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DEVELOPMENT OF A COLLABORATIVE TEACHING ABILITY ASSESSMENT MODEL FOR TOURISM MANAGEMENT FACULTY IN WUHAN UNIVERSITIES: A MIXED-METHODS STUDY

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ABSTRACT

China's transition from higher-education expansion to quality-oriented development has intensified scrutiny of teaching competence in application-oriented disciplines. Tourism Management is particularly exposed to this shift because it must reconcile theoretical rigor with rapidly changing industry practices (e.g., smart tourism platforms, data-driven service design, and digital marketing). Against this backdrop, Wuhan—an educational and tourism hub in Central China—faces a practical governance problem: existing faculty evaluation systems remain administrative-heavy and classroom-performance oriented, while under-measuring outcome alignment, feedback-driven improvement, and the enabling role of institutional–industry collaboration. To address this gap, this study develops and validates a localized, theory-informed assessment model for the teaching ability of Tourism Management faculty in Wuhan universities. The model is grounded in a triangulation of (a) teaching competence theory (Pedagogical Content Knowledge and its technological extension), (b) Outcome-Based Education (OBE) and constructive alignment, and (c) collaborative governance. An exploratory mixed-method design was adopted. In Phase 1, an initial pool of indicators was generated from literature and refined through expert consultation; content validity was supported by an Item-Objective Congruence index of 0.87. In Phase 2, survey data from 113 faculty members across five universities were used to evaluate the psychometric properties of a 20-item instrument. Exploratory Factor Analysis (KMO = 0.803; Bartlett's test $p < .001$) supported a five-factor structure explaining 75.14% of total variance: Instructional Design Ability, Teaching Evaluation and Feedback, Professional Development, Professional Knowledge and Teaching, and Information Literacy and Technology. The scale demonstrated strong internal consistency (Cronbach's alpha = 0.904). The results reveal a dual-speed faculty profile: theoretical and professional knowledge are relatively robust, whereas digital competence is uneven and appears stratified by age. The study contributes a diagnostic tool for developmental evaluation and proposes a collaborative implementation pathway that integrates university governance, faculty development, and industry engagement.

KEYWORDS: Teaching Ability Assessment, Tourism Management Education, Outcome-Based Education, Collaborative Governance, Pedagogical Content Knowledge, Smart Tourism, Faculty Development, Wuhan.

1. INTRODUCTION

Chinese higher education is undergoing a structural transition from rapid scale expansion to connotation-based quality improvement. National policy has increasingly emphasized strengthening educational evaluation systems and cultivating application-oriented talent as part of broader modernization goals (CPC Central Committee & State Council, 2020; National Development and Reform Commission, 2022). In this environment, faculty teaching competence becomes a strategic lever for institutional competitiveness and regional development. Teaching is no longer judged solely by classroom performance or publication output; it is increasingly evaluated by whether learning outcomes are achieved, whether feedback loops are closed, and whether curricula are responsive to industrial and societal change (Spady, 1994; Biggs, 1996; Biggs & Tang, 2011).

Tourism Management is an instructive case for this transition. The discipline straddles service operations, cultural and heritage stewardship, destination governance, and business strategy. Its professional field is highly sensitive to external shocks and technological disruption, including the rapid diffusion of digital platforms, algorithmic pricing, and data-driven marketing. Consequently, teaching competence in Tourism Management must encompass not only disciplinary knowledge, but also the capability to design authentic learning tasks, supervise experiential learning, and translate emerging industry practices into teachable representations (Shulman, 1986, 1987; Mishra & Koehler, 2006; Buhalis & Law, 2008).

Wuhan provides a meaningful regional context for examining this problem. As a major university city and a transportation hub, Wuhan hosts a large and diverse higher-education ecosystem, spanning research-intensive universities and application-oriented institutions. At the same time, local tourism recovery and industrial upgrading have increased demand for graduates who possess operational adaptability, digital fluency, and cross-sector collaboration skills. Yet, universities frequently report a persistent quality gap between graduate capabilities and industry expectations, especially in areas such as digital tools, scenario-based service design, and problem-solving in complex visitor systems. Faculty teaching ability is a proximate determinant of this gap because it shapes curriculum relevance, pedagogical choices, and students' exposure to up-to-date professional practices.

Despite the urgency, teaching evaluation mechanisms in many institutions remain narrow in scope. They often over-rely on end-of-semester student satisfaction surveys, administrative inspections, or research productivity indicators, which may not directly reflect outcome alignment or industry relevance. Moreover, conventional evaluations tend to treat teaching as an isolated individual activity, underestimating the enabling or constraining role of institutional support, industry partnerships, and policy incentives. This disconnect is especially problematic in application-oriented fields where teaching quality is co-produced by multiple stakeholders, including universities, enterprises, and government agencies (Ansell & Gash, 2008; Emerson, Nabatchi, & Balogh, 2012).

This study responds to the above gaps by developing and validating a localized teaching ability assessment model for Tourism Management faculty in Wuhan universities. Rather than designing a purely administrative scoring tool, the goal is to build a diagnostic instrument that supports developmental evaluation—i.e., identifying competency profiles and informing targeted faculty development. The model integrates pedagogical competence theory (PCK/TPACK), Outcome-Based Education (OBE), and collaborative governance to reflect both individual teaching capacity and the broader institutional ecosystem that shapes teaching practice. The study is guided by the following research questions: (1) What is a theoretically coherent and context-sensitive model for assessing the teaching ability of Tourism Management faculty in Wuhan? (2) What latent factor structure emerges from empirical validation of the assessment instrument? (3) What competency patterns and disparities (e.g., digital competence differences across age cohorts) can be identified, and what are their implications for faculty development and governance? The remainder of this paper is organized as follows. Section 2 reviews relevant theoretical and empirical literature. Section 3 presents the conceptual model and explains the operationalization into measurable indicators. Section 4 details the mixed-method research design and validation procedures. Section 5 reports the empirical results, including reliability, factor structure, and the digital-divide pattern. Sections 6 and 7 discuss theoretical contributions and practical implementation pathways. Section 8 concludes with limitations and directions for future research.

2. LITERATURE REVIEW AND THEORETICAL FOUNDATION

2.1. Teaching Competence: PCK and TPACK

A widely accepted starting point for

conceptualizing teaching competence is Shulman's (1986, 1987) notion of Pedagogical Content Knowledge (PCK). PCK highlights that effective teaching depends on the ability to transform disciplinary knowledge into forms that are learnable: selecting examples, designing representations, anticipating misconceptions, and sequencing content for learners. In Tourism Management, PCK has a distinctive applied character. For example, teaching revenue management or destination governance requires not only conceptual explanations, but also contextualized cases, simulations, and decision-making exercises that approximate industry realities (Shulman, 1986, 1987; Tribe, 2002).

The increasing technologization of both education and tourism has further extended PCK into technological domains. The Technological Pedagogical Content Knowledge (TPACK) framework formalizes this extension by emphasizing the intersection of content, pedagogy, and technology as an integrated form of teacher knowledge (Mishra & Koehler, 2006). In tourism education, technology is not merely a presentation tool; it is part of the professional domain itself. Faculty may need to teach with and about online booking systems, digital marketing analytics, smart destination platforms, or immersive technologies such as VR/AR. Therefore, a contemporary assessment model that ignores technology risks under-measuring a core capability needed for smart-tourism talent cultivation (Gretzel, Sigala, Xiang, & Koo, 2015).

2.2. Outcome-Based Education and Constructive Alignment

Outcome-Based Education (OBE) provides a second theoretical pillar. OBE shifts attention from teaching inputs to learning outputs: what students can demonstrably do at the end of a course and how teaching, assessment, and curriculum design are aligned to achieve those outcomes (Spady, 1994). In higher education, Biggs' constructive alignment framework operationalizes this logic by requiring explicit alignment between intended learning outcomes, learning activities, and assessment tasks (Biggs, 1996; Biggs & Tang, 2011).

For teaching assessment, OBE implies that faculty competence should be evaluated not only by classroom delivery, but by their ability to design outcome-aligned curricula, develop valid assessments, and use feedback data for continuous improvement. Harden (2002) highlights that learning outcomes and instructional objectives are related but not identical; outcomes emphasize what learners can demonstrate, which is essential for application-oriented disciplines. At the institutional level, outcomes-based quality assurance encourages curriculum improvement and system-level learning through feedback loops (Tam, 2014). Accordingly, teaching ability assessment should incorporate indicators of assessment literacy, feedback practices, and reflective teaching.

2.3. Teaching Evaluation, Assessment Literacy, and Faculty Development

A third stream of literature focuses on frameworks and instruments for teaching competence and faculty development in higher education. Tigelaar, Dolmans, Wolfhagen, and van der Vleuten (2004) demonstrate that teaching competence is multi-dimensional and can be structured into measurable domains for developmental use. Empirical studies also show that pedagogical training can improve teaching approaches and conceptions, suggesting that assessment should be linked to professional development rather than used solely for ranking or punitive control (Postareff, Lindblom-Ylänne, & Nevgi, 2007).

However, teaching evaluation is vulnerable to construct underrepresentation when it relies on narrow indicators. Student evaluations can be biased by grade expectations, instructor charisma, or course difficulty, and they may not capture the quality of instructional design, assessment validity, or industry relevance. Consequently, recent scholarship emphasizes triangulation: combining student feedback with peer review, teaching portfolios, learning analytics, and evidence of student learning outcomes. While this paper focuses on developing a psychometric self-report instrument, the broader logic is compatible with multi-source evaluation and developmental feedback.

Assessment and feedback are central mechanisms through which OBE is operationalized in daily teaching. Formative assessment is particularly important in applied disciplines because it enables students to practice complex tasks iteratively and to calibrate their performance against professional standards. Sadler (1989) argues that effective formative assessment requires learners to understand standards, compare current performance with those standards, and take action to close the gap. In Tourism Management, where tasks may involve service design proposals, destination planning briefs, or marketing analytics reports, feedback must be criterion-referenced and actionable rather than purely judgmental.

The broader feedback literature also emphasizes that feedback effectiveness depends on specificity, timeliness, and alignment with learning goals. Hattie and Timperley (2007) synthesize evidence showing that feedback can have substantial effects on learning, but only when it clarifies "where am I going," "how am I going," and "where to next." Similarly, Gibbs and Simpson (2004) highlight conditions under which assessment supports learning, including sufficient time-on-task, detailed feedback, and opportunities to use feedback in subsequent tasks. These findings justify treating Teaching Evaluation and Feedback as a separate competency domain in the present assessment model.

2.4. Collaborative Governance and Cross-Sector Collaboration in Applied Education

Teaching quality in applied fields is often co-produced beyond the classroom. Collaborative governance theory explains how multiple stakeholders jointly produce public value through structured, deliberative processes (Ansell & Gash, 2008). Emerson et al. (2012) further conceptualize collaborative governance as an integrative system involving principled engagement, shared motivation, and capacity for joint action. In educational settings, these ideas translate into cross-sector partnerships in curriculum development, practicum arrangements, co-supervision, and joint quality assurance.

Cross-sector collaboration is not costless; it requires governance design, incentive alignment, and boundary-spanning capacity. Bryson, Crosby, and Stone (2006) synthesize propositions on designing and implementing cross-sector collaborations, highlighting conditions such as shared purpose, formal structures, and accountability mechanisms. Network governance research similarly identifies different governance forms (shared governance, lead organization, network administrative organization) and their implications for effectiveness (Provan & Kenis, 2008). For Tourism Management education, where industry collaboration is essential for internships and applied projects, institutional support and governance arrangements should be treated as part of the teaching-ability ecosystem rather than background context.

2.5. Tourism Management Education and Dual-Qualified Faculty

Tourism education scholarship underscores the distinctive identity of tourism as an applied and interdisciplinary domain. Tribe (2002) argues for educating "philosophic practitioners" who can act competently in vocational contexts while engaging in reflective and ethical reasoning. The international tourism education literature has repeatedly emphasized the risk of "theory-heavy, practice-light" curricula, which may produce graduates who are knowledgeable but not professionally agile (Airey & Tribe, 2005; Inui, Wheeler, & Lankford, 2006).

The Tourism Education Futures Initiative (TEFI) highlights future-oriented competencies such as stewardship, ethics, professionalism, and systems thinking. Sheldon, Fesenmaier, Woeber, Cooper, and Antonioli (2008) emphasize that tourism education must anticipate long-term transformations and cultivate leadership capacity. Subsequent TEFI work argues for activating change in tourism education through values-based curricula and industry engagement (Sheldon, Fesenmaier, & Tribe, 2011).

At the faculty level, the "dual-qualified" requirement (academic competence plus industry competence) is widely discussed in tourism and hospitality education. Ladkin and Weber (2009) show that tourism and hospitality academics' career profiles often reflect tensions between academic incentives and industry engagement, which can shape teaching relevance. Busby and Huang (2012) further argue that curriculum should integrate conceptual understanding with industry intermediation, requiring educators who can navigate between academic theory and professional practice. These insights support the inclusion of professional development and industry engagement as components of teaching ability.

2.6. Experiential and Work-Integrated Learning in Tourism Education

Experiential and work-integrated learning represent another essential lens for Tourism Management education. Many tourism competencies—such as customer experience design, service recovery, stakeholder negotiation, and destination interpretation—are difficult to develop through lectures alone. Kolb's (1984) experiential learning theory conceptualizes learning as a cycle of concrete experience, reflective observation, abstract conceptualization, and active experimentation. In Tourism Management programs, this cycle can be operationalized through internships, fieldwork, simulations, and live projects co-developed with enterprises. Faculty teaching competence therefore includes the ability to design, supervise, and assess experiential learning activities, and to scaffold students' reflection so that experience is transformed

into transferable knowledge.

Reflection is not automatic; it is a pedagogical practice that requires facilitation. Schön (1983) distinguishes between reflection-in-action and reflection-on-action, emphasizing that professional competence is developed through mindful inquiry during and after practice. Boud, Keogh, and Walker (1985) similarly argue that reflective learning requires structured support, including prompts, dialogue, and safe spaces for critical examination of experience. When tourism internships are treated as mere placement requirements, their learning value may be limited. Accordingly, teaching ability assessment in tourism education should recognize faculty competence in guiding reflective practicum learning and linking workplace experience back to theoretical frameworks.

Situated learning theory provides an additional rationale for strengthening collaborative dimensions in tourism teaching. Lave and Wenger (1991) describe learning as legitimate peripheral participation in communities of practice. From this perspective, internships and industry projects are not only opportunities to apply knowledge but also entry points into professional communities. Faculty members act as boundary spanners who help students translate between academic expectations and workplace norms. This reinforces the need to assess institutional support mechanisms (e.g., stable enterprise partnerships, co-supervision protocols) and faculty capability to coordinate with external mentors—elements that fall naturally under collaborative governance and institutional support in the proposed model.

2.7. Digitalization, Smart Tourism, and Implications for Faculty Competence

Digitalization in tourism is not peripheral; it transforms products, distribution channels, and destination management. Buhalis and Law (2008) review how information and communication technologies reshape tourism management and identify enduring research themes in eTourism. More recently, the concept of "smart tourism" highlights the value creation enabled by big data, mobile technologies, and interconnected platforms across destinations, firms, and travelers (Gretzel et al., 2015).

For tourism education, these developments imply that faculty must possess information literacy that goes beyond generic ICT use. They need to understand tourism-specific digital tools, interpret data for managerial decisions, and design learning activities that simulate digital service environments. These competencies map naturally onto TPACK and motivate including a technology-focused dimension in teaching ability assessment (Mishra & Koehler, 2006; Gretzel et al., 2015).

2.8. Digital Divide and Technology Adoption Among Faculty

Technology competence, however, is not evenly distributed within academic workforces. Digital divide research suggests that disparities in access, skills, and outcomes can persist even when basic access is widespread (van Dijk, 2005). Empirical studies show that age, education, and occupational context can shape technology adoption and usage intensity. For example, Friemel (2016) documents a "grey digital divide" among seniors, while Helsper and Reisdorf (2017) highlight changing reasons for digital exclusion and the emergence of an underclass of non-users.

Although most digital divide studies focus on citizens or consumers, the same mechanisms may operate among faculty groups. In education systems undergoing rapid digital transformation, cohort differences can create uneven capacity to adopt technology-enhanced pedagogy and to teach industry-relevant digital practices. In the Chinese context, Chen and Hartt (2021) further demonstrate that age is not inherently determinative, but usability, accessibility, and support structures matter. These insights align with collaborative governance: institutional support may mediate the relationship between individual characteristics and digital competence.

2.9. Model Development and Operationalization

Integrating the above literatures, this study conceptualizes teaching ability in Tourism Management as a collaborative, outcome-oriented capability system rather than a purely individual attribute. The conceptual logic is that high-quality teaching in applied disciplines emerges from the interaction of (a) the instructor's pedagogical and professional competence, (b) the outcome alignment of curriculum and assessment, and (c) institutional and cross-sector structures that enable authentic learning opportunities. This framing treats teaching as both a professional practice and a governed process embedded in institutional ecosystems (Ansell & Gash, 2008; Biggs & Tang, 2011; Emerson et al., 2012).

Based on this logic, a three-dimensional collaborative assessment model is proposed (Figure 1). The first dimension is the Teaching Process, focusing on how faculty design and implement

instruction. It includes the ability to set outcomes, plan content sequences, select pedagogies, integrate cases and practice-based tasks, and use appropriate digital tools. This dimension reflects PCK/TPACK and constructive alignment principles (Shulman, 1986; Mishra & Koehler, 2006; Biggs, 1996).

The second dimension is Teaching Effectiveness and Feedback. This dimension captures assessment literacy and the ability to use evidence for improvement. It includes designing valid assessments, providing formative feedback, using learning analytics where appropriate, and reflecting on student performance data to adjust teaching. Conceptually, it operationalizes OBE's continuous improvement logic and responds to limitations in conventional end-of-semester evaluations (Spady, 1994; Tam, 2014).

The third dimension is Institutional Support, which represents the collaborative-governance environment that enables or constrains teaching quality. It includes access to teaching development resources, incentives for industry engagement, support for digital infrastructure, and mechanisms for cross-sector collaboration. In applied disciplines, institutional support is not merely a contextual variable; it is part of the capacity for joint action required to create authentic learning environments such as internships, live projects, and industry co-teaching (Bryson et al., 2006; Provan & Kenis, 2008).

To operationalize the model, the three dimensions were translated into measurable indicators and an initial item pool. Following standard scale development guidance, items were designed to be behaviorally specific and relevant to the Wuhan Tourism Management context (DeVellis, 2017). The resulting 20-item instrument is intended for developmental diagnosis rather than high-stakes personnel decisions. Its empirical structure was expected to reflect both theoretical coherence and local practice patterns. Specifically, while the conceptual model emphasizes three dimensions, the empirical factor structure may be more granular due to the way teaching tasks are enacted and supported in universities.

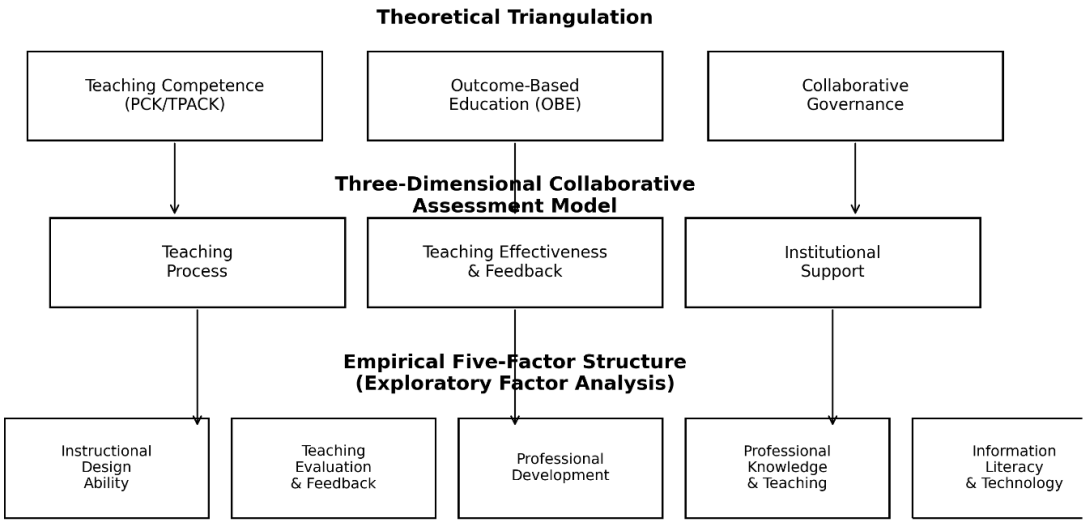

Figure 1: Theoretical Triangulation, Conceptual Dimensions, and Empirical Factor Structure.

3. METHODOLOGY

Research Design. This study employed an exploratory sequential mixed-method design. The qualitative phase informed instrument development, and the quantitative phase provided psychometric validation. This approach is suitable when the construct requires contextualization and when existing instruments are insufficiently aligned with the local setting (Creswell & Plano Clark, 2017).

Phase 1: Indicator Development and Content Validity. A literature-driven indicator framework was developed from the three theoretical pillars (PCK/TPACK, OBE, and collaborative governance), together with tourism-education scholarship on practice-oriented curricula and industry engagement (Airey & Tribe, 2005; Mishra & Koehler, 2006; Sheldon et al., 2011). An expert panel consisting of

seven specialists in tourism education and educational measurement reviewed the item pool for relevance and clarity. Content validity was quantified using the Item-Objective Congruence (IOC) method, which evaluates expert agreement on whether each item matches its intended construct (Rovinelli & Hambleton, 1976). The overall IOC value was 0.87, indicating good content validity for the instrument at this stage.

Phase 2: Sample and Data Collection. The quantitative survey was administered to Tourism Management faculty across five universities in Wuhan. A total of 113 valid responses were collected, corresponding to an approximate response rate of 71%. The sample size meets common heuristics for exploratory factor analysis, including a subject-to-item ratio exceeding 5:1 (Costello & Osborne, 2005). It is also broadly consistent with standard guidance on minimum sample sizes for survey research in applied educational settings (Krejcie & Morgan, 1970).

Measures. Teaching ability was measured by a 20-item scale using a 5-point Likert response format (1 = strongly disagree to 5 = strongly agree). Items were designed to cover instructional planning, teaching practice, assessment and feedback, professional development, institutional support, and technology-related competencies relevant to tourism teaching. Demographic items captured gender, age group, and academic rank.

Data Analysis Strategy. Psychometric evaluation proceeded in three steps. First, reliability was assessed using Cronbach's alpha, with values above 0.70 considered acceptable for research instruments (Cronbach, 1951; Nunnally & Bernstein, 1994). Second, the suitability of the data for factor analysis was assessed using the Kaiser–Meyer–Olkin (KMO) measure and Bartlett's test of sphericity. Third, Exploratory Factor Analysis (EFA) was used to explore the latent structure and to support construct validity. Following best-practice guidance, factor retention decisions were based on statistical criteria (e.g., eigenvalues, scree plot) and interpretability aligned with theory (Fabrigar, Wegener, MacCallum, & Strahan, 1999; Hair, Black, Babin, & Anderson, 2019).

Ethical Considerations. Participation was voluntary and anonymous, and the survey was used for research and developmental evaluation purposes. No identifying information was collected. These procedures are consistent with typical ethical requirements for minimal-risk educational research.

In addition to overall validation, the study explored a practical issue emphasized by participants and by tourism-education literature: whether information literacy and technology competence differs across cohorts. Rather than treating technology as uniformly adopted, the analysis examined descriptive patterns to identify a potential "grey digital divide" within the faculty population (van Dijk, 2005; Friemel, 2016).

Methodological Considerations for Self-Report Instruments. Because the present instrument uses a single survey source, it is potentially exposed to common method bias. Podsakoff, MacKenzie, Lee, and Podsakoff (2003) recommend procedural remedies such as ensuring anonymity, reducing evaluation apprehension, and carefully wording items to avoid ambiguity. Although the current study focused on exploratory validation, future applications of the instrument should incorporate such remedies and, where feasible, combine self-report data with peer or supervisor ratings to strengthen validity.

4. RESULTS

Table 1: Demographic Characteristics of Respondents (N = 113).

Category	Frequency	Percentage
Gender		
Male	48	42.5%
Female	65	57.5%
Age group		
Under 30	17	15.0%
30–45	68	60.2%
Over 45	28	24.8%
Academic rank		
Teaching Assistant	22	19.5%
Lecturer	54	47.8%
Associate Professor	26	23.0%
Professor	11	9.7%

As summarized in Table 1, the study surveyed a total of 113 respondents. The gender analysis reveals a moderate female majority, accounting for 57.5% of the sample, while males comprised the remaining 42.5%. Age-wise, the respondents were primarily concentrated in the 30–45 year range (60.2%), suggesting a workforce that is largely experienced yet still in the active phase of career development. Younger academics (under 30) and senior faculty (over 45) were less represented, at 15.0% and 24.8%, respectively. Breaking down the sample by academic rank shows that Lecturers were the dominant group, making up nearly half of the respondents (47.8%). The remainder of the sample was distributed among Associate Professors (23.0%), Teaching Assistants (19.5%), and full Professors (9.7%), providing a balanced cross-section of academic seniority from entry-level to leadership roles.

Table 2: Reliability of the Teaching Ability Assessment Model.

Factor	Cronbach's alpha	Number of items
Instructional Design Ability (IDA)	0.891	4
Teaching Evaluation and Feedback (TEF)	0.873	4
Professional Development (PD)	0.877	4
Professional Knowledge and Teaching (PKT)	0.889	4
Information Literacy and Technology (ILT)	0.885	4
Overall scale	0.904	20

Table 2 presents the reliability analysis for the Teaching Ability Assessment Model. The instrument demonstrated excellent internal consistency, with an overall Cronbach's alpha of 0.904, significantly exceeding the conventional threshold of 0.70 recommended by Nunnally and Bernstein (1994). Consistency remained high across all five subscales, with alpha coefficients ranging from 0.873 to 0.891. These results indicate that the items within each factor are strongly correlated and measure coherent domains of teaching ability. Consequently, the high reliability coefficients support the utility of this instrument as a robust diagnostic tool for developmental evaluation.

Table 3: KMO and Bartlett's Test of Sphericity.

Test	Value
Kaiser–Meyer–Olkin (KMO) measure	0.803
Bartlett's test of sphericity (χ^2)	1451.517
Degrees of freedom	190
Significance	$p < .001$

As shown in Table 3, the data demonstrated robust suitability for factor analysis, evidenced by a KMO value of 0.803 and a significant Bartlett's test ($\chi^2 = 1451.517$, $p < .001$). The subsequent EFA extracted five latent factors accounting for a substantial 75.14% of the total variance. This result refines the initial conceptual model, separating broad teaching functions Diagnostic tests confirmed the dataset's appropriateness for Exploratory Factor Analysis, with a KMO of 0.803 and a significant Bartlett's test ($\chi^2 = 1451.517$, $p < .001$; see Table 3). The analysis revealed a five-factor structure explaining 75.14% of the variance, providing a clearer empirical delineation of teaching competencies than the original theoretical model. Notably, the emergence of five distinct factors highlights that faculty perceive tasks such as instructional design and actual teaching practice as separate cognitive and behavioral domains, rather than a singular activity.

Consistent with Tigelaar et al. (2004), who argue for the multi-dimensionality of teaching competence, the factors were identified as: Instructional Design Ability (IDA), Teaching Evaluation and Feedback (TEF), Professional Development (PD), Professional Knowledge and Teaching (PKT), and Information Literacy and Technology (ILT). This granular categorization allows for a more precise diagnosis of faculty strengths and developmental needs, particularly in specialized areas like digital literacy and assessment strategies.

Table 4: Mean Scores on Information Literacy and Technology (ILT) by Age Group.

Age group	Mean ILT score
Under 30	4.21
30–45	3.45
Over 45	2.15

Beyond the structural validity, the analysis of the **Information Literacy and Technology (ILT)** dimension reveals critical demographic variations. As presented in Table 4, there is a distinct inverse relationship between faculty age and digital proficiency. The youngest cohort (Under 30) demonstrated high competence ($M = 4.21$), whereas the scores declined for the 30–45 age group ($M = 3.45$) and dropped precipitously for those over 45 ($M = 2.15$). This pronounced gradient aligns with the generational 'digital divide' often observed in educational technology adoption (van Dijk, 2005; Friemel, 2016).

The fact that the instrument successfully captures these granular differences distinguishing between 'digital natives' and late adopters provides further evidence of its construct validity. It demonstrates that the five-factor model is not merely a theoretical construct but a sensitive diagnostic tool capable of identifying specific developmental needs within the faculty workforce, particularly in emerging areas like smart tourism and digital assessment.

5. DISCUSSION

5.1. Operationalization of the Multi-Dimensional Teaching Construct

The transition from the theoretically proposed three-dimensional model to the empirically derived five-factor structure represents a significant finding. While the initial conceptual framework drew upon established theory to posit broad categories—teaching process, effectiveness, and support—the empirical data indicates that these dimensions crystallize into five distinct operational domains

within the Wuhan faculty context. This divergence does not suggest a methodological incongruity; rather, it reflects the differentiation of complex constructs when theoretical abstractions are translated into applied practice and measurement (DeVellis, 2017). Specifically, the bifurcation of the original "teaching process" dimension into Instructional Design Ability and Professional Knowledge and Teaching implies that faculty cognitively distinguish the architecture of learning (planning and alignment) from the enactment of disciplinary expertise (delivery and interaction).

5.2. Pedagogical Competence through Design, Knowledge, and Evaluation

The emergence of Instructional Design Ability (IDA) as a standalone factor highlights that outcome alignment is perceived as a specialized competence distinct from classroom delivery. This finding resonates with the principles of constructive alignment in Outcome-Based Education (OBE), which mandate that assessment and learning activities be explicitly engineered to achieve intended learning outcomes (Biggs, 1996; Biggs & Tang, 2011). In the context of Tourism Management, this design competence extends to the integration of industry realism—incorporating fieldwork, simulations, and live projects (Inui et al., 2006; Busby & Huang, 2012). Consequently, faculty evaluation systems must evolve beyond monitoring classroom performance to rigorously assess the design capacity of the curriculum itself.

Complementing design is Professional Knowledge and Teaching (PKT), which embodies the logic of Pedagogical Content Knowledge (PCK)—the capacity to transform raw disciplinary expertise into learnable forms. As noted in tourism education scholarship, the goal is to balance vocational skills with critical reflection and ethical reasoning (Tribe, 2002; Airey & Tribe, 2005). Therefore, PKT validates that teaching ability involves more than subject mastery; it requires the pedagogical skill to sequence concepts and scaffold students' understanding of complex systems. Furthermore, the identification of Teaching Evaluation and Feedback (TEF) supports the OBE imperative for continuous quality improvement. Teaching evaluation is only substantively meaningful when it generates actionable data that faculty have the assessment literacy to interpret. As Tam (2014) argues, outcomes-based quality assurance necessitates a direct link between assessment evidence and curriculum enhancement. The distinctiveness of the TEF factor suggests that competence in using feedback infrastructures is not an administrative add-on, but a core pedagogical skill required to "close the loop" in student learning.

5.3. Institutional Governance and the Faculty Digital Divide

The remaining factors, Professional Development (PD) and Information Literacy and Technology (ILT), situate teaching ability within a broader governance framework. PD underscores that teaching quality is not merely a static individual trait but a dynamic capacity shaped by institutional opportunity structures. Through the lens of collaborative governance, PD reflects the "capacity for joint action"—the ability to mobilize resources and engage in collective improvement (Emerson et al., 2012). For tourism programs, this implies that faculty development must be evaluated by its translation into practice, fostering engagement through industry sabbaticals and collaborative enterprise projects.

Finally, the analysis of Information Literacy and Technology (ILT) reveals a critical challenge regarding the internal "digital divide." The significant cohort differences in ILT scores suggest that universities cannot assume uniform technology adoption. As noted in digital divide literature, unequal skills can result in unequal educational outcomes, even when physical access to technology is ubiquitous (van Dijk, 2005). In a collaborative governance context, this deficit should not be framed solely as individual failure but as an organizational challenge. To mitigate these disparities, institutions must move beyond scaffolding-free mandates. Instead, governance-oriented interventions—such as "reverse mentoring" where digital-native faculty support senior colleagues, or partnerships with tech-forward tourism enterprises—can transform technology adoption from an isolated struggle into a shared organizational learning process (Bryson et al., 2006; Provan & Kenis, 2008).

6. PRACTICAL IMPLICATIONS AND IMPLEMENTATION GUIDELINES

6.1. Establishing Collaborative Governance and Evaluation Purpose

The validation of the Teaching Ability Assessment Model offers a robust instrument for developmental evaluation in Tourism Management programs. To maximize its utility, the implementation pathway must align measurement with continuous improvement and distribute responsibility across stakeholders. The foundational step requires explicitly positioning the instrument as a diagnostic

tool for teaching development rather than a mechanism for high-stakes personnel rating. Clear communication regarding this developmental purpose is essential to reduce faculty defensiveness and elicit honest self-reflection. Operationalizing this requires a collaborative governance structure, specifically a committee comprising program leaders, faculty representatives, teaching development staff, and industry advisors. Such a body creates a structured arena for deliberation, ensuring that evaluation criteria remain transparent and that results inform joint action rather than top-down control (Ansell & Gash, 2008).

6.2. Triangulating Evidence through Multi-Stakeholder Assessment

While the scale provides a coherent self-report measure, rigorous evaluation benefits from triangulation. The proposed implementation integrates three complementary data sources. First, faculty self-ratings on Instructional Design Ability (IDA) should be cross-referenced with syllabi and assessment designs to verify constructive alignment. Second, scores on Information Literacy and Technology (ILT) can be contextualized using Learning Management System (LMS) analytics, moving from self-perception to behavioral evidence. Third, given the applied nature of Tourism Management, industry mentors play a crucial role. Through internships and enterprise projects, external stakeholders can validate Professional Knowledge and Teaching (PKT) by assessing student performance in real-world scenarios. This creates a shared standards dialogue, helping faculty calibrate their teaching to current professional realities (Bryson et al., 2006).

6.3. Data-Informed Curriculum Governance

Beyond individual diagnosis, aggregated data should drive program-level decision-making. By analyzing factor profiles across courses and semesters, program leaders can identify systematic patterns, such as a cohort-wide strength in disciplinary knowledge but a weakness in Teaching Evaluation and Feedback (TEF). Such evidence justifies targeted interventions, including assessment literacy workshops or peer-review circles, effectively replacing anecdotal judgment with data-informed curriculum governance. This approach fosters a culture of continuous improvement rather than episodic inspection (Biggs & Tang, 2011; Tam, 2014).

6.4. Addressing the Digital Divide via Targeted Capacity Building

The study's findings regarding the internal digital divide dictate that support mechanisms cannot be uniform. Institutional support must be tiered to address varying levels of proficiency. This includes basic digital literacy support for late adopters, tourism-specific training for mid-level adopters, and advanced data-driven decision simulations for early adopters. Strategies such as reverse mentoring, where younger faculty support senior colleagues, can bridge the gap identified in the ILT factor. Consistent with digital divide literature, these interventions must address not only skills but also confidence and perceived utility (Helsper & Reisdorf, 2017; Chen & Hartt, 2021).

6.5. Closing the Feedback Loop via Continuous Improvement

Finally, the model supports the Outcome-Based Education (OBE) requirement for continuous improvement cycles. By administering the instrument annually, institutions can track longitudinal changes in factor profiles, linking resource allocation to measurable teaching outcomes. At a macro level, this approach aligns with national directives for modernizing educational evaluation and strengthening digital capacity (CPC Central Committee & State Council, 2020; Ministry of Education, 2025). Although localized to Wuhan, this implementation logic is transferable to other application-oriented disciplines, provided the indicators are contextually adapted.

7. LIMITATIONS AND FUTURE RESEARCH

This study has several limitations that should be considered when interpreting the findings. First, the data are cross-sectional and rely on self-reported perceptions. Self-report measures are vulnerable to social desirability bias and may not fully reflect observable teaching behaviors. Future studies should incorporate multi-source evidence, such as peer observations and student learning outcomes, to establish criterion-related validity.

Second, the sample is limited to five universities in Wuhan. While this focus supports contextual relevance, it constrains generalizability. Replication in other regions and across different types of institutions (research-intensive vs. application-oriented) is necessary to test the stability of the factor structure. Third, the current validation used exploratory factor analysis. Future research should conduct confirmatory factor analysis (CFA) to test measurement models and to evaluate measurement invariance across demographic groups (e.g., age cohorts and rank). Such analyses can clarify whether

observed group differences reflect true competence disparities or measurement artifacts (Hair et al., 2019).

Finally, technology and tourism practices evolve rapidly. The ILT domain is particularly susceptible to construct drift, where the meaning of "technology competence" changes as tools and platforms evolve. Therefore, periodic review and updating of ILT items is recommended, accompanied by revalidation to maintain relevance.

From a measurement perspective, subsequent validation work should examine convergent and discriminant validity using confirmatory factor analysis and related criteria. For example, Fornell and Larcker (1981) propose using average variance extracted (AVE) to evaluate whether items adequately represent their intended constructs and whether constructs are empirically distinct. Structural equation modeling frameworks can also be used to test relationships between teaching ability factors and external criteria such as student learning outcomes or graduate employability indicators (Kline, 2016).

8. CONCLUSION

This study developed and validated a collaborative teaching ability assessment model for Tourism Management faculty in Wuhan universities. Grounded in PCK/TPACK, OBE, and collaborative governance, the model conceptualizes teaching ability as an outcome-oriented capability system embedded in institutional ecosystems. Empirical validation supported a reliable 20-item instrument with a five-factor structure which Instructional Design Ability, Teaching Evaluation and Feedback, Professional Development, Professional Knowledge and Teaching, and Information Literacy and Technology explaining 75.14% of variance and demonstrating strong internal consistency (alpha = 0.904).

Beyond providing a psychometrically sound instrument, the study highlights two substantive insights. First, teaching competence in application-oriented tourism programs is multi-dimensional and differentiates into design, assessment, development, knowledge, and technology domains. Second, the ILT domain reveals a cohort-based digital divide, suggesting that digital transformation in tourism education requires targeted capacity building and supportive governance rather than uniform mandates.

By integrating measurement with a collaborative implementation pathway, the study contributes a practical tool for moving from summative evaluation toward developmental quality improvement in Tourism Management education.

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