine and sustainable component of academic activity.

Part 3: The suitability and feasibility of the model for developing managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi.

Based on data collected through focus group seminars and expert consultations, this study evaluated the suitability and feasibility of the proposed interdisciplinary teamwork model for art disciplines in universities situated in ethnic minority regions of Guangxi. The results of the focus group discussion indicated that the experts largely agreed that the model is both suitable and feasible for promoting interdisciplinary teamwork in this context.

To cultivate transformational leadership: Focus group discussions across universities indicated a strong consensus that transformational leadership is highly suitable and feasible for interdisciplinary teamwork in art disciplines in Guangxi. Experts emphasized that decentralized coordination, informal communication channels, and intellectual stimulation are particularly compatible with the cultural ethos of art institutions, where faculty members typically value autonomy and creative freedom. In such contexts, leadership that relies primarily on administrative authority may encounter resistance, whereas transformational leadership is more likely to mobilize intrinsic motivation and voluntary collaboration among creative professionals. These observations are consistent with leadership research indicating that transformational leadership is particularly effective in knowledge-intensive and creative organizations. In such environments, employees often respond more strongly to value-based inspiration, intellectual stimulation, and individualized support than to hierarchical control. Empirical studies demonstrate that transformational leadership contributes significantly to employee creativity, engagement, and collaborative behavior in complex organizational contexts (Lee et al., 2020). The discussions also highlighted the importance of establishing interdisciplinary “bilingual” communication mechanisms, such as shared glossaries and standardized documentation systems, to bridge gaps among artists, technologists, and scholars working on projects such as the digital preservation of intangible cultural heritage. Experts noted that communication barriers frequently arise not from conceptual disagreements but from differences in disciplinary language and documentation practices. For example, engineering teams often rely on flowcharts and Gantt charts, whereas art faculty frequently communicate through

sketches and narrative descriptions. Establishing standardized communication frameworks, therefore, becomes a critical leadership responsibility in interdisciplinary environments. Research on collaborative team science similarly emphasizes that effective interdisciplinary collaboration requires shared communication infrastructures and structured coordination mechanisms that enable participants to translate knowledge across disciplinary boundaries. Such mechanisms help align research practices, terminology, and methodological expectations among diverse participants, thereby improving coordination efficiency and knowledge integration (Hall et al., 2018). Experts further recommended complementing inspirational leadership with standardized project management tools, especially in collaborations with engineering universities, in order to improve coordination efficiency while respecting artistic autonomy. Rather than replacing artistic flexibility with rigid procedures, the goal is to develop hybrid governance mechanisms in which inspirational leadership coexists with structured coordination systems. From a governance perspective, this hybrid model balances the exploratory nature of artistic creativity with the procedural requirements of technologically complex projects. These insights are also supported by contemporary leadership research showing that collective and shared leadership arrangements strengthen collaboration, knowledge sharing, and adaptive problem-solving in complex organizational settings (Ospina et al., 2020). In addition, meta-analytic studies confirm that leadership styles emphasizing empowerment, ethical guidance, and vision communication significantly improve team coordination and performance beyond traditional hierarchical leadership models (Hoch et al., 2018). Transformational leadership in the proposed model functions as a key governance mechanism that balances academic autonomy, creative culture, and cross-sector collaboration. In the context of art disciplines, its significance lies not only in motivating individuals but also in shaping an organizational climate that legitimizes experimentation and encourages cross-disciplinary dialogue.

To foster team psychological safety: Experts consistently confirmed that team psychological safety is a critical condition for interdisciplinary collaboration in art disciplines. In creative environments where originality and authorship are highly

valued, faculty members may hesitate to express dissenting views or unconventional ideas if they fear reputational risks. Psychological safety, therefore, becomes particularly important for enabling open dialogue and constructive disagreement within interdisciplinary teams. Given the strong emphasis on authorship and individual reputation in artistic communities, experts suggested adapting anonymous suggestion mechanisms into a “signed-but-protected” system that allows faculty members to express dissenting views while ensuring protection against retaliation. This mechanism preserves the recognition associated with authorship while still safeguarding individuals from potential negative consequences. Similar hybrid mechanisms have been observed in collaborative innovation environments, where identity transparency combined with institutional protection enhances both accountability and psychological safety (Edmondson & Lei, 2014). In addition, experts proposed implementing creative protection periods during brainstorming sessions to prevent premature criticism and encourage unconventional ideas, especially in engineering-dominated environments where rational evaluation may otherwise suppress artistic creativity. For instance, during the initial stage of brainstorming, negative evaluation may be temporarily restricted so that diverse ideas can emerge before analytical assessment begins. This approach reflects research on group creativity, suggesting that separating idea generation from evaluation helps increase the quantity and diversity of ideas produced during collaborative brainstorming (Kohn & Paulus, 2017). Such mechanisms were viewed as highly feasible because similar flexible working arrangements and artistic sabbaticals are already practiced in some universities. These institutional precedents indicate that art institutions often possess a cultural foundation that supports flexible experimentation and open communication. These observations are also supported by empirical research demonstrating that psychological safety promotes knowledge sharing, innovative behavior, and team learning in collaborative environments. Meta-analytic studies confirm that psychological safety positively influences employee voice behavior, creativity, and team performance (Newman et al., 2017; Frazier et al., 2017). Consequently, team psychological safety in the proposed model functions as the

socio-emotional foundation that enables open dialogue, creative experimentation, and collaborative risk-taking. Without such a foundation, even well-designed interdisciplinary structures may fail to generate genuine intellectual exchange.

To forge shared vision: The focus groups widely agreed that a shared vision is both necessary and feasible for guiding interdisciplinary teamwork in art disciplines, but emphasized that the vision must be translated into concrete tasks to mobilize faculty participation. In academic environments where faculty members face heavy teaching and research responsibilities, abstract institutional slogans rarely generate sustained engagement. Translating the vision into tangible objectives, such as developing new interdisciplinary courses, producing digital cultural products, or publishing collaborative research, can significantly increase participation. Experts suggested that vision statements should emphasize artistic innovation as the core identity of art institutions while simultaneously incorporating broader social goals such as aesthetic education development, rural revitalization, and cultural heritage preservation. Maintaining this artistic core is particularly important because excessive emphasis on technology or industrial transformation may lead faculty to perceive interdisciplinary initiatives as external to the mission of art institutions. Another important suggestion was to align interdisciplinary initiatives with the needs of primary and secondary school aesthetic education and regional development policies. Such alignment can strengthen both external legitimacy and internal motivation, as faculty members are more likely to support initiatives that clearly contribute to educational and social development. In regions like Guangxi, where cultural heritage and rural revitalization are prominent policy priorities, interdisciplinary art projects can serve as an important bridge between universities and local communities. These findings correspond with research indicating that shared vision enhances organizational alignment, collaboration, and innovation outcomes when it is translated into actionable objectives (Carton et al., 2014; Berson et al., 2015). Moreover, studies on organizational leadership and strategic management suggest that shared vision fosters collective commitment and coordinated action by aligning individual motivations with broader institutional goals,

thereby strengthening collaboration and long-term performance (Kantabutra & Avery, 2017). Thus, shared vision within this model functions as a strategic integrative mechanism that connects institutional identity, faculty motivation, and regional development priorities. Linking artistic innovation with social impact, it helps interdisciplinary teams maintain both academic legitimacy and public relevance.

To expand interdisciplinary boundary spanning: Experts strongly endorsed the mechanisms proposed for interdisciplinary boundary spanning, particularly milestone-based coordination, joint curriculum development, and collaborative seminars, which are already practiced in some teacher-training universities through virtual teaching and research communities. These mechanisms create regular opportunities for interaction across disciplinary boundaries, thereby facilitating knowledge exchange and collaborative problem-solving. Experts also emphasized the need for standardized collaboration tools such as project management software, technical salons, and demonstration sessions to facilitate communication between disciplines with different epistemological traditions. Standardized tools not only improve efficiency but also establish shared working routines, which can reduce misunderstandings and coordination costs in interdisciplinary projects. Furthermore, experts suggested incorporating technological ethics review mechanisms into interdisciplinary projects to address emerging issues related to artificial intelligence, copyright, and algorithmic bias in art–technology integration. As digital technologies become increasingly embedded in artistic production, ethical considerations are likely to become a central issue in interdisciplinary collaboration. Establishing ethical review mechanisms involving scholars from the humanities and social sciences can therefore help ensure responsible innovation. These insights are consistent with interdisciplinary research indicating that boundary-spanning structures and collaborative governance mechanisms significantly enhance knowledge integration and innovation performance in complex research environments. Studies on interdisciplinary team science emphasize that structured collaboration platforms and integrative coordination mechanisms facilitate communication across disciplinary cultures and improve the effectiveness of knowledge integration within research

teams (Hall et al., 2018). Research on interdisciplinary expertise further demonstrates that structured coordination platforms and integrative collaboration processes are essential for translating heterogeneous knowledge into coherent research outcomes (Bammer et al., 2020). Accordingly, interdisciplinary boundary spanning in this model acts as the structural interface through which diverse knowledge domains can effectively interact and co-produce new forms of artistic and technological innovation. It provides the organizational infrastructure necessary for transforming disciplinary diversity into collaborative advantage.

To clarify role negotiation and clarity: Experts confirmed that clear role negotiation and clarification are essential for effective interdisciplinary teamwork. When participants from different disciplines collaborate without clear expectations, misunderstandings and conflicts are likely to arise, particularly regarding task allocation and recognition of contributions. In practice, experts recommended milestone-based role allocation, where artistic faculty lead the conceptual design stage and engineering specialists take over during technical implementation. This staged collaboration model reflects the natural workflow of many art–technology projects and allows each discipline to contribute its strengths at the most appropriate phase. Experts also emphasized the importance of outcome-oriented workload calculation systems and project-based collaboration instead of rigid time-based evaluation. In creative and intellectual work, it is often difficult to quantify productivity in terms of working hours. An outcome-oriented approach, therefore, provides a more realistic method for evaluating contributions. Additionally, mentorship systems involving external experts were proposed as a more feasible alternative to formal dual-appointment systems in specialized art institutions. Project-based mentorship arrangements can provide access to technical expertise without requiring complex administrative procedures associated with joint appointments. These suggestions are consistent with contemporary research showing that role clarity and negotiated task structures significantly reduce conflict and improve collaboration in interdisciplinary teams (Stokols et al., 2018). Research on team effectiveness further demonstrates that clearly defined team roles and

structured coordination mechanisms enhance collaboration quality and collective performance in complex project environments (Humphrey et al., 2017; Mathieu et al., 2019). Therefore, role negotiation and clarification in the proposed model function as a governance mechanism that aligns individual expertise with project phases and ensures equitable distribution of responsibilities and rewards.

To refine institutional support for interdisciplinarity: Experts generally agreed that institutional support mechanisms are essential for sustaining interdisciplinary collaboration in art disciplines. Without stable policy frameworks and resource allocation systems, interdisciplinary initiatives often remain temporary experiments rather than long-term institutional practices. They supported measures such as rolling performance evaluation systems, seed funding, and flexible working arrangements, but also emphasized the need for context-sensitive adjustments. In particular, experts recommended establishing a dual evaluation system to distinguish between pure artistic research and interdisciplinary applied projects. For example, exhibitions and artistic awards may serve as evaluation indicators for traditional artistic creation, whereas industrial transformation or technological outputs may be used for interdisciplinary projects. Experts also proposed implementing pilot reform programs with clear audit and fault-tolerance mechanisms for innovation funding. Such mechanisms can reduce the perceived risks associated with experimental interdisciplinary projects while maintaining financial accountability. Another suggestion was to allocate a defined proportion of project revenue to team development funds, which can support further collaborative research and capacity building. This approach reflects practices commonly used in science and engineering disciplines to sustain research teams. Finally, experts suggested incorporating teaching outcomes and student learning benefits as evaluation indicators to ensure alignment with educational missions. Because interdisciplinary collaboration often produces new teaching materials, courses, and learning experiences, recognizing these outcomes can strengthen faculty motivation to participate. These recommendations are consistent with higher education research demonstrating that institutional incentives, funding structures, and governance mechanisms strongly

influence interdisciplinary collaboration and research productivity. Studies show that interdisciplinary research is particularly sensitive to funding design and evaluation criteria, which can either encourage or discourage cross-disciplinary collaboration (Bromham et al., 2016; Youtie & Shapira, 2017). Research on academic collaboration further indicates that institutional policies and reward systems significantly shape scholars' willingness to engage in interdisciplinary research (Leahey et al., 2017). Consequently, institutional support serves as the macro-level structural foundation of the model, ensuring that interdisciplinary teamwork is supported by stable policies, resources, and evaluation systems.

Recommendations

Implications

1. Cultivating transformational leadership: Administrators should prioritize transformational leadership. They must act as ethical role models, institutionalize communication, and co-create shared visions. Implementing outcome-oriented governance with incentives and providing trial-and-error space are vital to enhancing leadership charisma and motivating teams.

2. Fostering team psychological safety: Administrators should prioritize fostering team psychological safety. They must institutionalize failure-learning mechanisms to protect innovation. Establishing non-judgmental norms and procedural safeguards ensures equal voice. Formalizing conflict management reduces authority pressure and enhances team innovation.

3. Forging shared vision: Administrators should prioritize forging a shared vision. They must co-create visions via participatory processes and translate them into roadmaps. Sustaining vision through communication and establishing alignment mechanisms are essential. Leveraging external references reinforces consensus and enhances team legitimacy.

4. Expanding interdisciplinary boundary spanning: Administrators should prioritize expanding interdisciplinary boundary spanning. They must institutionalize boundary-spanning roles within project-based structures. Establishing shared

languages and co-produced output standards is essential. Promoting co-location facilitates knowledge translation and effective integration.

5. Clarifying role negotiation and clarity: Administrators should prioritize clarifying role negotiation and clarity. They must establish flexible negotiation mechanisms and institutionalize fair contribution recognition. Clarifying authority and formalizing attribution rules are essential. Mitigating role conflicts through appointments enhances team efficiency and collaboration.

6. Refining institutional support for interdisciplinarity: Administrators should refine institutional support by establishing seed funding and reforming evaluation systems. Ensuring fairness through pluralistic review and providing sustained funding are essential. By building stable platforms, administrators can create incentive loops and foundational infrastructures.

Future Researches

1. This study used a cross-sectional design. Future research should employ longitudinal methods to track team evolution. Analyzing how leadership and support changes impact long-term effectiveness would offer insights. Specifically, tracking “structural consistency with pathway differentiation” would reveal deeper sustainability mechanisms for collaboration.

2. Future research should explore how AI and the Metaverse influence team dynamics. Investigating virtual environments’ impact on knowledge integration is key. Determining if digital transformation alters traditional variables’ weight would be a timely contribution to understanding interdisciplinary collaboration.

3. With psychological safety as a bottleneck, future studies should focus on emotional intelligence and well-being. Examining how emotional states affect risk-taking is crucial. Additionally, exploring interventions to prevent burnout in high-demand environments would be practically valuable for sustaining innovation.

4. Developed in university art contexts, the model needs validation in non-artistic and non-university settings. This testing will determine if the emphasis on artistic identity is essential or if the model generalizes to other complex, ambiguous knowledge domains.

5. Research should quantify the “depth of integration” beyond co-publication counts. Developing metrics for novelty and transformative potential is needed. Measuring concept blending and paradigm shifts would provide empirical evidence for moving from “physical patchwork” to “chemical reactions.”

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Appendices

Appendix A
List of Specialists and Letters of Specialists Invitation
for IOC Verification

List of Specialists and Letters of Invitation for IOC Verification

NO.	Name	Professional title	Workplace
1	Mo Fujian	Professor	Guangxi Art University
2	Lei canming	Professor	Guangxi Art University
3	Ma Quanfu	Professor	Guangxi Art University
4	Wu Yin	Professor	Guangxi Normal University
5	Zhang jun	Professor	Guilin University of Technology



Ref.No. MHESI 0643.14/1091

Bansomdejchaopraya Rajabhat University
1061 Itsaraphap Hiranruchi
Thonburi Bangkok 10600

11 December 2025

RE: Invitation to validate research instrument

Dear Professor Dr.Mo Fujian

Mrs.Liu Jia is a graduate student in Doctor of Philosophy Program in Educational Administration of Bansomdejchaopraya Rajabhat University. She is undertaking research entitle "Development of a Managerial Effectiveness Model for Interdisciplinary Teamwork in Art Disciplines of Universities in Ethnic Minority Regions in Guangxi"

The thesis adversity committee has considered that you are an expert in this topic. Your recommendations would be useful for further improvement of this research instrument.

With your expertise, we would like to ask your permission to validate the attached research instrument. Would like to avail ourselves of this opportunity to express our sincere thanks and appreciation for your help.

Sincerely,

Assistant Professor Dr.Tanaput Chanchaen
(Vice Dean of Graduate School for Dean of Graduate School)

Bansomdejchaopraya Rajabhat University
Tel.+662-473-7000
www.bsru.ac.th
E-mail: grad@bsru.ac.th



Ref.No. MHESI 0643.14/1083

Bansorndejchaopraya Rajabhat University
1061 Itsaraphap Hirannuchi
Thonburi Bangkok 10600

11 December 2025

RE: Invitation to validate research instrument

Dear Professor Dr.Lei Canming

Mrs.Liu Jia is a graduate student in Doctor of Philosophy Program in Educational Administration of Bansorndejchaopraya Rajabhat University. She is undertaking research entitle "Development of a Managerial Effectiveness Model for Interdisciplinary Teamwork in Art Disciplines of Universities In Ethnic Minority Regions in Guangxi"

The thesis adversity committee has considered that you are an expert in this topic. Your recommendations would be useful for further improvement of this research instrument.

With your expertise, we would like to ask your permission to validate the attached research instrument. Would like to avail ourselves of this opportunity to express our sincere thanks and appreciation for your help.

Sincerely,

Assistant Professor Dr.Tanaput Chanchaoren
(Vice Dean of Graduate School for Dean of Graduate School)

Bansorndejchaopraya Rajabhat University

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Ref.No. MHESI 0643.14/1094

Bansorndejchaopraya Rajabhat University
1061 Itsaraphap Hiranruchi
Thonburi Bangkok 10600

11 December 2025

RE: Invitation to validate research instrument

Dear Professor Dr.Ma QuanFu

Mrs.Liu Jia is a graduate student in Doctor of Philosophy Program in Educational Administration of Bansorndejchaopraya Rajabhat University. She is undertaking research entitle "Development of a Managerial Effectiveness Model for Interdisciplinary Teamwork in Art Disciplines of Universities in Ethnic Minority Regions in Guangxi"

The thesis adversity committee has considered that you are an expert in this topic. Your recommendations would be useful for further improvement of this research instrument.

With your expertise, we would like to ask your permission to validate the attached research instrument. Would like to avail ourselves of this opportunity to express our sincere thanks and appreciation for your help.

Sincerely,

Assistant Professor Dr.Tanaput Chanchaen
(Vice Dean of Graduate School for Dean of Graduate School)

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Ref.No. MHESI 0643.14/ 1099

Bansomdejchaopraya Rajabhat University
1061 Itsaraphap Hiranruchi
Thonburi Bangkok 10600

11 December 2025

RE: Invitation to validate research instrument

Dear Associate Professor, Zhang jun

Mrs.Liu Jia is a graduate student in Doctor of Philosophy Program in Educational Administration of Bansomdejchaopraya Rajabhat University. She is undertaking research entitle "Development of a Managerial Effectiveness Model for Interdisciplinary Teamwork in Art Disciplines of Universities in Ethnic Minority Regions in Guangxi"

The thesis adversity committee has considered that you are an expert in this topic. Your recommendations would be useful for further improvement of this research instrument.

With your expertise, we would like to ask your permission to validate the attached research instrument. Would like to avail ourselves of this opportunity to express our sincere thanks and appreciation for your help.

Sincerely,

Assistant Professor Dr.Tanaput Chanchaoren
(Vice Dean Acting for of Dean of Graduate School)

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Ref.No. MHESI 0643.14/ 1095

Bansomdejchaopraya Rajabhat University
1061 Itsaraphap Hiranruchi
Thonburi Bangkok 10600

11 December 2025

RE: Invitation to validate research instrument

Dear Associate Professor. Wu Yin

Mrs.Liu Jia is a graduate student in Doctor of Philosophy Program in Educational Administration of Bansomdejchaopraya Rajabhat University. She is undertaking research entitle "Development of a Managerial Effectiveness Model for Interdisciplinary Teamwork in Art Disciplines of Universities in Ethnic Minority Regions in Guangxi"

The thesis adversity committee has considered that you are an expert in this topic. Your recommendations would be useful for further improvement of this research instrument.

With your expertise, we would like to ask your permission to validate the attached research instrument. Would like to avail ourselves of this opportunity to express our sincere thanks and appreciation for your help.

Sincerely,

Assistant Professor Dr.Tanaput Chanchaen
(Vice Dean Acting for of Dean of Graduate School)

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Appendix B

Official Letter



Ref.No. MHESI 0643.14/1096

Bansorndejchaopraya Rajabhat University
1061 Itsaraphap Hiranruchi
Thonburi Bangkok 10600

11 December 2025

RE: Request for Data Collection and In-depth Interviews

Dear Sir or Madam

Mrs.Liu Jia is a graduate student in Doctor of Philosophy Program in Educational Administration of Bansorndejchaopraya Rajabhat University. She is undertaking research entitle "Development of a Managerial Effectiveness Model for Interdisciplinary Teamwork in Art Disciplines of Universities in Ethnic Minority Regions in Guangxi"

The thesis adversity committee has considered that you are an expert in this topic. Your recommendations would be useful for further improvement of this research. List of experts according to the attached document.

With your expertise, we would like to request to collect the data to be used in the research. Would like to avail ourselves of this opportunity to express our sincere thanks and appreciation for your help.

Sincerely,

(Assistant Professor Dr.Tanaput Chanchaoen)
Vice Dean Acting for of Dean of Graduate School

Bansorndejchaopraya Rajabhat University

Tel+662-473-7000

www.bsru.ac.th

E-mail: grad@bsru.ac.th

List of Universities for Data Collection and In-depth Interviews

No	University / College
1.	Guangxi Arts University
2.	Guangxi Normal University
3.	Guilin University of Technology

Sincerely,



(Assistant Professor Dr.Tanaput Chanchaoren)
Vice Dean Acting for of Dean of Graduate School

Appendix C

Research Instrument

1. Survey Questionnaire

Survey Questionnaire on the model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi

Instructions:

In order to understand the current situation of Interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi, researchers have reviewed a large amount of research literature and, based on the findings of previous studies combined with the present study, developed and designed this questionnaire. The questionnaire consists of seven sections.

The authenticity and completeness of the questionnaire data are crucial to the results of this study. Please read the questions carefully and select the most appropriate option. There are no right or wrong answers to the questions. Except for the "Basic Information" section, this questionnaire mainly uses a 5-point rating scale: 1 – completely Inconsistent, 2-Somewhat Inconsistent, 3 - Neutral, 4 - Somewhat Consistent, 5. Completely Consistent. Your responses are vital to the purpose of this research.

Once again, thank you for taking the time to participate in this survey, This questionnaire is anonymous, and the data collected will be used solely for academic research purposes It will not be used for commercial or any other purposes. Your answers will be aggregated and analyzed together with other respondents' answers and will be kept strictly confidential. Please feel free to answer all the questions based on your actual situation and genuine thoughts. If you would like to receive a summary of the final research results, please provide your contact information or email, and we will provide feedback in a timely manner after the study is completed. if you have any questions, please feel free to communicate with us at any time.

Thank you again for your cooperation!

Part1: Respondent Status (Personal Information)

1. Gender:

☐ Male ☐ Female

2. How many years of experience do you have in state-owned assets management in universities?

☐ 1-3 years

☐ 4 – 7years

☐ 7 - 15 years

☐ over 15 years

3. Your education background

☐ Bachelor

☐ Master

☐ Doctor

4. Your professional title

☐ Associate Senior

☐ Intermediate

☐ Junior

5. Your place of work

☐ Guangxi Arts University

☐ Guangxi Normal University

☐ Guilin University of Technology

Part 2: Questionnaire

The index of objective congruence (IOC)

Development of a Managerial Effectiveness Model for Interdisciplinary Teamwork in Art Disciplines of Universities in Ethnic Minority Regions in Guangxi

NO	Variable	5	4	3	2	1
	Transformational leadership					
1	University administrators act as ethical role models, demonstrating professional integrity that inspires trust among interdisciplinary team members.					
2	University administrators' behavior reflects consistent values and standards that guide team members in decision-making and collaboration.					
3	University administrators clearly communicate the institution's vision for interdisciplinary collaboration, making goals understandable and motivating.					
4	University administrators encourage team members to commit to collective goals and maintain enthusiasm for long-term collaborative projects.					
5	University administrators encourage team members to question assumptions and explore innovative approaches in interdisciplinary research.					
6	University administrators promote critical thinking and reflective discussions to enhance problem-solving and learning within the team.					
7	University administrators support experimentation and creative solutions, even when they involve uncertainty or risk.					
8	University administrators recognize the unique strengths, expertise, and developmental needs of each team					

NO	Variable	5	4	3	2	1
	member.					
9	University administrators provide personalized guidance, mentoring, and support to help team members achieve their professional potential.					
10	University administrators adapt their leadership approach to address differences in team members' skills, experiences, and motivations.					
	Team psychological safety					
11	University administrators encourage interdisciplinary team members to express divergent viewpoints without worrying about negative evaluations.					
12	University administrators ensure that team members can question existing teaching norms, research assumptions, or administrative practices in an open and respectful environment.					
13	University administrators normalize constructive debate in team discussions, reducing the psychological risks associated with speaking up.					
14	University administrators treat mistakes or unexpected outcomes in interdisciplinary projects as collective learning opportunities.					
15	University administrators provide developmental guidance and supportive feedback when setbacks occur, rather than criticism or blame.					
16	University administrators clearly communicate tolerance for experimentation, emphasizing that innovative attempts may fail but still contribute to team progress.					
17	University administrators foster mutual trust within interdisciplinary teams through fair treatment and transparent communication.					

NO	Variable	5	4	3	2	1
18	University administrators ensure that team members feel respected for their disciplinary identities and professional expertise.					
19	University administrators provide emotional and professional support to members encountering complex teaching or research pressures.					
20	University administrators guide collaborative decision-making in a way that promotes inclusion, shared ownership, and equitable participation across disciplines.					
	Shared vision					
21	University administrators clearly articulate the organization's long-term goals in a way that all members can easily understand.					
22	University administrators ensure that the organization's vision is logically structured, coherent, and communicated with sufficient detail.					
23	University administrators translate broad strategic goals into concrete priorities and actionable expectations for interdisciplinary teams.					
24	University administrators provide consistent explanations of the organization's direction so that members can align their work with institutional priorities.					
25	University administrators communicate the organization's future direction in a way that inspires enthusiasm and collective commitment.					
26	University administrators present a vision that motivates members to invest extra effort in achieving shared institutional goals.					
27	University administrators articulate a development vision that encourages members to pursue continuous					

NO	Variable	5	4	3	2	1
	professional growth.					
28	University administrators promote a vision that aligns well with members' personal values and professional beliefs.					
29	University administrators foster strong value resonance by linking the organization's vision with members' sense of purpose and identity.					
30	University administrators encourage members to support the organization's vision because they perceive it as meaningful and personally relevant.					
	Interdisciplinary boundary spanning					
31	University administrators demonstrate the ability to integrate concepts, methods, and insights drawn from multiple academic disciplines.					
32	University administrators actively seek knowledge outside their primary academic background to address complex institutional challenges.					
33	University administrators value interdisciplinary reasoning and incorporate diverse disciplinary logics into decision-making processes.					
34	University administrators can translate specialized disciplinary language into accessible concepts that interdisciplinary teams can collectively understand.					
35	University administrators proactively build communication channels that connect members from different disciplinary backgrounds.					
36	University administrators foster mutual understanding and trust by encouraging open dialogue across disciplinary boundaries.					
37	University administrators effectively mediate disciplinary					

NO	Variable	5	4	3	2	1
	differences and resolve conflicts arising during interdisciplinary collaboration.					
38	University administrators act as social connectors who strengthen relational networks across academic units.					
39	University administrators identify institutional barriers that hinder interdisciplinary collaboration and work proactively to address them.					
40	University administrators advocate for structural or procedural reforms that facilitate long-term interdisciplinary collaboration.					
	Role negotiation and clarification					
41	University administrators clearly understand their own responsibilities and expected contributions within interdisciplinary teams.					
42	University administrators have a clear understanding of the responsibilities and task boundaries of other team members.					
43	University administrators clearly communicate team goals, task expectations, and performance standards to all members.					
44	University administrators ensure that all team members share a common understanding of roles, workflows, and coordination requirements.					
45	University administrators actively participate in discussions to adjust role allocations based on emerging team needs or project demands.					
46	University administrators effectively negotiate and resolve disagreements related to responsibilities or task ownership.					
47	University administrators adjust role assignments by					

NO	Variable	5	4	3	2	1
	considering individual strengths, expertise, and workload balance.					
48	University administrators establish transparent mechanisms that allow team members to renegotiate roles when tasks evolve.					
49	University administrators adapt their responsibilities proactively when team priorities or project conditions change.					
50	University administrators help maintain team performance by reallocating tasks or reorganizing workflows during periods of change.					
	Interdisciplinary support for innovation					
51	University administrators ensure that interdisciplinary research receives adequate, stable, and strategically allocated funding.					
52	University administrators provide the necessary equipment, facilities, and digital infrastructure required for interdisciplinary projects.					
53	University administrators offer timely technical, administrative, and logistical support to sustain interdisciplinary research activities.					
54	University administrators ensure that interdisciplinary teams have equitable access to institutional resources compared with single-discipline units.					
55	University administrators develop clear policies that explicitly recognize and reward interdisciplinary research contributions.					
56	University administrators implement performance evaluation standards that incorporate interdisciplinary outcomes as key indicators.					

NO	Variable	5	4	3	2	1
57	University administrators establish incentive mechanisms—such as grants, awards, or workload adjustments—to encourage faculty participation in interdisciplinary collaboration.					
58	University administrators establish interdisciplinary platforms, centers, or research hubs that facilitate sustained collaboration.					
59	University administrators design clear, standardized, and easy-to-follow procedures that support interdisciplinary collaboration and project management.					
60	University administrators coordinate across institutional units to remove procedural bottlenecks that hinder interdisciplinary teamwork.					

2. Interview Outline

Interview outline of model I for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi

Instructions:

Purposive sampling was employed, and a total of six experts were interviewed. The determination of the sample size followed the principle of data saturation, meaning that sampling ceased when interviews no longer generated new themes or information.

The interviewees in this research were 6 high-level administrators and teachers in the art disciplines of universities in ethnic minority regions in Guangxi. The qualifications of the interviewee are as follows: 1) at least 6 years of work experience as a high-level administrator in private universities, 2) received a certificate in the field of professional art skills, and 3) graduated with a master's degree or above.

Part 1: Respondent Status (Personal Information)

1. Name
2. Position
3. School
4. Date of Interview
5. Length of interview

Part 2: Interview outline

Interview Question

Content	Question
Transformational leadership	1. In the development of interdisciplinary teams within the art disciplines at your university, how do administrators establish a unified value system and collaboration standards? In practice, when teachers from different disciplinary backgrounds experience conceptual conflicts, how does the university coordinate and provide guidance? 2. In response to the personalized professional development needs of art faculty, how does the university provide differentiated career development support within interdisciplinary teams? In particular, how do personalized mentoring or guidance strategies differ across various team models?
Team psychological safety	3. During academic discussions and decision-making processes in interdisciplinary art teams, how does the university foster an open academic climate that ensures faculty from art, education, engineering, and other fields can freely express their views without bias? Especially when addressing sensitive issues such as academic evaluation and research project approval, how is fairness in opinion expression ensured? 4. When interdisciplinary projects encounter setbacks or failures, how does the university's management mechanism shift from an "accountability-oriented model" to a "learning-oriented model"? How does the institution use developmental feedback to promote team reflection and improvement?
Shared vision	5. How are the long-term strategic goals for interdisciplinary team development in the art disciplines formulated at your

Content	Question
	university? How is this vision effectively communicated at the university, faculty, and team levels to ensure that all participants clearly understand it and reach a shared consensus? 6. How does the university translate macro-level policy initiatives such as the “New Liberal Arts” and “art–engineering integration” into concrete indicators for interdisciplinary projects? What specific practices are implemented in terms of goal decomposition and task execution?
Interdisciplinary boundary spanning	7. In deep collaborations between art disciplines and other fields, how does the university establish effective knowledge integration mechanisms? How are different disciplinary theoretical frameworks, research methodologies, and discourse systems effectively synthesized? 8. When disciplinary cultural conflicts arise between art faculty and colleagues from engineering, humanities, or social sciences during collaboration, what mechanisms does the university use for mediation? Does the university have dedicated interdisciplinary coordination bodies or institutional arrangements to address such issues?
Role negotiation and clarity	9. Within interdisciplinary teams in the art disciplines at your university, how are team members’ roles and responsibility boundaries defined? Particularly on collaborative platforms involving multiple units, how is the relationship between faculty members’ interdisciplinary work and their primary job responsibilities coordinated? 10. How does the university dynamically assign roles based on team members’ professional expertise and strengths? When project needs change or members’ competencies develop, what mechanisms govern role adjustment? In practice, how

Content	Question
	does the institution balance issues of role authority that stem from differences in disciplinary contribution levels?
Institutional support for interdisciplinarity	11. How is the funding support system for interdisciplinary teams in the art disciplines structured at your university? How does the university ensure sustained investment in such research projects rather than one-time funding? 12. In promotion reviews, performance evaluations, and reward systems, how does the university recognize the academic value of interdisciplinary research outcomes?

3: Interview Records

Transformational leadership

Question 1: 1. In the development of interdisciplinary teams within the art disciplines at your university, how do administrators establish a unified value system and collaboration standards? In practice, when teachers from different disciplinary backgrounds experience conceptual conflicts, how does the university coordinate and provide guidance?

Expert 1: At our School of Art, faculty members tend to have a strong sense of professional identity. Those engaged in fine art and those working in digital technology often hold fundamentally different understandings of what constitutes “beauty.” It is therefore difficult to confine everyone within a single rigid set of standards. Our current approach is to “let the work speak,” meaning that we use the tangible outputs of interdisciplinary workshops to drive the convergence of values. For example, in rural revitalization projects, if coordination fails, the design cannot be realized and no one produces outcomes. Conflict is inevitable. We generally avoid suppressing disagreements through administrative orders; instead, we invite third-party experts recognized by all parties to conduct evaluations, or we implement a dual-leadership structure consisting of a “Chief Artist” and a “Technical Director,” enabling those with artistic expertise and those with technical expertise to reach mutual compromise.

Expert 2: In teacher education-oriented universities, the core of our value system is actually very clear: it is centered on “educating students.” Regardless of whether team members are specialists in art, education, or technology, the first step after joining the team is to affirm this shared objective. In terms of establishing standards, we rely on the National Virtual Teaching and Research Office platform as the institutional basis. Through this platform, members collaboratively develop teaching syllabi and project procedures. When conceptual disagreements arise for example, when technology specialists seek to adopt the latest VR technologies while art faculty believe this may not align with aesthetic education goals we return to the fundamental question: “What can students actually learn from this?” In this process,

the role of administrators is primarily that of coordinators. Their task is to guide members to focus on long-term educational objectives rather than competing over short-term preferences or disciplinary priorities.

Expert 3: We come from an engineering background, where projects operate under clear deadlines and quality standards. Our unified value system is essentially centered on “problem-solving.” Whether in design or engineering, if the final product cannot be realized or no one uses it, the project is considered a failure. Therefore, our collaboration standards are grounded in engineering management processes. When conflicts arise for instance, when a designer proposes ideas that engineers consider overly extravagant or technically unfeasible we rely on feasibility analysis to make decisions. If the challenge is genuinely technical, we establish a project to address and overcome it. If the concept is detached from practical realities, we adjust it according to market logic. This reflects an efficiency-first operational logic.

Expert 4: Let me add one more point. As administrators, we emphasize “inclusiveness.” In the integration of art and technology, many conflicts arise simply because people do not share the same professional language. We have therefore developed a kind of “cross-disciplinary glossary,” or workshop-based mechanism, that requires participants to communicate using non-specialist terminology. When addressing conflicts, I often remind faculty that they are not there to prove the superiority of their own discipline, but to solve problems that a single discipline cannot address alone. We have also established an interdisciplinary innovation fund, for which only genuinely collaborative, multi-party teams are eligible to apply. This form of resource-based guidance has proven far more effective than relying solely on verbal persuasion.

Expert 5: Our mechanism is relatively flexible. We primarily cultivate alignment in values through collective lesson planning and joint teaching–research activities. Conflicts often stem from a lack of recognition of each other’s contributions. To address this, we have introduced a contribution-point system, which clearly records each member’s input at different stages when applying for teaching achievement awards or completing project evaluations. This has significantly

reduced tensions. During coordination, we often reference the Ministry of Education's development standards, transforming external policy pressure into internal motivation. When everyone works toward shared goals such as securing awards or project approvals, it becomes much easier to reach consensus.

Expert 6: In our model of design-driven industrial empowerment, the value system is essentially market-oriented. Many conflicts are resolved on the client's side. However, within the team for example, when industry mentors feel proposals are overly academic, while university faculty consider them too commercialized administrators need to step in to maintain balance. We typically introduce user-testing stages and rely on data to inform decisions. Whichever solution demonstrates stronger market acceptance becomes the preferred direction. This reflects a results-oriented value logic. In this context, the administrator plays the role of a "diagnostician," ensuring that debates remain aligned with the core objective of enhancing industrial value rather than drifting into purely disciplinary disagreements.

Question 2: In response to the personalized professional development needs of art faculty, how does the university provide differentiated career development support within interdisciplinary teams? In particular, how do personalized mentoring or guidance strategies differ across various team models?

Expert 1: At our teacher-training university, the primary priority is the enhancement of teaching competence. For art faculty, we support their engagement in information-based teaching practices and encourage participation in teaching innovation competitions. Personalized guidance is reflected in our arrangement of one-on-one support from education specialists, who help faculty translate their artistic expertise into pedagogical models. For example, if an oil painting instructor wishes to join an interdisciplinary team, we guide them in applying color theory within psychology courses. Our strategy can be summarized as "art + education." The developmental pathway is clearly oriented toward cultivating distinguished teachers and educational practitioners.

Expert 2: Here, faculty place greater emphasis on engineering-oriented competencies. When art instructors join, we expect them to develop an

understanding of materials and production processes. Personalized support, therefore, involves pairing them with engineering mentors for instance, those working in interaction design are guided by computer science faculty in coding and technical implementation. In terms of career development, we encourage them to obtain engineering-related professional titles or to develop as “dual-qualified” teachers. If a faculty member prefers to focus exclusively on pure art, we generally do not recommend that they join the core interdisciplinary teams, as this would not align with their professional trajectory. Instead, we suggest that they engage with platforms dedicated to pure artistic creation.

Expert 3: We place strong emphasis on respecting faculty members’ identities as artists. Personalized guidance is therefore quite nuanced: some faculty aspire to be theorists, others to become curators, and some to serve as inheritors of intangible cultural heritage. We do not require everyone to learn coding or conduct anthropological fieldwork. Our strategy is project-based. For example, within an anthropology research center, those inclined toward theory focus more on writing reports, while those who prefer hands-on practice concentrate on design work. The university also permits interdisciplinary outputs to be submitted under the leading discipline of the project, which alleviates faculty concerns about evaluation risks. The administrator’s role is to safeguard individual strengths rather than attempting to turn everyone into generalists.

Expert 4: We place particular emphasis on the transformation of early-career faculty. Many newly recruited PhD holders come from highly specialized academic backgrounds and often feel uncertain when entering interdisciplinary teams. To address this, we have established a mentorship system, inviting senior professors especially those from art academies with extensive interdisciplinary experience to supervise and guide junior faculty. Personalization is reflected in our practice of matching resources to individual research interests. For example, faculty interested in intangible cultural heritage are guided toward cultural transmission pathways, while those inclined toward technology are encouraged to develop in digital media arts. Support measures include preferential access to research funding as well as overseas

training opportunities, specifically aimed at learning international approaches to art education.

Expert 5: We emphasize team-based operations, and personalization is often built upon overall team needs. The support we provide to faculty is highly practical. For instance, if someone wishes to engage in industry-oriented projects, the university helps connect them with enterprises such as Huawei or Liuzhou Automobile; if they prefer research-focused work, we provide access to key laboratories. Regarding career development, we break down traditional departmental boundaries. As long as a faculty member makes substantive contributions within interdisciplinary projects, their prospects for promotion and recognition can improve accordingly. Our differentiated guidance is mainly determined by an individual's position within the industry chain whether they focus on front-end creative work, back-end implementation, or intermediary coordination and management since each role corresponds to a distinct developmental pathway.

Expert 6: Some of our faculty have secured major projects under the National Social Science Fund through interdisciplinary collaboration, while others have won prestigious design awards. For the former, we assign academic assistants and reduce their teaching loads; for the latter, we establish dedicated studios and provide specialized equipment. Our personalized guidance is therefore based on each individual's specific pain points. Administrators need to maintain regular communication with faculty to understand their aspirations and resource gaps. Within the artist engineer model, we encourage faculty to retain the sensitivity of artists while developing the rigor of engineers. This form of identity transition requires the university to provide structured training as well as transitional support mechanisms.

2) Team psychological safety

Question 3: During academic discussions and decision-making processes in interdisciplinary art teams, how does the university foster an open academic climate that ensures faculty from art, education, engineering, and other fields can freely express their views without bias? Especially when addressing sensitive issues such as

academic evaluation and research project approval, how is fairness in opinion expression ensured?

Expert 1: Art faculty do initially experience pressure and may worry about being labeled as “unscientific.” We have therefore introduced an explicit rule that, during brainstorming sessions, terms such as “unfeasible” or “unscientific” are not allowed. We also implement a three-minute speaking rule: participants must speak in turns and are not permitted to interrupt. To encourage art faculty to voice their ideas, we established a “creative green-light” mechanism—any proposal aimed at innovation, even if it initially sounds unrealistic, must first be explored in terms of feasibility. In essence, this is about building procedural justice, ensuring that all participants feel they have an equal voice in the discussion.

Expert 2: In our context, it is actually the science and engineering faculty who are sometimes reluctant to speak up. To cultivate a supportive atmosphere, we often move interdisciplinary workshops into informal settings, such as cafés or galleries. In these relaxed environments, communication becomes easier and disciplinary biases tend to diminish. In academic discussions, we emphasize decentralization. If a senior professor becomes overly dominant, the moderator will tactfully intervene and redirect the floor to younger faculty members. We believe that the best ideas often emerge under conditions of genuine equality.

Expert 3: Teacher education institutions value “harmony with diversity.” We reduce bias through joint lesson planning. When faculty work together on concrete issues such as lesson design and classroom implementation, disciplinary boundaries naturally become less rigid. To ensure freedom of expression, we implement an anonymous proposal system within the virtual teaching and research office. At times, individuals may hesitate to challenge leaders openly in group discussions, but anonymous input often proves to be the most candid. Administrators deliberately collect and consider these views during decision-making. At the same time, we strongly emphasize pedagogical ethics grounded in mutual respect: criticism must address issues rather than individuals.

Expert 4: We frequently use role-switching approaches. Art faculty teach technical faculty how to draw, while technical faculty teach art instructors how to program. Through this process, participants become more aware of each other's challenges and values. In decision-making, we typically adopt multiple rounds of back-to-back scoring to minimize the influence of authority. Although our university has a strong cultural tradition and an overall atmosphere of inclusiveness, we remain vigilant about entrenched stereotypes that separate the humanities and sciences. We address this by actively promoting interdisciplinary achievements to shape perceptions and guide attitudes.

Expert 5: We regularly invite faculty who have succeeded in interdisciplinary collaboration to share their experiences firsthand. When a humanities scholar secures a major project after gaining technological competence, or an engineering professor wins awards after developing artistic sensibility, this demonstrative effect is far more persuasive than any abstract advocacy. Institutionally, we also protect dissenting views. During project review meetings, if an opposing opinion is well-reasoned, we typically suspend the decision and provide the dissenting party with additional time and space to further substantiate their argument.

Expert 6: To ensure that participants from different fields can all express their views effectively, we require each party to submit structured reports prior to meetings, relying on charts and data. Designers present renderings and visualizations, while engineers provide parameter tables and technical specifications, enabling everyone to understand each other's logic. To minimize the influence of bias, we introduce external expert review, particularly from industry specialists. When a corporate client affirms the quality of a design, engineers have little basis for objection; when technical parameters demonstrate stability, art faculty cannot rely solely on subjective impressions. This approach helps cultivate a more objective deliberative environment.

Question 4: When interdisciplinary projects encounter setbacks or failures, how does the university's management mechanism shift from an "accountability-oriented

model” to a “learning-oriented model”? How does the institution use developmental feedback to promote team reflection and improvement?

Expert 1: We previously ran a project on intelligent aesthetic education. The first version performed poorly the technology was unstable, and the interface was not user-friendly. Under past practices, the team might simply have been criticized for incompetence. This time, however, we organized a review session called a “Pitfall-Avoidance Sharing Workshop.” We did not discuss who was at fault; instead, we focused on what had gone wrong. It turned out that the technology faculty and art faculty had fundamentally misaligned understandings of the target user profile. We subsequently adjusted the collaboration process, requiring all members to attend classes and conduct field research. Rather than pursuing accountability, the university provided additional funding to support development of a second version. This kind of tolerance created a strong sense of psychological safety within the team.

Expert 2: In a rural revitalization project, we once experienced a failure. We had a design that had won an international award and assumed it would be successful; however, when implemented in the village, local residents did not accept it at all. The setback was significant. The university did not criticize us. Instead, it arranged for our team to live in the village for half a month, sharing daily life with the residents. This was a form of developmental feedback—not telling us we were wrong, but taking us to the field to understand where the mismatch lay. After returning, we completely overturned the original plan. This case later became a classic teaching example, used to instruct new faculty on the importance of remaining grounded in real contexts.

Expert 3: In anthropological fieldwork, encountering setbacks is quite common. On one occasion, our team attempted the digital reconstruction of a minority ethnic ritual, but due to a lack of understanding of local taboos, we were asked to leave by the villagers. This was a minor setback. After returning to the university, the response was not to criticize the team for inadequate preparation. Instead, we invited an anthropology specialist to deliver lectures specifically on fieldwork ethics. We also documented this failure in the project completion report as

a lesson learned. The university regarded this kind of authentic exploration as more valuable than flawless success, and the project was later recognized as outstanding. This reflects an approach that treats failure as a resource.

Expert 4: One of our faculty members once attempted to apply holographic projection of ink painting in primary school classrooms. However, the equipment costs were too high, and schools could not afford it, making large-scale implementation impossible. During the review meeting, we affirmed the creativity of the idea while pointing out the mismatch between the technology and its intended application context. We suggested repositioning the project toward “museum public education” or “high-end art exhibitions.” This type of feedback was future-oriented. The university also helped connect the faculty member with museum resources. The project later achieved considerable success in museum settings. This reflects the flexibility of our management mechanism rather than closing off a path, we help individuals adjust direction.

Expert 5: For exploratory small-scale projects, we have established a seed funding scheme that tolerates a failure rate of up to 50%. During reimbursement, even if a project does not succeed, expenses are still covered as long as the team submits a detailed analytical report explaining why it failed and how improvements could be made in the future. This mechanism encourages faculty to take risks. For example, a digitalization project related to intangible cultural heritage did not run successfully due to algorithmic issues, yet the failure report proved highly valuable for subsequent teams. The university not only accepted the outcome but also granted an award, recognizing the contribution of the lessons learned.

Expert 6: We have established an interdisciplinary issue repository. Technical bugs, design flaws, and managerial loopholes are all documented within this system, and regular meetings are held to review them. For instance, in an app development project, the interaction design was overly complex, resulting in a poor user experience. Rather than blaming the design team, we brought in the engineering team to help optimize the interaction logic. This feedback mechanism is constructive

in nature, with everyone oriented toward the shared objective of improving the product.

3) Shared vision

Question 5: How are the long-term strategic goals for interdisciplinary team development in the art disciplines formulated at your university? How is this vision effectively communicated at the university, faculty, and team levels to ensure that all participants clearly understand it and reach a shared consensus?

Expert 1: Our overarching objective is quite ambitious: to build a leading ASEAN hub for art, science, and technological innovation. This vision was formulated through multiple rounds of expert consultation, integrating Guangxi's regional advantages with our existing disciplinary strengths. At the university level, the broad strategic direction is communicated through large-scale institutional meetings. At the college level, this vision is decomposed into concrete disciplinary targets for example, advancing design toward top-tier disciplinary rankings or securing major grants in art theory. At the team level, these goals are translated into specific projects, such as completing the digitalization of three intangible cultural heritage villages within the year. Through this layered process of strategic decomposition, all participants gain clarity regarding their respective responsibilities and objectives.

Expert 2: Our strategic objective is to support Guangxi's industrial revitalization through design-driven industrial empowerment. This goal is aligned with the region's broader development agenda. Implementation primarily relies on special disciplinary zone policies: the university formulates enabling policies, colleges develop roadmaps, and teams secure project commissions. To ensure that everyone clearly understands these goals, we deliberately invite representatives from industry clients to deliver presentations on campus. When professionals from companies such as Huawei explain the types of designers they need, faculty gain a concrete understanding of the target competencies. In this way, consensus is built on a foundation of shared interests.

Expert 3: Our vision is to become a nationally leading center for art education within the teacher education sector. The formulation of this goal is

primarily based on the Ministry of Education's standards for the development of "New Teacher Education." We implement this vision mainly through curriculum reform. Interdisciplinary principles are embedded into talent cultivation plans, so when faculty review the teaching syllabi, they clearly recognize these as institutional expectations. At the team level, we operationalize the vision through collective lesson planning within virtual teaching and research offices, translating it into concrete practices for each class session.

Expert 4: In fact, the very process of forming the vision is itself a process of building consensus. During the planning stage, we held numerous consultation meetings to gather faculty input, so the goals were collectively shaped rather than imposed. To ensure clarity and shared understanding, we also developed highly visual roadmaps and implementation charts, which are displayed on the walls of various teaching and research offices. This allows everyone to see clearly what milestones are expected at each stage and where the institution aims to be in each year.

Expert 5: For specialized institutions, the vision must be elevated and aspirational. We frame ours around the integration of art and technology, with equal emphasis on heritage and innovation. In communicating this vision, we intentionally adopt a narrative approach. For example, we invite senior professors to recount the history of the academy and describe how earlier generations brought folk art onto formal stages. This legacy is then used to inspire current faculty to engage in interdisciplinary work. We also present the vision through exhibitions and performances, making it visible and tangible. In this way, faculty can experience the vision as something concrete rather than abstract.

Expert 6: Our objectives are highly quantifiable and are formulated primarily with reference to Guangxi's industrial layout. Although this may sound somewhat rigid, it is the most effective approach in an engineering-oriented institution. When team members see the KPIs, they immediately understand what the university expects. At the same time, we explain the rationale behind these targets for example, emphasizing that only by effectively serving industry can our design

discipline maintain its current ranking level. This helps foster a shared sense of urgency and collective responsibility.

Question 6. How does the university translate macro-level policy initiatives such as the “New Liberal Arts” and “art–engineering integration” into concrete indicators for interdisciplinary projects? What specific practices are implemented in terms of goal decomposition and task execution?

Expert 1: Our approach is project-based. When Guangxi advanced the agenda of industrial revitalization, we promptly established special research tracks in rural landscape design, smart home systems, and industrial interaction design. The indicators are explicit: each team must align with the needs of at least one county or district and translate at least one outcome into practical application. In terms of execution, we adopt a dual-leadership structure one lead specializing in technology and the other in design both jointly accountable for project targets. Without an interdisciplinary background, it is essentially impossible to secure such projects. In this way, policy pressure is effectively transformed into internal motivation.

Expert 2: In teacher education institutions, the core of the “New Liberal Arts” agenda lies in talent cultivation. We translate this policy into concrete indicators related to curriculum-based ideological and political education, as well as information-enabled teaching reform. For example, each art instructor is required to collaborate with an information technology teacher to co-develop a blended course. In terms of implementation, we rely on virtual teaching and research offices to form mixed teams. During evaluation, we do not focus on how many individual papers a teacher has published; instead, we assess the scale of the course resource repository developed by the team and how widely it is adopted by other schools. In this way, macro-level policy is transformed into specific team-based tasks.

Expert 3: For art institutions, the “New Liberal Arts” agenda signifies the need to break traditional disciplinary boundaries. We operationalize this by decomposing it into indicators such as the degree of disciplinary integration and the level of social contribution. In project proposals, we include specific scoring criteria: additional points are awarded if science and engineering disciplines are involved, and

further points if outcomes can serve local economic development. At the implementation level, we have established seed incubation funds dedicated to supporting emerging cross-boundary ideas at their early stages. In this way, broad policy concepts are translated into a series of concrete experimental initiatives.

Expert 4: After policy documents are issued, we promptly organize experts to develop operational guidelines. For example, initiatives related to aesthetic education and ideological-political education are translated into specific projects. In terms of task execution, we implement a checklist system: each team receives a task list, and items are marked off upon completion. This prevents faculty from perceiving policies as abstract or symbolic. We also maintain a process supervision group that conducts regular on-site reviews to monitor progress.

Expert 5: We translate policy directives primarily through platform development. Since the policy environment supports areas such as art anthropology, we establish dedicated physical research centers and define performance indicators for them. During implementation, we grant teams considerable autonomy, allowing them to determine how best to meet the targets. Administrators focus on outcomes rather than closely monitoring procedural details. **Expert 6:** Our conversion pathway is highly pragmatic and interventionist. When policies call for art-engineering integration, we require faculty from the design school to take temporary posts in engineering laboratories, while engineering faculty must participate in design reviews. The key performance indicators are the number of jointly filed patents and jointly received awards. In implementation, we have even reorganized physical workspaces by creating shared offices, deliberately colocating faculty from different disciplines. This form of enforced spatial integration has proven especially effective in breaking down barriers during the initial stages of collaboration.

4) Interdisciplinary boundary spanning

Question 7. In deep collaborations between art disciplines and other fields, how does the university establish effective knowledge integration mechanisms? How are different disciplinary theoretical frameworks, research methodologies, and discourse systems effectively synthesized?

Expert 1: We have established a regular workshop mechanism in which participants sit together to align and explain their respective terminologies. In projects involving the digitalization of intangible cultural heritage, we do not simply begin with technical recording. Instead, anthropologists first conduct fieldwork to identify the core cultural and ritual meanings. Based on this interpretive foundation, art faculty design the visual representation, and finally technical specialists implement the outcome using VR. Each stage builds directly upon the outputs of the previous one, enabling a structured and sequential integration of knowledge.

Expert 2: In our intelligent education projects, integration is achieved through co-development of courses. Education specialists provide the pedagogical theoretical framework, art instructors contribute aesthetic content, and technical experts supply the implementation methods. The integration of discourse systems takes place through collaborative lesson-plan writing. All members jointly develop a single lesson plan: education scholars define learning objectives, art faculty design learning activities, and technical specialists specify the tools and platforms to be used. Through this process, participants gradually gain insight into one another's modes of thinking.

Our shared theoretical foundation is constructivism, which serves as a cross-disciplinary framework broadly accepted by all participating fields.

Expert 3: In science and engineering contexts, integration emphasizes process interfaces. For example, in industrial design projects, we use design thinking as the integrative framework. This aligns with the innovation logic of art disciplines while remaining intelligible to engineers. In the “Double-Hundred Rice-Crayfish Cultivation” project, the design team was responsible for landscape design and the engineering team for infrastructure construction, yet both groups worked from a shared set of design drawings and the same project management software.

At the level of discourse, we standardize the use of project management terminology such as milestones and deliverables to reduce ambiguity. Integration, in essence, is achieved by bringing all participants into a common project workflow.

Expert 4: We rely on collective seminars to foster alignment. In aesthetic education research, we invite faculty from psychology, sociology, and art studies to observe classes together. Afterward, they engage in joint discussions from their respective perspectives: art faculty address aesthetic qualities, psychologists analyze student responses, and sociologists examine broader social implications. Through sustained dialogue, participants gradually realize that they are often interpreting the same phenomenon through different lenses. Over time, this process naturally gives rise to a hybrid research paradigm. Institutionally, we reinforce this mechanism by establishing interdisciplinary research grants, which can only be awarded to proposals jointly submitted by scholars from multiple disciplinary backgrounds.

Expert 5: Art emphasizes sensibility, while engineering prioritizes rationality. In developing interactive art installations, we integrate disciplines around the concept of user perception. Art faculty focus on the aesthetic pleasure of perception, technical faculty on the responsiveness and performance of the system, and anthropologists on the cultural resonance of the perceptual experience. We consolidate these three dimensions into a unified evaluation model. This provides a shared reference point for different methodological traditions, preventing fragmented or parallel discussions and enabling genuinely integrated assessment.

Expert 6: Our approach is product-oriented. Whether developing an app or hardware, the end result must take the form of a tangible product. Product logic serves as the strongest integrative mechanism. For example, when preparing for the “Challenge Cup” competition, the shared objective is to impress the judges. Under this goal, theoretical frameworks are structured through user scenarios and narrative story telling. Methodologically, we adopt iterative prototyping: art faculty produce sketches, technical teams develop demos, and all members refine the work collaboratively. In terms of discourse, communication often occurs through reviewing each other’s outputs; visual and functional results convey meaning more effectively than verbal explanation alone.

Question 8. When disciplinary cultural conflicts arise between art faculty and colleagues from engineering, humanities, or social sciences during collaboration, what

mechanisms does the university use for mediation? Does the university have dedicated interdisciplinary coordination bodies or institutional arrangements to address such issues?

Expert 1: In teacher education institutions, conflicts tend to be relatively moderate—for example, humanities faculty may feel that engineering colleagues are overly utilitarian, while engineering faculty may view humanities approaches as overly abstract. We address such issues through the Teaching Guidance Committee, which includes representatives from all disciplines. If coordination at the team level fails, matters are brought to the committee for collective deliberation. Institutionally, we promote benefit-sharing mechanisms. For instance, in jointly developed courses, we stipulate that workload credit is allocated equally (50% to each side), thereby reducing potential conflicts of interest. Culturally, we strengthen interpersonal relationships through collective activities. Many tensions are eased in informal and social settings, where mutual understanding develops beyond formal professional roles.

Expert 2: Conflict is inevitable, especially between artists and engineers one group tends toward divergent thinking, the other toward convergent thinking. Our university has an Innovation Laboratory Management Office, a small but dedicated unit responsible for coordinating such issues. They do not side with any discipline; their sole focus is project progress. We also have a system of academic leave. If collaboration becomes excessively difficult, one party may apply to withdraw or be replaced. Participation is not forced. During mediation, we typically deconstruct the conflict identifying which aspects are aesthetic issues and which are technical so that each can be addressed separately.

Expert 3: We address such issues primarily through project-based governance. Project managers usually faculty with strong management expertise hold final decision-making authority. If coordination still proves difficult, matters are referred to an interdisciplinary review panel. Institutionally, we place strong emphasis on contractual awareness. Responsibilities, rights, and benefit-sharing arrangements are clearly defined before collaboration begins, and implementation proceeds strictly

according to the agreement. This reduces ambiguity and minimizes interpersonal disputes.

Expert 4: We place considerable emphasis on affective governance. Conflicts often arise from mutual unfamiliarity rather than substantive disagreement. To address this, we organize interdisciplinary salons that avoid formal academic agendas and instead encourage participants to share personal experiences, challenges, and interests. As informal relationships develop, work-related tensions become easier to negotiate. At the institutional level, the virtual teaching and research office functions as a buffer space for dialogue. Although we do not maintain a dedicated conflict-resolution unit, party leadership at the college level plays an important mediating role. They frequently hold individual conversations with both sides, emphasizing the shared objective of serving students an objective that functions as a powerful integrative force.

Expert 5: I believe the most effective mediation often involves third-party intervention. When two disciplines argue internally, discussions can reach an impasse. We therefore invite external experts or even industry clients to provide judgment. For example, in rural revitalization projects, if local residents find a design both appealing and practical, internal disputes largely become irrelevant. Institutionally, we encourage cross-disciplinary mobility, allowing art faculty to take part-time teaching roles in engineering schools and vice versa. After working within another discipline's environment, individuals gain a clearer understanding of the constraints and challenges faced by their counterparts, and conflicts naturally decrease. This functions as a preventive, mechanism-based approach to conflict reduction.

Expert 6: We rely on data and standardized procedures as the basis for decision-making. When conflicts arise, we convene technical review meetings and present empirical data and test results. For instance, if a designer insists on a particular form but wind tunnel testing shows excessive drag, the design must be modified. Institutionally, we operate through the Guangxi Rural Revitalization Design Research Institute, a provincial-level platform whose regulations are jointly formulated by universities, enterprises, and government bodies. Its authority exceeds

that of any single college. Once issues are escalated to this level, most conflicts can be resolved according to established rules.

5) Role negotiation and clarity

Question 9. Within interdisciplinary teams in the art disciplines at your university, how are team members' roles and responsibility boundaries defined? Particularly on collaborative platforms involving multiple units, how is the relationship between faculty members' interdisciplinary work and their primary job responsibilities coordinated?

Expert 1: Our approach is relatively explicit: roles are determined according to project milestones. For example, during the initial conceptual design phase, art faculty take the lead while engineers provide support. In the subsequent engineering implementation phase, engineers assume primary responsibility, and art faculty focus on visual and experiential oversight. Responsibility boundaries are specified in the project contract at the proposal stage. Regarding the coordination of routine duties, we implement a work-time exchange system. The time that faculty devote to interdisciplinary projects can be converted into equivalent teaching workload or research performance credits. In some cases, faculty members are permitted, within a defined period, to shift their primary workload almost entirely to the project, with teaching responsibilities temporarily covered by other team members. The institution formally recognizes this form of internal adjustment.

Expert 2: In teacher education universities, faculty members typically carry substantial dual responsibilities in teaching and research. Within the framework of the virtual teaching–research community, role delineation follows a task-driven principle. The individual who initiates a task serves as the lead coordinator, while other members assume responsibility for specific modules. The collaboration model combines integration and division: core components of a project are addressed collectively, whereas specialized segments are undertaken independently according to disciplinary expertise. Coordination with routine duties is primarily managed through the institutional course scheduling system. Time allocated to interdisciplinary teamwork is formally embedded into the teaching timetable in a manner

comparable to required courses. This arrangement is officially recognized by the academic affairs office, thereby legitimizing participation and reducing faculty concerns about workload conflicts.

Expert 3: We generally adopt a chief-responsibility system. For a large project, one chief expert is appointed, with several sub-project leaders underneath. Boundaries are formed dynamically through consultation. We do not require a teacher to stay from beginning to end; they can enter or exit according to their expertise. Regarding coordination with regular duties, we are relatively flexible. We believe that when an individual teacher's capability improves, it is also a contribution to the team. Institutionally, we implement a flexible working system no clocking in, and performance is judged by outcomes.

Expert 4: In enterprise-collaboration platforms, role definitions usually come from the client side. The boundaries are written directly into the project task agreement. As for teachers' primary duties, we implement a dual-appointment system. A teacher can belong to both the School of Art and the Industry College at the same time. The workload they complete in the Industry College is counted directly toward the School's performance evaluation. This way, the contradiction between "public duties" and "external collaboration" disappears. Doing interdisciplinary industry projects is no longer extra work it is part of their core job.

Expert 5: Our positioning is relatively ambiguous, and this is actually a strategy. Education is complex, and it is difficult to draw a clear line between aesthetic education and moral education. Within our aesthetic education teams, everyone often takes part in multiple roles, without very rigid boundaries.

Coordination of primary duties mainly relies on reform in workload calculation. We convert interdisciplinary social service and curriculum development into standard workload, and the coefficient is set quite high. As a result, teachers feel that this work is worthwhile, and they naturally take the initiative to adjust their time. At the college level, we are also very supportive and help teachers rearrange their teaching schedules.

Expert 6: In academic teams, roles are negotiated collectively whoever has expertise in a given area takes responsibility for it. There are no administrative orders; everything relies on professional self-discipline. If someone fails to fulfill their duties, it is regarded as an issue of academic integrity, and their reputation within the community will suffer.

Regarding primary responsibilities, we allow faculty members to leverage support. For example, if a teacher is heavily involved in an interdisciplinary project, their graduate students may help share part of the undergraduate teaching tasks. As long as quality is assured, the university tacitly permits this practice. We try to create enabling conditions for our teachers as much as possible.

Question 10. How does the university dynamically assign roles based on team members' professional expertise and strengths? When project needs change or members' competencies develop, what mechanisms govern role adjustment? In practice, how does the institution balance issues of role authority that stem from differences in disciplinary contribution levels?

Expert 1: We implement a “menu-based” team formation approach. Whenever a new project arises, we circulate a task menu in the virtual teaching–research group, and teachers select roles according to their expertise and competencies. If project requirements change midway—for instance, shifting from an offline exhibition to an online format—we reopen recruitment to bring in teachers with technical strengths, while original members may transition into advisory roles. The adjustment mechanism is highly flexible. We operate a rolling project system in which teachers can join or exit as needed, provided project continuity is maintained. This elasticity also benefits professional development, as teachers have opportunities to experiment with different roles.

Expert 2: When assigning roles, we intentionally place promising young teachers in relatively critical positions to stretch their capabilities. For example, a young painter with programming skills may be appointed as the technical lead. If project requirements change or a teacher's competencies no longer align with role demands, we hold a team review meeting where members collectively reassess and

reconfigure responsibilities. At the institutional level, intervention is minimal; there is strong trust in the team's capacity for self-regulation. We also provide professional development opportunities. If a teacher lacks certain competencies required by a role, the university funds relevant training to support skill acquisition.

Expert 3: We adjust roles based on project phase milestones. For example, during the concept development stage, designers take the lead; during the engineering stage, engineers take over. If someone in the team acquires a new skill—for instance, an art teacher learns 3D modeling—we assign them responsibility for modeling in the next phase and modify their role accordingly. Mechanism-wise, we have a weekly meeting system. Every week, we make small adjustments to task allocation based on progress and team members' status. If major changes occur, we initiate a formal change management process to reassess each person's contributions and responsibilities.

Expert 4: In our research center, roles are topic-based. For example, if the research focuses on Dong Grand Song, specialists in ethnic music naturally take the lead; if the next project is about Dong architecture, those in design step forward. Our work is issue-driven, so roles are fluid. As team members develop their capabilities, they can apply to take on more complex modules. Adjustments are mainly made through democratic consultation whoever the group agrees is most suitable takes the responsibility. We strongly encourage this kind of internal mobility, as we believe it keeps the team dynamic and vibrant.

Expert 5: Roles are allocated based on task packages. A large project is decomposed into several task packages, and each package specifies a required skills list. Teachers claim packages according to their current competencies. If project needs change, the task packages are redefined, and teachers can withdraw from or re-select packages accordingly. For teachers whose capacities are developing, we intentionally guide them to take on higher-level task packages as a form of progression. At the institutional level, the university maintains faculty competency profiles to dynamically track capability changes, which then serve as evidence for subsequent role allocation.

Expert 6: We implement a project manager responsibility system. Role allocation is primarily determined by the project manager, but decisions must be evidence-based. We operate an internal talent inventory system that maps each member's skill tree. When project requirements change, the system enables rapid matching of suitable personnel. The adjustment mechanism is relatively formal, as major changes usually involve resource reallocation and therefore require administrative approval. Minor adjustments—such as adding a small feature can be resolved internally within the team. We place strong emphasis on person–position fit: if a role match proves unsuitable, personnel are replaced rather than accommodated, as this is considered essential for project success.

6) Institutional support for interdisciplinarity

Question 11. How is the funding support system for interdisciplinary teams in the art disciplines structured at your university? How does the university ensure sustained investment in such research projects rather than one-time funding?

Expert 1: Our funding mainly comes from vertical research grants and the university's New Liberal Arts development initiatives. To ensure continuity of investment, we have established a project echelon system. When we secure a national-level project, the university provides matching funds and requires us to allocate a portion specifically to incubate sub-projects. In this way, when a major project concludes, smaller projects have already grown to take its place. For balance, we implement a categorized budgeting approach. For purely theoretical research, we prioritize support for data collection and academic exchange. For applied research, we focus on equipment and student labor costs. For industry-oriented transformation projects, we mainly support pilot testing and market promotion. Funds are earmarked for specific purposes so that each type of work receives appropriate support.

Expert 2: Our funding structure is pyramid-shaped. At the top are national-level major projects, the middle consists of provincial/ministerial grants and industry-sponsored horizontal projects, and the base is the university's seed funding. Sustained investment relies on performance-based rolling support. If a previous

project performs well and achieves a high rate of external funding inflow, the university increases support for the next project. In terms of balance, we take a pragmatic approach. Pure art research receives relatively less funding, but we guarantee a baseline through discipline development funds. For interdisciplinary applied research and industry transformation, we encourage teams to generate their own revenue. A proportion of the income they earn can be retained and reinvested, creating a self-reinforcing cycle where the more they accomplish, the more momentum they gain.

Expert 3 Our funding sources in teacher-training universities are relatively limited, mainly relying on government appropriations. Our strategy for securing sustained investment is bundling. We package curriculum development, textbook development, and teaching platform construction into one large “New Teacher Education” project and apply it as a whole, so the funding can cover three to five years at once. In terms of balance, we have a funding adjustment pool. If pure art research faces shortages, a portion can be reallocated from the surplus of industry-sponsored projects, but this requires proper justification. We try to ensure that theory-oriented faculty can also receive a share. It may not be much, but at least it sustains their basic research work.

Expert 4: We have set up an interdisciplinary innovation fund specifically to support creative projects that are stuck in the “valley of death” stage. Sustained investment mainly comes from returns on research commercialization. We encourage faculty to license the copyrights of their works or develop cultural and creative products. The university takes a small management fee, and the rest is returned to the team for further research. In this way, pure art can also generate outputs, and interdisciplinary work can be monetized. In terms of funding allocation, we focus on impact. Projects that can win awards, be exhibited, or deliver public benefits receive more funding.

Expert 5: We are currently exploring diversified funding channels. In addition to government appropriations, we actively seek corporate sponsorship and alumni donations. To ensure sustained investment, we have established an alumni fund

dedicated to supporting young faculty in interdisciplinary exploration. Balancing funding is a challenge. At the school level, disciplinary evaluations are used to safeguard the foundation of pure arts research, while major institutional projects are designed to compete for the strategic high ground in interdisciplinary applications. Each level follows its own track without competing for the same resources.

Expert 6: Interdisciplinary teams are required to undertake industry-oriented projects; only by generating revenue can they receive a share of funding allocations. For pure arts research, we rely on the university's basic research operating funds as a foundational guarantee. Sustainability depends largely on brand reputation. As long as our rural revitalization projects build a strong track record, government agencies and enterprises will proactively approach us with funding.

In terms of resource allocation, teams that bring in more funding receive a larger share. Although this market-oriented mechanism may seem harsh, it is the most effective it pushes everyone to balance diverse demands.

Question 12. In promotion reviews, performance evaluations, and reward systems, how does the university recognize the academic value of interdisciplinary research outcomes?

Expert 1: We implement a “representative work” evaluation system what matters is producing top-tier outcomes rather than sheer quantity. For interdisciplinary work, we have established a cross-disciplinary review panel composed of leading experts from different fields, who are capable of evaluating hybrid forms of achievement. At the project approval stage, contribution agreements are signed in advance, and workload is converted proportionally according to agreed contribution ratios.

Expert 2: Teacher education institutions place greater emphasis on educational outcomes. Many of our interdisciplinary achievements take the form of courses, textbooks, or teaching models. We have developed specific evaluation criteria for teaching achievement awards, with strong attention to their actual implementation data in real teaching contexts. For outputs with unclear disciplinary attribution, we classify them based on the discipline of the first affiliated unit or the

principal lead, while also granting corresponding participation recognition to collaborators. We strive to make evaluation as detailed and quantified as possible for example, assigning different point values for chief editors and contributing editors so as to reduce ambiguity.

Expert 3: In art institutions, the forms of outcomes are very diverse artworks, exhibitions and performances, as well as academic papers. We have established an equivalency conversion table for achievements. For example, a gold award at a national-level exhibition is considered equivalent to one CSSCI paper. For interdisciplinary outcomes, we place strong emphasis on social impact. If a design truly helps villagers sell their pomelos, that is regarded as a major achievement. Regarding contribution, we trust evaluation within the academic community. If a teacher is widely recognized within the professional field as the core contributor, even if their authorship appears later in the list, we will provide special recognition and explanation in the promotion review process as a form of encouragement.

Expert 4: We have established a green channel in the professional title evaluation process. If someone is a key contributor to a major interdisciplinary project, as long as they meet the basic threshold, they can be promoted with priority. For contributions that are difficult to quantify, we introduce peer review. We invite experts from other universities to score and identify who the core contributors are. We have also reformed the reward system. If a major award is obtained through interdisciplinary collaboration, the authority to distribute the bouns is delegated to the team leader, who allocates it based on each member's actual contribution.

Expert 5: Our solution is classified evaluation. If an outcome is more art-oriented, we assess it according to the norms of the art field looking at curatorial work and awards. If it is more technology-oriented, we follow the standards of the engineering field looking at patents and practical applications. For achievements that are truly hard to categorize, we establish a dedicated Interdisciplinary Contribution Award, with separate indicators that do not compete with traditional evaluation quotas.

Expert 6: We rely on contracts and data. The project contract specifies the ownership of outcomes, which directly determines who receives credit for professional title evaluation. For grey areas for example, when an app involves both design and coding we quantify using data, such as lines of code and the number of design drafts. If it is still difficult to separate, we classify it according to the applying unit. If the applicant unit is from science and engineering, then it is counted as a science and engineering achievement. We try to set the rules clearly in advance.

Focus Group Discussion Field Notes

Date & Time: January 26/27/28, 2026, 09:00–12:00

Venue: Conference Center, Guangxi Arts University, Nanning

Moderator: Research Team Recorder

Meeting Theme:

Evaluation of Expert Interview Recommendations on Interdisciplinary Team Building in Art Disciplines at Universities in Guangxi

Meeting Objectives:

1. To assess the feasibility and applicability of the expert interview recommendations.
2. To propose improvement suggestions in light of the specific context of Guangxi.
3. To build consensus and promote interdisciplinary team development in art disciplines at universities in Guangxi.

Meeting Agenda:

1. The moderator introduces the background and objectives of the meeting.
2. Review of the expert interview recommendations.
3. Group discussions on the feasibility and applicability of the recommendations.
4. Group representatives report discussion outcomes.
5. Plenary discussion among all experts to reach a consensus.

Moderator: Good morning, distinguished experts. Based on the earlier expert interviews, we distilled six variables encompassing a total of 48 management recommendations. Today, we invite you to assess the feasibility of these recommendations from a practical perspective. What are your overall views?

Group1: January 26, 2026, 09:00–12:00

Expert 1: I will start. After reviewing these recommendations, I strongly agree with them especially the parts concerning transformational leadership and team psychological safety. The emphasis on informal communication and decentralization

aligns perfectly with the ethos of art institutions. Our faculty at Guangxi Arts University has strong individual personalities; relying on administrative commands simply does not work.

Expert 2: Yes, I agree with you, particularly the recommendation on establishing a “bilingual” interdisciplinary communication mechanism. This is extremely necessary. When we work on intangible cultural heritage (ICH) digitization projects, technical staff and folklore scholars often struggle to communicate effectively.

Expert 1: Exactly. In our ICH digitization projects, communication barriers between technical personnel and folklore experts are very common.

Expert 2: That’s right. So I think the suggestion to compile an interdisciplinary glossary is very feasible. For example, in next semester’s anthropology workshop, we could try producing such a glossary.

Expert 3: However, regarding the recommendations on rolling performance evaluation and “earning funding through projects,” I think some adjustments are needed for Guangxi Arts University. As a specialized art institution, much pure art research (such as oil painting or traditional Chinese painting creation) is difficult to monetize directly. If we overemphasize revenue generation as a condition for funding allocation, it may harm foundational artistic creation.

Expert 4: Your concern is very realistic. We do need to strike a balance in implementation. The recommendations mention establishing “disciplinary special zones” and classified evaluation, which we support. I suggest adding one more point: for pure art creation, evaluation should be based on exhibitions and awards; for interdisciplinary applied projects, industrial transformation can be used as the evaluation criterion. This way, we preserve our core strengths while still encouraging cross-boundary collaboration.

Expert 3: This dual evaluation standard sounds reasonable and takes into account those of us engaged in pure art.

Expert 5: I would like to add something. Regarding the dual-appointment system in role negotiation, it is difficult for us to implement in practice. Guangxi Arts

University is a single-discipline institution. When we want to appoint faculty from engineering universities, their positions and affiliations are elsewhere, making dual appointments very challenging.

Expert 1: Indeed, personnel barriers are a major issue.

Expert 5: The mentorship system mentioned in the recommendations seems more practical. We could invite external experts as industry or technical mentors. This would be project-based collaboration rather than formal personnel dual appointments.

Expert 6: As for the shared vision component, the recommendation to communicate vision through storytelling is excellent this is something art institutions are particularly good at. However, when implementing layered decoding of the vision, I suggest placing greater emphasis on the artistic core. If the vision is framed entirely around technology and industry, faculty may feel that it does not belong to an art academy. The core of the vision must remain artistic innovation.

Expert 2: Exactly. If the vision is all about technology and industry, our faculty will feel it is not the business of an art institution.

Expert 6: Yes, the core of the vision must be artistic innovation.

Expert 7: I think the anonymous proposal mechanism under team psychological safety is a good idea. However, in practice, artists place great importance on authorship and discursive authority. Fully anonymous proposals may reduce motivation. Could we consider signed-but-protected proposals instead?

Expert 3: How should we understand “signed but protected”?

Expert 7: It means allowing people to raise dissenting opinions with their names attached, while guaranteeing no retrospective accountability or punishment. This may be more compatible with our institutional culture.

Expert 8: Overall, these recommendations are very grounded in reality. In particular, the flexible working system and artistic sabbaticals are practices our university has already begun to implement. These recommendations provide strong theoretical support and give us greater confidence in promoting such policies in the future.

[Consensus of Group 1]:

The group highly endorses the recommendations. However, it is suggested that the dual-appointment system be replaced with project-based collaboration or an external mentor system; performance evaluation should adopt a dual standard distinguishing pure art from interdisciplinary work; vision communication should reinforce the centrality of artistic ontology; and the anonymous proposal mechanism should be adjusted to a signed-but-protected (non-retaliation) model.

Group 2: January 27, 2026, 09:00–12:00

Expert 1: I think these recommendations are highly applicable to teacher-training universities. In particular, the joint co-construction model mentioned under crossing interdisciplinary boundaries aligns perfectly with our positioning of integrating arts and education. Our current virtual teaching and research communities are already operating in this way. The curriculum co-construction and collective seminars summarized in the recommendations are essentially our daily practice.

Expert 2: Yes, our virtual teaching and research communities are doing exactly this. Curriculum co-construction and collective discussion, as described in the recommendations, are already part of our routine work.

Expert 3: I strongly agree with the suggestion under shared vision to translate the vision into concrete task lists. Faculty in teacher-training universities are extremely busy with both teaching and research; abstract goals attract little attention. Only when the vision is translated into tangible tasks such as developing a course or compiling a textbook will people mobilize quickly. This recommendation is very precise.

Expert 2: Regarding transformational leadership, the emphasis on respecting disciplinary differences is particularly important in normal universities. Faculty in education tend to think in a more rigorous and structured way, while those in the arts are often more divergent and creative. The recommendation not to constrain everyone with rigid standards is absolutely correct. I would add one point: in

coordination, as long as it benefits students, whether one comes from a technical or artistic background, people are generally willing to sit down and negotiate.

Expert 4: On a more practical note, I have a small suggestion. Regarding the risk pool and seed funding under interdisciplinary institutional support, as a comprehensive university, our financial management is relatively strict. Fully opening reimbursement for failed attempts may be difficult under existing audit requirements. I suggest reframing these as pilot reform projects, with clearly defined fault-tolerance mechanisms and specific audit procedures. This approach would ensure compliance while still encouraging innovation.

Expert 1: This is indeed a real issue financial audit procedures are often overly complex.

Expert 4: Exactly. That is why I recommend establishing pilot reform projects with explicit fault-tolerance mechanisms and dedicated audit processes, so that innovation can be encouraged in a safe and compliant manner.

Expert 5: I am particularly concerned with role negotiation and clarification. The recommendation on workload exchange is theoretically sound, but in practice it is difficult to operationalize. How should working hours be quantified? For example, if a theory-oriented scholar spends an entire afternoon thinking, does that count as working hours?

Expert 6: This highlights the inherent difficulty of quantifying cognitive labor.

Expert 5: I suggest introducing an outcome-oriented workload calculation method for instance, assigning a certain number of working hours to the completion of a teaching module rather than relying solely on clock-in or time-based measures.

Expert 7: I think the role-switching mechanism under team psychological safety is excellent. As a junior faculty member, I would very much like to attend courses in education or technology. However, I suggest that the university provide institutional safeguards, such as recognizing interdisciplinary course attendance as part of the official workload or granting credit recognition. Without such mechanisms, it is difficult for young faculty to sustain motivation.

Expert 3: This is a very practical suggestion. We should indeed take into account the tangible benefits for early-career faculty.

Expert 8: Overall, these recommendations are highly instructive for advancing the development of the New Liberal Arts. I particularly appreciate the establishment of an interdisciplinary “bilingual” communication mechanism. At normal universities, the jargon of education and that of the arts are indeed quite different. We plan to compile a glossary of educational aesthetics next semester to bridge the two discourses.

Expert 1: That’s an excellent idea. A glossary is a very effective entry point.

Expert 8: I only have one minor revision suggestion. The recommendations mention leveraging external pressure to build consensus. In our university, in addition to policy and industry pressures, the demands of basic education reform constitute an even stronger external driver. I suggest that, in the vision section, greater emphasis be placed on aligning with the aesthetic education needs of primary and secondary schools. This would give interdisciplinary efforts a more focused and concrete direction.

[Consensus of Group 2]:

The group highly endorses the recommendations. It is suggested that, for financial compliance, seed funding be standardized as pilot reform projects with explicit audit and fault-tolerance mechanisms; that workload quantification adopt an outcome-oriented calculation approach; that the shared vision incorporate the aesthetic education needs of primary and secondary schools as a core external driving force; and that institutional guarantees be provided for young faculty’s interdisciplinary learning through workload recognition or credit certification.

Group 3: January 28, 2026, 09:00–12:00

Expert 1: I think these recommendations are excellent, especially the emphasis under interdisciplinary boundary crossing on product-oriented logic and evidence-based decision-making. This aligns perfectly with the mindset of science and engineering universities. In our rural revitalization projects, outcomes speak for

themselves. The project manager responsibility system mentioned in the recommendations is something we have already been implementing, and it has proven very effective.

Expert 2: The milestone-based role allocation proposed under role negotiation is extremely practical. During the project design phase, art faculty take the lead; when it moves into the engineering structure phase, colleagues from structural engineering and materials science take over. The boundaries are clear, and conflicts are much less likely.

Expert 3: I would suggest adding one more point: in the distribution of outcomes and benefits, contributions should also be strictly allocated according to milestones. We should not allow the fact that engineers dominate the final phase to overshadow the contributions of early-stage artistic design.

Expert 2: Yes, this addition is critical.

Expert 4: I am particularly interested in the rolling performance mechanism and the “earn-to-sustain” model under interdisciplinary institutional support. This is a model that science and engineering disciplines favor. Our university has substantial horizontal (industry-funded) projects. If a proportion of the revenue generated could be allocated as a team development fund, faculty motivation would increase dramatically.

Expert 1: But the proportion needs to be carefully defined; otherwise, it could lead to disorder.

Expert 4: Exactly. That is why I suggest clearly specifying the ratio in practice for example, retaining 30% for reinvestment in R&D and allocating the remainder to performance incentives. This would ensure sustainability.

Expert 5: Regarding the bilingual communication mechanism under transformational leadership, I think compiling a glossary alone is not sufficient. Greater emphasis should be placed on standardized documentation. Engineering faculty are accustomed to flowcharts and Gantt charts, while art faculty tend to rely on hand-drawn sketches.

Expert 6: Yes, inconsistent drawing and documentation formats are one of the biggest pain points.

Expert 5: Precisely. While the recommendations mention adopting a common framework, I suggest directly mandating the use of engineering project management software as a compulsory tool. This would force all participants to work on a unified platform, maximizing efficiency.

Expert 7: I am very interested in the “creative green light” mechanism under team psychological safety. However, in institutions with a strong engineering culture, people can sometimes be overly rational and dismiss creative ideas too quickly. I suggest not only prohibiting immediate rejection, but also establishing a “creative protection period.” For example, during the first 30 minutes of a brainstorming session, any negative evaluation should be prohibited; no matter how unconventional an idea is, it should first be recorded.

Expert 1: The idea of a 30-minute protection period is very interesting and worth trying.

Expert 8: Overall, the recommendations are excellent. I would like to raise one point regarding shared vision. The recommendations mention interest alignment, but in our context, this involves not only individual interests but also the tripartite interests of government, universities, and enterprises. I suggest that, when formulating the vision, government and industry needs should be explicitly written in as key indicators. This would give interdisciplinary teams a broader and more sustainable space for development.

Expert 4: I completely agree. Government demand is the backbone of our projects.

Expert 7: Regarding the recommendations on interdisciplinary boundary crossing, I think there should also be a stronger emphasis on technological ethics. As art increasingly integrates with AI, faculty with engineering backgrounds may be less sensitive to ethical issues such as copyright and algorithmic bias.

Expert 8: This is a very novel perspective.

Expert 7: I suggest incorporating a humanities- and ethics-based review mechanism into the knowledge integration process, allowing art and humanities scholars to participate in ethical oversight.

Expert 2: I agree with everyone's views. These recommendations are highly operational for the development of integrated science, humanities, and art disciplines. I would like to add one point under role negotiation: the same principle of dynamic roles should apply to the management of student interdisciplinary teams. Faculty should avoid rigid control and instead allow students to experiment with different roles across projects.

[Consensus of Group 3]:

The group highly endorses the recommendations. It is suggested that standardized collaboration be enforced through mandatory project management software; that outcome distribution be quantitatively aligned with milestone-based contributions; that a technological ethics review mechanism be added to knowledge integration; that government and enterprise demands be incorporated as explicit indicators in the shared vision; and that dynamic role principles also be applied to the management of student interdisciplinary teams.

Summary

After in-depth discussions, the three focus groups (GXAU, GXNU, and GLUT) reached near-unanimous agreement that the 48 recommendations derived from the expert interviews are highly feasible and contextually targeted. The proposed revisions, reflecting institutional contexts and cultural differences, mainly focus on the following areas:

1) Group1: Emphasizing the primacy of artistic ontology; adjusting the “dual-appointment system” to a “project-based/mentorship-based” model; and optimizing anonymity mechanisms into a “signed-but-protected” approach.

2) Group2: Specifying fault-tolerance mechanisms as “pilot reform projects” to meet audit requirements; and incorporating “primary and secondary school aesthetic education needs” as a key driver of the shared vision.

3) Group3: Introducing mandatory standardized management tools; adding a technological ethics review component; and clarifying the weighting of government and enterprise demands in benefit distribution.

These refinements will further enhance the applicability and effectiveness of the management model across different types of universities in Guangxi.

Moderator: Thank you to all three groups for the in-depth discussions. It is clear that there is a strong consensus regarding the 48 recommendations derived from the earlier expert interviews, which are widely recognized as capturing the key issues in interdisciplinary team development within art disciplines at universities in Guangxi.

Based on the feedback from the three groups, the following core revisions have been formulated:

At the Institutional support for interdisciplinarity level:

Group1: Implement a dual-track system to protect the foundational role of pure art research and prevent its marginalization by interdisciplinary applications.

Group2: Add “teaching application data” as a core evaluation indicator for interdisciplinary outcomes.

Group3: Enforce rigid Full-Time Equivalent (FTE) workload calculations to ensure substantive commitment.

1)At the transformational leadership, role negotiation and clarification) levels:

Group1: Adjust the dual-appointment system to more flexible project-based joint appointments or flexible talent engagement.

Group2: Pilot a “signed-but-protected” mechanism within TPS (Team Psychological Safety) to replace purely **anonymous systems**.

Group3: Emphasize rigid management, using processes and contracts to regulate roles.

2)At the interdisciplinary boundary spanning, shared vision levels:

Group1 Shift the focus of the shared vision from market value to cultural and social impact.

Group2: Add a curriculum-oriented pathway to IBS, with attention to blended courses and textbook development.

Group3: Mandate the inclusion of technological ethics review within IBS, and emphasize communication formats such as technical salons and demo presentations.

4. Assessment Checklist

Assessment Checklist of the Model for developing the managerial effectiveness model of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi.

Thank you very much for your busy schedule and participation in the evaluation of this study. Please assess the suitability and feasibility of the model for developing the managerial effectiveness model of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi.

Development of a managerial effectiveness model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi			
Content (Assessment Checklist)	suitability	feasibility	suggestion
Cultivating transformational leadership			
1. Establish interdisciplinary communication mechanisms. Facilitate interaction among faculty from different disciplines through workshops, seminars, and related activities, in order to break down disciplinary barriers and develop a shared language.	√	√	Supported.
2. Implement a dual-leadership system. Appoint two leaders in interdisciplinary teams one from the arts and one from another discipline to balance power and prevent dominance by a single discipline.	√	√	Partially supported with reservations. Group 1 pointed out that in specialized arts institutions, the “dual-appointment/dual-leadership” system faces institutional barriers, and suggested replacing it with project-based collaboration or an external mentorship system; however, they endorsed the governance logic of “balancing power.”

Development of a managerial effectiveness model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi			
Content (Assessment Checklist)	suitability	feasibility	suggestion
3. Adopt an outcome-oriented approach. Focus on final project outputs and use objective results to drive convergence in values and collaboration standards among team members.	√	√	Supported with conditions. Group 3 highly endorses the outcome-oriented approach; Group 1 explicitly proposed the need to prevent the “outcome-oriented” approach from marginalizing pure artistic creation, suggesting that it be paired with a classified evaluation system.
4. Provide differentiated career pathway guidance. Design personalized promotion pathways based on faculty members’ disciplinary backgrounds and developmental needs, and support these pathways with appropriate training resources.	√	√	Supported.
5. Cultivate an informal communication climate. Promote interaction and emotional bonding among faculty from different disciplines through tea gatherings, salons, and field trips.	√	√	Supported.

Development of a managerial effectiveness model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi			
Content (Assessment Checklist)	suitability	feasibility	suggestion
6. Promote academic sabbaticals and flexible work arrangements. Allow room for trial and error, reduce psychological pressure, and enhance faculty motivation and engagement.	√	√	Supported.
7. Lead by example in learning from other disciplines. Administrators should proactively acquire knowledge from other fields, demonstrate respect for diverse disciplines, and help eliminate disciplinary bias.	√	√	Supported.
8. Establish interdisciplinary innovation seed funds. Provide financial support for early-stage interdisciplinary projects to encourage experimentation and innovation.	√	√	Supported but requires institutional revision. Group 2 emphasized audit and compliance risks, suggesting implementation through “pilot reform projects + fault-tolerance mechanisms.”

Development of a managerial effectiveness model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi			
Content (Assessment Checklist)	suitability	feasibility	suggestion
9. Introduce external expert review. When internal consensus is difficult to achieve, invite external experts to conduct evaluations and provide objective perspectives.	√	√	Supported.
10. Establish an interdisciplinary coordination body. Create a dedicated institutional unit responsible for coordinating interdisciplinary collaboration and resolving conflicts and operational issues.	√	√	Supported.
Foster team psychological safety			
1. Establish a structured post-project review mechanism. Treat project setbacks as learning opportunities by conducting systematic review meetings to analyze problems, encourage open discussion of failures, and extract lessons learned.	√	√	Supported.
2. Introduce a “creative green light” policy. During brainstorming sessions, encourage free expression and prohibit the use of negative or dismissive language, creating an open	√	√	Supported.

Development of a managerial effectiveness model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi			
Content (Assessment Checklist)	suitability	feasibility	suggestion
atmosphere in which all members can express their genuine ideas.			
3. Implement an anonymous proposal system. Allow ideas and feedback to be submitted through anonymous channels, ensuring that all members especially early-career faculty or those from less dominant disciplines can speak freely without being constrained by authority.	√	√	Supported with modifications. Group 1 and Group 3 pointed out that artistic culture places high value on authorship, suggesting an adjustment to a “signed-but-protected (non-retaliation)” mechanism.
4. Incorporate objective third-party evaluation. When internal deliberations reach an impasse, invite external experts or industry partners to conduct reviews, providing an objective perspective to resolve subjective internal conflicts.	√	√	Supported.
5. Enforce an issue-focused, not person-focused, critique principle. Establish strict communication norms requiring all feedback to target specific proposals, data, or processes, while	√	√	Supported.

Development of a managerial effectiveness model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi			
Content (Assessment Checklist)	suitability	feasibility	suggestion
strictly prohibiting personal attacks based on individual competence or disciplinary background, so as to protect team members' dignity.			
6. Implement a three-minute rotating speaking rule. In decision-making meetings, mandate turn-taking and a no-interruption rule to ensure that every discipline's voice is heard and to prevent domination by more powerful members.	√	√	Supported.
7. Protect a buffer zone for dissenting voices. Publicly acknowledge members who raise constructive opposing views and provide them with space for further argumentation, encouraging the constructive exchange of diverse perspectives.	√	√	Supported.
8. Use success cases to build psychological safety. Publicize representative cases in which trial and error ultimately led to success, demonstrating that failure is both permissible and valuable, thereby fostering a positive psychological safety net	√	√	Supported.

Development of a managerial effectiveness model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi			
Content (Assessment Checklist)	suitability	feasibility	suggestion
and encouraging experimentation and innovation.			
9. Establish psychological counseling mechanisms. Provide access to counseling services to help team members cope with stress and challenges and maintain healthy psychological well-being.	√	√	Supported.
10. Conduct regular team-building activities. Strengthen team cohesion, enhance mutual trust, and cultivate a harmonious and supportive team climate.	√	√	Supported.
11. Build trust-enhancing mechanisms. Promote mutual trust among members through instruments such as team charters and regular communication, reducing suspicion and misunderstanding.	√	√	Supported.
12. Establish conflict management mechanisms. Put in place effective procedures such as negotiation and mediation to resolve conflicts in a timely manner, prevent escalation, and	√	√	Supported.

Development of a managerial effectiveness model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi			
Content (Assessment Checklist)	suitability	feasibility	suggestion
safeguard the overall functioning of the team.			
Forge shared vision			
1. Adopt a combined top-down and bottom-up approach to vision formulation. Through multiple rounds of consultation meetings, incorporate frontline faculty input so that the vision is co-created by all members, thereby enhancing collective ownership, identification, and participation.	√	√	Supported.
2. Develop intuitive roadmaps and implementation blueprints. Decompose long-term strategic visions into visualized phased goals and concrete tasks, enabling each member to clearly understand their current position and next steps, and to align their efforts accordingly.	√	√	Supported.
3 Communicate the vision through storytelling. Convey the vision by narrating institutional history, alumni success stories, or future scenarios, imbuing the vision with emotional resonance,	√	√	Supported.

Development of a managerial effectiveness model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi			
Content (Assessment Checklist)	suitability	feasibility	suggestion
strengthening members' sense of identity and mission, and motivating sustained engagement.			
4. Translate the vision into concrete task lists. Break down overarching goals into checkable quarterly or monthly task lists, ensuring that the vision is operationalized and transformed into actionable guidance.	√	√	Supported.
5. Translate the vision into concrete task lists. Break down overarching goals into checkable quarterly or monthly task lists, ensuring that the vision is operationalized and transformed into actionable guidance.	√	√	Supported.
6. Leverage external pressure to build internal consensus. When internal agreement is difficult to achieve, reference national policies, industry demands, or third-party evaluation standards as external benchmarks, converting external pressure into internal collaborative momentum.	√	√	Supported with modifications. Group 1 proposed shifting from a “market/industry-oriented” focus to “cultural and social value”; Group 2 added “primary and secondary school

Development of a managerial effectiveness model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi			
Content (Assessment Checklist)	suitability	feasibility	suggestion
			aesthetic education needs”; Group 3 emphasized “government and industry demands.”
7. Establish milestone celebration mechanisms. Publicly recognize and reward teams upon achieving phased objectives, reinforcing confidence in the shared vision and strengthening team cohesion	√	√	Supported.
8. Implement an interest-alignment strategy. Clearly communicate the personal benefits associated with achieving the shared vision, tightly linking collective goals with individual development to stimulate motivation and proactive engagement.	√	√	Supported with conditions, provided that the evaluation and distribution mechanisms are transparent.
9. Implement an interest-alignment strategy. Clearly communicate the personal benefits associated with achieving the shared vision, tightly linking collective goals with individual	√	√	Supported.

Development of a managerial effectiveness model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi			
Content (Assessment Checklist)	suitability	feasibility	suggestion
development to stimulate motivation and proactive engagement.			
10. Disseminate the vision through new media platforms. Use channels such as official WeChat accounts and institutional websites to communicate the shared vision to a broader audience, expanding its reach and influence.	√	√	Supported.
11. Develop a structured vision communication mechanism. Establish effective channels such as regular vision-sharing sessions and published vision-related updates to ensure that all members remain informed about the latest developments and progress of the vision.	√	√	Supported.
Expand interdisciplinary boundary spanning			
1. Establish a project-based knowledge integration model. Concretize interdisciplinary collaboration into discrete projects and use the project life cycle to regulate disciplinary inputs and	√	√	Supported.

Development of a managerial effectiveness model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi			
Content (Assessment Checklist)	suitability	feasibility	suggestion
outputs at different stages, thereby ensuring the achievement of project objectives.			
2. Adopt a unified project management and design thinking framework. Select a common working framework acceptable to all disciplines as a shared operational language, standardize workflows, reduce communication costs, and enhance efficiency.	√	√	Supported.
3. Implement a liaison (boundary-spanner) system. Appoint bilingual talents who possess competencies in both the arts and technology/management to act as liaisons, responsible for translating disciplinary terminology and requirements and facilitating effective cross-disciplinary communication.	√	√	Supported.
4. Promote a jointly co-produced output model. Require that project outcomes be demonstrably interdisciplinary; institutionally stipulate that outputs rooted in a single discipline	√	√	Supported.

Development of a managerial effectiveness model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi			
Content (Assessment Checklist)	suitability	feasibility	suggestion
alone do not meet standards, thereby incentivizing genuine knowledge integration and intellectual exchange.			
5. Promote a jointly co-produced output model. Require that project outcomes be demonstrably interdisciplinary; institutionally stipulate that outputs rooted in a single discipline alone do not meet standards, thereby incentivizing genuine knowledge integration and intellectual exchange.	√	√	Supported.
6. Identify shared focal points as integration entry points. Locate common concerns across disparate disciplines and use them as cores for integrating methodologies and discourses—for example, adopting a user-centered orientation to synthesize knowledge from the arts, technology, and social sciences.	√	√	Supported.
7. Use prototyping and iteration to facilitate integration. Develop low-fidelity prototypes (e.g., sketches or models) early in projects, enabling all disciplines to modify and comment on a	√	√	Supported.

Development of a managerial effectiveness model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi			
Content (Assessment Checklist)	suitability	feasibility	suggestion
shared artifact; iterative refinement helps build consensus and deepen mutual understanding.			
8. Establish an interdisciplinary issue repository or knowledge graph. Systematically document typical problems encountered in collaboration and their solutions to create organizational memory, provide cross-boundary references for new teams, and reduce repeated coordination costs.	√	√	Supported.
9. Build interdisciplinary knowledge-sharing platforms. Create online and/or offline platforms to promote cross-disciplinary knowledge exchange, such as interdisciplinary libraries and databases.	√	√	Supported.
10. Encourage interdisciplinary curriculum development. Offer interdisciplinary courses to cultivate cross-disciplinary talent, such as programs integrating art and technology or art and the humanities.	√	√	Supported.

Development of a managerial effectiveness model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi			
Content (Assessment Checklist)	suitability	feasibility	suggestion
11. Establish interdisciplinary research platforms. Create dedicated platforms that provide hardware and software support for interdisciplinary research, including interdisciplinary laboratories and research centers.	√	√	Supported.
12. Develop an interdisciplinary talent cultivation system. Implement structured training pathways for interdisciplinary talent, such as interdisciplinary graduate programs and cross-disciplinary academic symposia.	√	√	Supported.
Clarify role negotiation and clarity			
1. Implement a menu-based team formation and task-claiming system. Package project tasks into a “menu” from which members can claim responsibilities according to their expertise and interests, thereby improving person–task fit and allowing flexible adjustment as project needs evolve.	√	√	Supported.
2. Introduce workload exchange and equivalency	√	√	Supported with conditions. Group 2

Development of a managerial effectiveness model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi			
Content (Assessment Checklist)	suitability	feasibility	suggestion
mechanisms. Formally recognize the time faculty invest in interdisciplinary teams by converting it into equivalent teaching workload or research credit.			considers that “time” is difficult to quantify and suggests changing to an outcome-oriented conversion calculation.
3. Establish dual-appointment arrangements and flexible staffing affiliations. Allow faculty to be affiliated with two colleges or centers simultaneously, with interdisciplinary work fully recognized by their home units, thereby institutionally resolving conflicts of role and identity.	√	√	Partially feasible. Group 1 explicitly pointed out institutional barriers and suggested replacing it with a project-based or mentorship system.
4. Implement phased leadership transfer mechanisms. Define disciplinary leadership roles according to the project life cycle, clarifying decision-making authority at each stage to avoid continuous power struggles or responsibility shirking.	√	√	Supported.
5. Formalize responsibilities, rights, and benefits through contribution agreements. Prior to project initiation, clearly	√	√	Supported.

Development of a managerial effectiveness model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi			
Content (Assessment Checklist)	suitability	feasibility	suggestion
specify individual duties, contribution ratios, and rules for outcome attribution and ranking in written agreements.			
6. Use weekly meetings for micro-adjustment and reflection. Maintain high-frequency communication and conduct weekly fine-tuning of task allocation based on members' real-time capacities and project progress, ensuring optimal role alignment throughout the project.	√	√	Supported.
7. Encourage flexible entry-and-exit participation. Allow members to join or exit projects at different stages according to their strengths, without requiring full-cycle participation, as long as they make substantive contributions during relevant phases.	√	√	Supported.
8. Establish a mentorship system for role adaptation. Assign mentors to faculty assuming new roles in interdisciplinary teams to support rapid adjustment to new responsibilities and expectations.	√	√	Supported.

Development of a managerial effectiveness model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi			
Content (Assessment Checklist)	suitability	feasibility	suggestion
9. Create an interdisciplinary talent pool. Develop and maintain a talent repository to provide a ready pool of interdisciplinary expertise for project teams.	√	√	Supported.
10. Develop incentive mechanisms for interdisciplinary teams. Reward high-performing interdisciplinary teams to recognize collaborative excellence and motivate sustained cooperation.	√	√	Supported.
Refine institutional support for interdisciplinarity			
1. Establish interdisciplinary seed funds and risk pools. Create dedicated funding mechanisms to support exploratory, high-risk yet high-potential interdisciplinary projects, allowing for a relatively high tolerance of failure in order to encourage experimentation and innovation.	√	√	Supported but requires compliance measures. Group 2 suggests implementing it as “pilot reform projects + explicit audit rules.”
2. Implement a “representative work” and equivalency-based evaluation system. Break away from a paper-only	√	√	Supported.

Development of a managerial effectiveness model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi			
Content (Assessment Checklist)	suitability	feasibility	suggestion
orientation in promotion and tenure reviews by recognizing interdisciplinary outputs as representative works, supported by rigorous equivalency standards that incorporate project outcomes, patents, software copyrights, and similar outcomes.			
3. Form independent interdisciplinary review panels. At both project approval and outcome evaluation stages, assemble review committees composed of experts from multiple disciplines to ensure pluralistic perspectives and fairness, thereby avoiding single-discipline bias.	√	√	Supported.
4. Introduce rolling performance funding and bundled application mechanisms. Provide sustained financial support to high-performing interdisciplinary teams, and encourage the bundling of platform development, talent cultivation, and scientific research into large-scale project proposals to secure long-term, stable funding.	√	√	Supported.

Development of a managerial effectiveness model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi			
Content (Assessment Checklist)	suitability	feasibility	suggestion
5. Implement revenue-return incentives for research commercialization. Allow interdisciplinary teams to retain a relatively high proportion of income from technology transfer, licensing, or copyright revenues for reinvestment in subsequent R&D, thereby creating a virtuous cycle that incentivizes knowledge translation.	√	√	Supported but requires clear ratios
6. Develop quantitative contribution-allocation standards. Establish multi-dimensional quantitative models to calculate individual contribution levels to team outputs, using these metrics as the basis for reward distribution and career advancement to ensure transparency, fairness, and equity.	√	√	Supported.
7. Create disciplinary “special zones” and green channels. Provide targeted policy privileges to key interdisciplinary platforms such as autonomous recruitment or separate evaluation criteria using localized institutional breakthroughs to	√	√	Supported.

Development of a managerial effectiveness model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi			
Content (Assessment Checklist)	suitability	feasibility	suggestion
drive broader systemic reform and improve the policy environment for interdisciplinary research.			
8. Balance baseline security with strategic peak investment. While safeguarding basic funding for core disciplinary (e.g., pure arts) research, strategically concentrate resources on interdisciplinary and applied research frontiers, achieving complementary development and shared advancement.	√	√	Group 1 strongly emphasized preventing the marginalization of art.
9. Establish dedicated interdisciplinary research platforms. Build specialized platforms such as interdisciplinary laboratories and research centers to provide the necessary hardware and software infrastructure for sustained interdisciplinary inquiry.	√	√	Supported.
10. Develop an integrated interdisciplinary talent cultivation system. Systematically train interdisciplinary talent through measures such as interdisciplinary graduate programs and cross-disciplinary academic conferences and workshops.	√	√	Supported.

Development of a managerial effectiveness model for interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi			
Content (Assessment Checklist)	suitability	feasibility	suggestion
11. Institutionalize interdisciplinary project management mechanisms. Create robust systems for project governance, including standardized management procedures and evaluation frameworks, to ensure the effective implementation and oversight of interdisciplinary projects.	√	√	Supported.
12. Establish mechanisms for disseminating interdisciplinary outcomes. Develop channels such as exhibition platforms and formal result-release events to enhance the visibility, social impact, and practical application of interdisciplinary research outcome.	√	√	Supported.

Appendix D

The Results of the Quality Analysis of Research Instruments

The index of objective congruence (IOC)

Development of a Managerial Effectiveness Model for Interdisciplinary Teamwork in Art Disciplines of Universities in Ethnic Minority Regions in Guangxi

No.	Current situation of the managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi	Experts					IOC	Validity
		E1	E2	E3	E4	E5		
Transformationa leadership								
1	University administrators act as ethical role models, demonstrating professional integrity that inspires trust among interdisciplinary team members.	1	1	1	1	1	1.00	Valid
2	University administrators’ behavior reflects consistent values and standards that guide team members in decision-making and collaboration.	1	1	1	1	1	1.00	Valid
3	University administrators clearly communicate the institution’s vision for interdisciplinary collaboration, making goals understandable and motivating.	1	1	1	1	1	1.00	Valid
4	University administrators encourage team members to commit to collective goals and maintain enthusiasm for long-term collaborative projects.	1	1	1	1	1	1.00	Valid
5	University administrators encourage team members to question assumptions and explore innovative approaches in interdisciplinary research.	1	1	1	1	1	1.00	Valid
6	University administrators promote critical thinking and reflective	1	1	1	1	1	1.00	Valid

No.	Current situation of the managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi	Experts					IOC	Validity
		E1	E2	E3	E4	E5		
	discussions to enhance problem-solving and learning within the team.							
7	University administrators support experimentation and creative solutions, even when they involve uncertainty or risk.	1	1	1	1	1	1.00	Valid
8	University administrators recognize the unique strengths, expertise, and developmental needs of each team member.	1	1	1	1	1	1.00	Valid
9	University administrators provide personalized guidance, mentoring, and support to help team members achieve their professional potential.	1	1	1	1	1	1.00	Valid
10	University administrators adapt their leadership approach to address differences in team members' skills, experiences, and motivations.	1	1	1	0	1	0.8	Valid
Team psychological safety								
11	University administrators encourage interdisciplinary team members to express divergent viewpoints without worrying about negative evaluations.	1	1	1	1	1	1.00	Valid
12	University administrators ensure that team members can question existing teaching norms, research assumptions, or administrative practices in an open	1	1	1	1	1	1.00	Valid

No.	Current situation of the managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi	Experts					IOC	Validity
		E1	E2	E3	E4	E5		
	and respectful environment.							
13	University administrators normalize constructive debate in team discussions, reducing the psychological risks associated with speaking up.	1	1	1	1	1	1.00	Valid
14	University administrators treat mistakes or unexpected outcomes in interdisciplinary projects as collective learning opportunities.	1	1	1	1	1	1.00	Valid
15	University administrators provide developmental guidance and supportive feedback when setbacks occur, rather than criticism or blame.	1	1	1	1	1	1.00	Valid
16	University administrators clearly communicate tolerance for experimentation, emphasizing that innovative attempts may fail but still contribute to team progress.	1	1	1	1	1	1.00	Valid
17	University administrators foster mutual trust within interdisciplinary teams through fair treatment and transparent communication.	1	1	1	1	1	1.00	Valid
18	University administrators ensure that team members feel respected for their disciplinary identities and professional expertise.	1	1	1	1	1	1.00	Valid

No.	Current situation of the managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi	Experts					IOC	Validity
		E1	E2	E3	E4	E5		
19	University administrators provide emotional and professional support to members encountering complex teaching or research pressures.	1	1	1	1	1	1.00	Valid
20	University administrators guide collaborative decision-making in a way that promotes inclusion, shared ownership, and equitable participation across disciplines.	1	1	1	1	1	1.00	Valid
Shared vision								
21	University administrators clearly articulate the organization's long-term goals in a way that all members can easily understand.	1	1	1	1	1	1.00	Valid
22	University administrators ensure that the organization's vision is logically structured, coherent, and communicated with sufficient detail.	1	1	1	1	1	1.00	Valid
23	University administrators translate broad strategic goals into concrete priorities and actionable expectations for interdisciplinary teams.	1	1	1	1	1	1.00	Valid
24	University administrators provide consistent explanations of the organization's direction so that members can align their work with institutional priorities.	1	1	1	1	1	1.00	Valid

No.	Current situation of the managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi	Experts					IOC	Validity
		E1	E2	E3	E4	E5		
25	University administrators communicate the organization's future direction in a way that inspires enthusiasm and collective commitment.	1	1	0	1	1	0.8	Valid
26	University administrators present a vision that motivates members to invest extra effort in achieving shared institutional goals.	1	1	1	1	1	1.00	Valid
27	University administrators articulate a development vision that encourages members to pursue continuous professional growth.	1	0	1	1	1	0.8	Valid
28	University administrators promote a vision that aligns well with members' personal values and professional beliefs.	1	1	1	1	1	1.00	Valid
29	University administrators foster strong value resonance by linking the organization's vision with members' sense of purpose and identity.	1	1	1	1	1	1.00	Valid
30	University administrators encourage members to support the organization's vision because they perceive it as meaningful and personally relevant.	1	1	1	1	1	1.00	Valid
Interdisciplinary boundary spanning								
31	University administrators demonstrate the ability to integrate concepts, methods, and insights drawn from	1	1	0	1	1	0.8	Valid

No.	Current situation of the managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi	Experts					IOC	Validity
		E1	E2	E3	E4	E5		
	multiple academic disciplines.							
32	University administrators actively seek knowledge outside their primary academic background to address complex institutional challenges.	1	1	1	1	1	1.00	Valid
33	University administrators value interdisciplinary reasoning and incorporate diverse disciplinary logics into decision-making processes.	1	1	1	1	1	1.00	Valid
34	University administrators can translate specialized disciplinary language into accessible concepts that interdisciplinary teams can collectively understand.	1	1	1	1	1	1.00	Valid
35	University administrators proactively build communication channels that connect members from different disciplinary backgrounds.	1	1	1	1	1	1.00	Valid
36	University administrators foster mutual understanding and trust by encouraging open dialogue across disciplinary boundaries.	1	1	1	1	1	1.00	Valid
37	University administrators effectively mediate disciplinary differences and resolve conflicts arising during interdisciplinary collaboration.	1	0	1	1	1	0.8	Valid

No.	Current situation of the managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi	Experts					IOC	Validity
		E1	E2	E3	E4	E5		
38	University administrators act as social connectors who strengthen relational networks across academic units.	1	1	1	1	1	1.00	Valid
39	University administrators identify institutional barriers that hinder interdisciplinary collaboration and work proactively to address them.	1	1	1	1	1	1.00	Valid
40	University administrators advocate for structural or procedural reforms that facilitate long-term interdisciplinary collaboration.	1	1	1	1	1	1.00	Valid
Role negotiation and clarification								
41	University administrators clearly understand their own responsibilities and expected contributions within interdisciplinary teams.	1	1	1	1	1	1.00	Valid
42	University administrators have a clear understanding of the responsibilities and task boundaries of other team members.	1	1	1	1	1	1.00	Valid
43	University administrators clearly communicate team goals, task expectations, and performance standards to all members.	1	1	1	1	1	1.00	Valid
44	University administrators ensure that all team members share a common understanding of roles, workflows, and	1	1	1	1	1	1.00	Valid

No.	Current situation of the managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi	Experts					IOC	Validity
		E1	E2	E3	E4	E5		
	coordination requirements.							
45	University administrators actively participate in discussions to adjust role allocations based on emerging team needs or project demands.	1	1	1	0	1	0.8	Valid
46	University administrators effectively negotiate and resolve disagreements related to responsibilities or task ownership.	1	1	1	1	1	1.00	Valid
47	University administrators adjust role assignments by considering individual strengths, expertise, and workload balance.	1	1	1	1	1	1.00	Valid
48	University administrators establish transparent mechanisms that allow team members to renegotiate roles when tasks evolve.	1	1	1	1	1	1.00	Valid
49	University administrators adapt their responsibilities proactively when team priorities or project conditions change.	1	1	1	1	1	1.00	Valid
50	University administrators help maintain team performance by reallocating tasks or reorganizing workflows during periods of change.	1	1	1	1	1	1.00	Valid
Interdisciplinary support for innovation								
51	University administrators ensure that interdisciplinary research receives	1	1	1	1	1	1.00	Valid

No.	Current situation of the managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi	Experts					IOC	Validity
		E1	E2	E3	E4	E5		
	adequate, stable, and strategically allocated funding.							
52	University administrators provide the necessary equipment, facilities, and digital infrastructure required for interdisciplinary projects.	1	1	1	1	1	1.00	Valid
53	University administrators offer timely technical, administrative, and logistical support to sustain interdisciplinary research activities.	1	0	1	1	1	0.8	Valid
54	University administrators ensure that interdisciplinary teams have equitable access to institutional resources compared with single-discipline units.	1	1	1	1	1	1.00	Valid
55	University administrators develop clear policies that explicitly recognize and reward interdisciplinary research contributions.	1	1	1	1	1	1.00	Valid
56	University administrators implement performance evaluation standards that incorporate interdisciplinary outcomes as key indicators.	1	1	1	1	1	1.00	Valid
57	University administrators establish incentive mechanisms—such as grants, awards, or workload adjustments—to encourage faculty participation in interdisciplinary collaboration.	1	1	1	1	1	1.00	Valid

No.	Current situation of the managerial effectiveness of interdisciplinary teamwork in art disciplines of universities in ethnic minority regions in Guangxi	Experts					IOC	Validity
		E1	E2	E3	E4	E5		
58	University administrators establish interdisciplinary platforms, centers, or research hubs that facilitate sustained collaboration.	1	1	1	1	1	1.00	Valid
59	University administrators design clear, standardized, and easy-to-follow procedures that support interdisciplinary collaboration and project management.	1	1	1	1	1	1.00	Valid
60	University administrators coordinate across institutional units to remove procedural bottlenecks that hinder interdisciplinary teamwork.	1	1	1	1	1	1.00	Valid

Reliability analysis of research instruments

To ensure the reliability and validity of the data collected by the questionnaire, the researcher conducted a reliability and validity analysis of the questionnaire using SPSS software.

Reliability Analysis

Simplified Format of Cronbach's Reliability Analysis		
Sample Size	Number of Items	Cronbach's Alpha Coefficient
297	60	0.934

From the table above, it can be seen that the reliability coefficient value is 0.934, which is greater than 0.9, indicating that the quality of the research data reliability is high. Regarding the "CITC value," the CITC values for all analyzed items are above 0.4, indicating that there is a good correlation between the analyzed items, which also indicates a good reliability level. In summary, the reliability coefficient value of the research data is higher than 0.9, which comprehensively indicates high data reliability quality and can be used for further analysis.

Appendix E

Certificate of English



This is to certify that

Mrs. Liu Jia

Achieved BSRU English Proficiency Test (BSRU-TEP) level

C1

Given on 3rd November 2023

A handwritten signature in blue ink, likely belonging to Dr. Kulsirin Aphirattvoradej, is positioned above the official title.

(Assistant Professor Dr Kulsirin Aphirattvoradej)

Director

CS 扫描全能王 创建

Appendix F

The Document for Acceptance Research

ธ.ว. ๘๐๒๒๗ / ๒๕๖๓



มหาวิทยาลัยมหาจุฬาลงกรณราชวิทยาลัย

วิทยาเขตนครศรีธรรมราช

๓๗๓ ม. ๕ ต. มะม่วงสองต้น อ. เมือง จ. นครศรีธรรมราช ๘๐๐๐๐

โทร. ๐๗๕-๓๕๒๘๘๘ โทรสาร ๐๗๕-๓๕๕๖๒

๒๑ มิถุนายน ๒๕๖๓

เรื่อง รับรองการลงบทความวิจัยเพื่อตีพิมพ์ในวารสารมหาจุฬาลงกรณราชวิทยาลัย

เรียน นางหลิว เจีย

ตามที่ นางหลิว เจีย และรองศาสตราจารย์ ดร.นิรันดร์ สุธีนิรันดร์ ผู้ช่วยศาสตราจารย์ ดร.พัชรา เตชโฮม และผู้ช่วยศาสตราจารย์ ดร.สาธุยุทธ์ เศรษฐสุขจร ได้ส่งบทความวิจัยเรื่อง "การพัฒนารูปแบบประสิทธิภาพการบริหารจัดการการทำงานเป็นทีมแบบสหวิทยาการในสาขาศิลปะของมหาวิทยาลัยในพื้นที่ชนกลุ่มน้อยของเขตปกครองตนเองกว่างซีจ้วง (DEVELOPMENT OF A MANAGERIAL EFFECTIVENESS MODEL FOR INTERDISCIPLINARY TEAMWORK IN ART DISCIPLINES IN ETHNIC MINORITY REGIONS IN GUANGXI) เพื่อพิจารณาตีพิมพ์ในวารสารมหาจุฬาลงกรณราชวิทยาลัย มหาวิทยาลัยมหาจุฬาลงกรณราชวิทยาลัย วิทยาเขตนครศรีธรรมราช ซึ่งได้รับการคัดเลือกเข้าสู่ฐานข้อมูล ของศูนย์ดัชนีการอ้างอิงวารสารไทย (ศูนย์ TCI) ได้ถูกจัดกลุ่มคุณภาพวารสารประจำปี พ.ศ. ๒๕๖๔ ให้เป็น วารสารที่มีคุณภาพกลุ่มที่ ๑ (TCI ฐาน ๑) และอยู่ในฐานข้อมูล TCI จนถึง ๓๑ ธันวาคม ๒๕๖๒ โดยจะดำเนินการจัดพิมพ์ในฉบับต่อไปตามระยะเวลาที่ได้กำหนดไว้ และวารสารมหาจุฬาลงกรณราชวิทยาลัย ได้รับบทความวิจัยของท่านเป็นที่เรียบร้อยแล้ว

ในการนี้ วารสารมหาจุฬาลงกรณราชวิทยาลัย สังกัดมหาวิทยาลัยมหาจุฬาลงกรณราชวิทยาลัย วิทยาเขตนครศรีธรรมราช ขอรับรองว่าบทความของท่านได้ผ่านตอบรับเพื่อพิจารณาบทความตีพิมพ์เผยแพร่ในปีที่ ๑๓ ฉบับที่ ๑๒ (ธันวาคม ๒๕๖๓) นี้ ซึ่งภายหลังจากนั้นบทความจะผ่านการตรวจสอบความถูกต้องทางวิชาการ โดยกองบรรณาธิการวารสาร ฯ และผู้ทรงคุณวุฒิต่อไป

จึงเรียนมาเพื่อโปรดทราบและดำเนินการต่อไป

เรียนมาด้วยความเคารพ

(นางสาวปัทมา จงละเอียด)

บรรณาธิการวารสารมหาจุฬาลงกรณราชวิทยาลัย

มหาวิทยาลัยมหาจุฬาลงกรณราชวิทยาลัย วิทยาเขตนครศรีธรรมราช

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