Guideline for Tourism and Intelligent Technology Skills Improvement of Students in Guilin Tourism University

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Abstract: With the ongoing development of information technology, China's tourism industry has gradually entered a stage of intelligent transformation[1]. The integration of tourism and technology has become a key driver for the advancement of tourism education[2]. This study aims to explore strategies to enhance students' skills in tourism and intelligent technology at Guilin Tourism University. Questionnaires were distributed to graduates, current students, and employers to evaluate skill levels and identify gaps between education and industry requirements. The results show that while students have strong theoretical knowledge, their practical ability to utilize intelligent technologies is comparatively weak. Employers highlight the importance of interdisciplinary training, digital literacy, and fostering innovation awareness among graduates. Based on these findings, the study recommends curriculum reform, increased practical training, and stronger industry–university collaboration as essential strategies to improve students' professional and technical skills. This research offers practical insights for optimizing tourism education and advancing the integration of tourism and intelligent technology.

Keywords: Smart tourism; Higher education; Skill development; Employability; Interdisciplinary learning; Talent cultivation; Guilin Tourism University

1. Introduction

With the rapid advancement of artificial intelligence (AI), big data, and cloud computing, the tourism industry is experiencing a swift shift toward digital and intelligent transformation[1]. This change not only alters the operational models of tourism businesses but also reshapes the structure of tourism employment and the skills required[3]. Smart tourism, as an emerging trend, focuses on using advanced technologies to boost management efficiency and improve tourist experiences[4]. In the context of tourism integrated with intelligent technology, higher education institutions face new challenges in preparing students to meet the demands of the new industrial landscape[5].

As an application-oriented university, Guilin Tourism University places great emphasis on developing students' professional abilities and technological literacy to adapt to the transformation of the tourism industry[6]. However, a gap still exists between the current talent cultivation model and the requirements of smart tourism development[7]. Therefore, this study uses Guilin Tourism University as a case study to explore strategies for improving students' skills in tourism and intelligent technologies. The results aim to provide insights for other universities in cultivating talents for smart tourism.

2. Literature Review

The research on smart tourism and higher education skill development has expanded rapidly over the past decade, demonstrating an increasing connection between tourism studies and emerging technologies[1]. Scholars generally agree that the concept of smart tourism originated from the broader trend of smart cities, where digital infrastructure, big data, and intelligent systems are applied to enhance efficiency and user experience (Gretzel et al., 2015). In this context, smart tourism is viewed as an ecosystem integrating information technology, innovation, and service design to create flexible, data-driven tourism environments.

2.1. Global Perspectives on Smart Tourism and Talent Development

International research underscores the importance of aligning educational systems with digital transformation in tourism. According to Buhalis and Amaranggana (2015), developing smart destinations requires professionals with interdisciplinary expertise in ICT, data management, and experience design. Similarly, Neuhofer (2016) emphasizes that tourism professionals should not only understand technological tools but also be able to creatively integrate them into service innovation. Studies in Europe and North America show that universities have begun updating their tourism curricula by adding modules on digital marketing, data analytics, and sustainable technology adoption (Xiang et al.,

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2021)[8]. However, challenges remain in bridging the gap between theoretical learning and practical application, especially in developing countries where resources and technical infrastructure are limited[9].

2.2. Smart Tourism Education in the Chinese Context

In China, the concept of "Tourism + Intelligent Technology" has received strong policy support since the launch of the national "Smart Tourism Development Plan (2015–2025)[3]." Researchers such as Guo (2017) and Liang (2023) point out that although many Chinese universities have adopted the idea of smart tourism, most programs still rely heavily on traditional teaching methods. Mo (2024) suggests that tourism education in China needs to focus more on innovation and better integrate digital tools such as geographic information systems (GIS), virtual reality (VR), and artificial intelligence for experience simulation and market forecasting. However, the use of these technologies in classroom teaching remains limited, creating a gap between educational goals and industry needs[10].

Empirical research further indicates that Chinese tourism graduates often lack the technological literacy and problem-solving skills employers seek[5]. For example, Li et al. (2024) note that many students have strong theoretical knowledge but lack data analytical skills and innovation mindset. Wang and Geng (2024) found that even when smart tourism courses are offered, they tend to emphasize theoretical understanding over practical application. As a result, there is a growing demand for universities to develop interdisciplinary programs that combine tourism management with computer science, data analytics, and artificial intelligence applications[11].

2.3. Skill Development and Employability Frameworks

Beyond tourism-specific research, theories of vocational development and employability offer valuable insights into how student skills can be improved[12]. Parsons (1909) first introduced the idea of matching individual traits with job requirements, suggesting that education should help students gain self-awareness and career flexibility. Super (1953) built on this by highlighting career development as a lifelong process shaped by personal growth, social factors, and economic shifts. More recently, employability frameworks by Yorke and Knight (2006) and Hillage and Pollard (1998) focus on combining knowledge, skills, and attributes that enable graduates to find and maintain jobs in changing labor markets.

Applying these ideas to tourism education means that universities should develop not only technical skills but also soft skills like communication, critical thinking, and teamwork. In today's digital world, employability also depends on students' ability to adapt to technological changes and pursue continuous learning. As Yu and Shi (2025) point out, artificial intelligence and automation are

transforming the workforce, creating a need for professionals who can balance human interaction with machine-assisted decision-making[13].

2.4. Summary and Research Gaps

The reviewed literature highlights two significant gaps[7]. First, although awareness of smart tourism education is growing, there is limited empirical research that systematically examines the perspectives of students, graduates, and administrators within a single institutional setting. Most studies focus either on student learning outcomes or employer expectations, but rarely combine both viewpoints. Second, while many scholars emphasize the need for digital skill development, few studies offer specific, institution-based guidelines for improving educational practices[4]. This study addresses both gaps by analyzing Guilin Tourism University as a representative case and employs a mixed-method approach to assess current skills, identify challenges, and propose targeted strategies for skill development in the era of "Tourism + Intelligent Technology."

3. Research Objectives

The main goal of this study is to create a detailed guideline for enhancing tourism and smart technology skills among students at Guilin Tourism University The main goal of this study is to develop a comprehensive guideline for enhancing tourism and smart technology skills among students at Guilin Tourism University [6]. In response to the growing needs of the smart tourism industry, this research aims to analyze the current state of skill development, assess the effectiveness of existing educational methods, and propose strategies to bridge the gap between university training and industry demands[4]. This study is organized around three key participant groups—100 graduates, 324 current students, and 99 administrators from relevant sectors—whose experiences and views offer a comprehensive understanding of the institutional and professional environment. By combining these perspectives, the study seeks to present a multi-faceted view of the challenges and opportunities related to skill development in tourism education within the Tourism + Intelligent Technology framework[5].

The specific objectives of this research are as follows:

1. To identify the current employment situation and skill utilization among graduated students of Guilin Tourism University, focusing on their ability to apply knowledge in intelligent tourism workplaces[13]. This includes understanding the types of positions held, perceived adequacy of university training, and areas needing further improvement.

2. To assess the competencies, learning motivation, and skill gaps among current students, especially regarding their readiness for technology-driven jobs[10]. The research examines students' familiarity with digital tools, problem-solving skills, and adaptability to new industry demands.

3. To analyze administrators' perspectives—including those of HR managers,

tourism enterprise leaders, and educational policymakers—on the employability and performance of graduates [11]. Their evaluations offer essential insights into how well educational outcomes align with professional expectations.

4. To compare the views of the three groups to identify common and divergent opinions on skill priorities, curriculum development, and the role of intelligent technology in tourism education[7].

5. To develop a set of practical recommendations for enhancing students' tourism and intelligent technology skills, including curriculum improvements, hands-on training, industry partnerships, and digital learning innovations[8].

Through these objectives, the study not only helps to understand the current state of student skill development but also provides a strategic framework for future educational reforms at Guilin Tourism University and similar institutions[9]. The results aim to support the shift in tourism education from a knowledge-based approach to a skill- and innovation-focused system capable of sustaining the growth of China's intelligent tourism industry.

4. Methodology

4.1. Research Design

This study employed a mixed-methods research design, combining quantitative and qualitative approaches to obtain a comprehensive understanding of students' and administrators' views on tourism and the development of skills related to intelligent technology. The mixed-method framework was selected to balance statistical accuracy with contextual depth, ensuring that both measurable patterns and individual experiences were effectively captured[12]. Quantitative data were collected through structured questionnaires distributed to students and graduates, while qualitative data were obtained through semi-structured interviews with administrators and selected students.

The research took place over four months at Guilin Tourism University, whose diverse student body and strong ties with regional tourism businesses provided an ideal setting for exploring how tourism education integrates with intelligent technologies.

4.2. Participants

A total of 523 participants took part in this study, divided into three main groups:

1. Graduated Students (n = 100) — These were alumni who completed their undergraduate studies within the past three years. They provided insights into how well the skills learned are applied in real-world settings, as well as their transition from university to careers in tourism and related fields.

2. Current Students (n = 324) — The largest group included currently enrolled undergraduates in tourism and smart technology programs. Their

responses helped evaluate current educational effectiveness, self-assessed skill levels, and readiness for careers in intelligent tourism.

3. Administrators (n = 99) — This group consisted of human resource managers, department supervisors from tourism companies, and academic administrators from Guilin Tourism University. Their perspectives provided external perspectives for assessing the quality and employability of the university's graduates.

The selection of these groups ensured the research covered multiple aspects of skill development—from learning experiences and graduate results to employer feedback and institutional policies.

4.3. Research Instruments

The study used three sets of structured questionnaires and one semi-structured interview framework, which were designed and validated through expert review and pilot testing:

Questionnaire A (Graduated Students): Focused on employment experience, job relevance, satisfaction with university training, and areas for improvement.

Questionnaire B (Current Students): Assessed skill levels in tourism management, intelligent technology, problem-solving, and communication, as well as motivation and attitudes toward self-improvement.

Questionnaire C (Administrators): Collected evaluations of graduates' performance, technological adaptability, and suggestions for educational reform.

All questionnaires used five-point Likert scales ranging from 1 (strongly disagree) to 5 (strongly agree) and were validated through expert review, achieving an Index of Item-Objective Congruence (IOC) greater than 0.80.

The semi-structured interview protocol involved 15 participants (5 from each group) to gather detailed qualitative data on learning challenges, curriculum design, and the role of intelligent technologies in talent development. Interviews were recorded and transcribed for thematic analysis.

4.4. Data Collection Procedures

Data collection was conducted both online and offline to promote inclusivity and accessibility. Questionnaires were distributed electronically through the university's internal communication system and professional networking platforms such as WeChat and email. Additionally, paper-based surveys were given in selected classrooms and alumni gatherings to reach participants with limited online access.

The total valid responses included 100 from graduated students, 324 from current students, and 99 from administrators, resulting in a 100% effective response rate after data cleaning and validation. Qualitative interviews were conducted in person and via video conferencing, adhering to ethical research standards, including voluntary participation, confidentiality, and informed

consent.

4.5. Data Analysis

The collected data were analysed using both quantitative statistical methods and qualitative thematic analysis.

Quantitative Analysis: Descriptive statistics (mean, standard deviation, frequency distribution) were used to summarize responses, while inferential statistics, including independent sample t-tests and ANOVA, helped identify differences among groups.

Qualitative Analysis: Interview transcripts were coded and were analyzed thematically to identify common themes and patterns related to skill gaps, educational practices, and stakeholder perceptions.

4.6. Research Validity and Reliability

To ensure the validity of the study, all instruments were reviewed by three experts in tourism education and intelligent technology. Feedback was incorporated to improve the wording and clarity of each item. For reliability, Cronbach's Alpha Coefficients were calculated, yielding values above 0.85 for all questionnaires, indicating strong internal consistency.

5. Findings

This chapter presents a comprehensive analysis of the research results, organized into findings from graduated students, current students, employers, and a synthesis of qualitative interviews.

5.1. Findings from Graduated Students

Data from 100 graduates revealed a solid theoretical foundation but significant gaps in practical technology application. The overall mean score ($\bar{x}$=3.72, SD=1.07) indicates a positive self-assessment, yet detailed analysis uncovers critical challenges.

Table 1. Key Skill Deficiencies Reported by Graduates

Deficiency Area	Representative Item	Mean Score	SD
Technical Application	Proficiency in data analysis tools (Q3)	3.76	1.09
	Intelligent system operation (Q15)	3.52	1.16
Interdisciplinary Integration	Integrating tourism and technology knowledge (Q11)	3.54	1.06
Career Preparedness	Understanding of emerging roles (Q15)	3.52	1.16

Practical Experience	Access to real-world projects (Q19.1)	3.04	0.93

Qualitative interviews with four graduates consistently highlighted that while university courses provided a foundational understanding of concepts like "smart tourism," there was a stark lack of hands-on experience with industry-standard platforms (e.g., CRM, GIS, Python for data analysis). One graduate stated, "I understood the theory behind intelligent tourism, but I didn't know how to use the technology when I entered the job." Despite these gaps, 72% of graduates reported strong motivation for self-learning post-graduation.

5.2. Findings from Current Students

Survey responses from 324 current students showed a clear disconnect between awareness and competency. The overall mean ($\bar{x}$=3.68, SD=1.03) is slightly lower than that of graduates, potentially due to their lack of workplace experience.

Table 2. Current Students' Self-Assessed Proficiency

Skill Category	Sample Skill	Mean Score	SD
Theoretical Awareness	Importance of smart technology (Q1)	3.89	0.94
Practical Proficiency	Mastery of intelligent technology skills (Q3)	3.49	1.22
Digital Application	Digital Marketing (Q8)	3.56	1.03
	Intelligent System Operation (Q11)	3.76	0.97

Interview data revealed that students are eager for more hands-on learning but find available courses overly theoretical. As one student noted, "We learn about digital tourism in class, but rarely get to use the technology ourselves." This is compounded by limited industry exposure, with a mean score of 3.41 for participation in industry summits (Q18.1).

5.3. Findings from Employers

The 99 employers surveyed provided a critical external perspective on graduate readiness. The overall mean ($\bar{x}$=3.55, SD=1.18) suggests that employer standards are higher than students' self-perceptions.

Table 3. Employer Priorities and Evaluations

Evaluation Area	Key Item	Mean Score	SD
Valued Skills	Data Analysis (Q2)	3.61	1.17
	Interdisciplinary Integration (Q6)	3.60	1.19
	Bachelor's Degree as requirement (Q8)	3.64	1.11
Graduate Assessment	Technological Proficiency (Q10)	3.54	1.19
	Overall Competitiveness (Q12)	3.61	1.18

A clear consensus emerged: while graduates demonstrate strong professionalism and soft skills, they lack the technological proficiency required for modern tourism roles. One HR manager commented, "Our company is moving toward digital transformation. We need people who can analyze customer data, understand algorithms, and manage online platforms."

5.4. Summary of Qualitative Interviews

Graduates emphasized the need for more practical, project-based learning with real industry data.

Industry Experts stressed that the curriculum lags behind technological trends (e.g., digital twins, AI large models) and lacks interdisciplinary depth.

HR Managers pointed to a common "strong in theory but weak in practice" phenomenon and advocated for deeper university-industry collaboration, including enterprise mentors in curriculum design.

6. Discussion

The findings reveal a complex interplay between higher education, technological innovation, and employability. This discussion integrates the empirical evidence with theoretical perspectives to elucidate the implications for tourism education reform.

6.1. Bridging the Theory-Practice Divide through Curriculum Reform

The core issue identified is the misalignment between curriculum content and industry expectations. Graduates and current students reported robust theoretical training but insufficient practical application, a finding consistent with Liang (2023) and Wang & Geng (2024). This gap is quantitatively underscored by the low self-rated proficiency in digital tools ($\bar{x}=3.49$ for current students)

compared to their recognition of its importance ($\bar{x}$=3.89).

This misalignment can be framed within Super's (1953) career development theory. The rapid evolution of the tourism industry represents a shifting "career development task," for which current educational "preparatory behaviors" are inadequate. To improve employability, the curriculum must foster greater adaptability and practical problem-solving skills, moving beyond knowledge transmission to competency development.

6.2. Enhancing Practical Learning and Digital Literacy

The high value placed on internships ($\bar{x}$=4.00) and project-based learning by students aligns with the principles of experiential learning theory (Kolb, 1984). The deficiency in these areas, as reported by 30.6% of students having no related practical experience, creates a significant barrier to skill internalization.

The findings support the arguments of Neuhofer (2016) and Xiang et al. (2021) for practice-based digital learning models. Establishing "Smart Tourism Simulation Labs," as suggested by stakeholders, would provide a controlled environment for experiential learning, bridging the gap between classroom theory and the unpredictable nature of industry practice.

6.3. Fostering Interdisciplinary Competence

The low scores in interdisciplinary integration (graduates: $\bar{x}$=3.85; employers: $\bar{x}$=3.60) highlight a fundamental structural issue in the curriculum. As expert interviews indicated, emerging roles require a "deep integration of technology and business," yet siloed academic departments hinder this synthesis.

This reflects the global trend noted by Buhalis & Amaranggana (2015), where tourism professionals must act as "hybrid talents." The study confirms that educational institutions must actively break down disciplinary barriers, for instance, by creating joint programs or interdisciplinary project modules that mirror the integrated nature of the modern workplace.

6.4. Strengthening the University-Industry Ecosystem

The strong consensus among administrators (96% willing to provide internships) on the need for closer collaboration presents a clear path forward. The success of models like the "Inspur Digital Cultural Tourism Industry College," which employs a dual-mentor system, demonstrates the efficacy of deeply integrated industry-education partnerships.

This aligns with employability frameworks (Hillage & Pollard, 1998; Yorke & Knight, 2006) that emphasize the role of external stakeholders in defining and validating the skills that constitute employability. A sustained feedback loop between academia and industry is not merely beneficial but essential for ensuring the relevance and currency of educational outcomes.

7. Recommendations

To address these conclusions, a multi-faceted reform framework is proposed.

7.1. Curriculum Reform and Content Innovation

Integrate Technology-Focused Core Courses: Make courses like "Tourism Data Analytics," "Smart Destination Management," and "AI Applications in Hospitality" mandatory, ensuring they combine theoretical concepts with hands-on tool usage (e.g., Python, Tableau, GIS).

Adopt Project-Based and Case-Based Learning: Replace passive learning with real-world case studies and simulated industry challenges. For example, students could analyze real scenic area data to optimize visitor flow or develop a digital marketing campaign for a local tourism product.

Pursue "Course-Certification Integration": Align course content with industry-recognized certifications (e.g., CDA Data Analyst, Huawei HCIA), enhancing graduates' employment competitiveness.

7.2. Enhancement of Practical and Experiential Learning

Expand and Structure Internship Programs: Forge stronger partnerships with tourism tech companies and local tourism bureaus to offer internships that include technology-based tasks like data collection, system testing, and social media analysis.

Establish a Smart Tourism Simulation Lab: Create an on-campus lab equipped with VR/AR systems and simulation software, allowing students to engage with digital twin scenic spots and intelligent management systems in a risk-free environment.

Promote Project Incubation: Encourage and support the conversion of student competition projects and research into enterprise-ready prototypes.

7.3. Faculty Development and Capacity Building

Implement Regular Technology Training: Hold professional development programs to keep faculty abreast of the latest tools in data analytics, AI, and digital management.

Encourage Industry-Academic Exchanges: Motivate faculty to participate in enterprise training, internships, or collaborative research to gain direct industry experience.

Promote Collaborative Teaching: Facilitate team-teaching between tourism faculty and IT professionals to create more interdisciplinary classroom experiences.

7.4. Strengthening University–Industry Collaboration

Formalize a Dual-Mentor System: Pair students with both an academic advisor and an industry professional from a partner company for project guidance and career advice.

Invite Enterprises into Curriculum Design: Establish committees with industry representatives to provide ongoing feedback and co-create course syllabi to ensure alignment with market needs.

Co-establish "Intelligent Tourism Industry Colleges": Develop deep, strategic partnerships with leading firms to co-manage specialized programs, share resources, and create a direct talent pipeline.

Acknowledgements

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