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Original Article

Integrating Artificial Intelligence in Undergraduate Tourism Education to Meet International Standards

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Abstract - The tourism industry worldwide is undergoing a fundamental transformation driven by Artificial Intelligence, yet educational institutions-particularly in developing economies-struggle to keep pace. This study investigates how undergraduate tourism programs in Vietnam can meaningfully integrate AI competencies to align with international benchmarks. Drawing on qualitative comparative analysis of educational models from Singapore, Canada, the United States, and France, specific pedagogical gaps within Vietnamese curricula are identified. The research proposes a multi-pronged intervention strategy encompassing curriculum restructuring, faculty digital capacity building, and strengthened industry-academia collaboration. Findings reveal that aligning local training with global digital standards serves dual purposes: enhancing graduate employability while positioning institutions for international accreditation. The proposed framework addresses an often-overlooked dimension-the ethical deployment of AI in educational settings. These insights offer practical guidance for educators, institutional administrators, and policymakers seeking to modernize tourism human resource development in an increasingly automated world.

Keywords - Artificial Intelligence, Curriculum innovation, International standards, Tourism education, Vietnam.

1. Introduction

The global tourism landscape has entered an era of unprecedented technological disruption. Artificial Intelligence now permeates nearly every touchpoint of the travel experience-from conversational booking agents and dynamic pricing algorithms to predictive analytics that anticipate visitor flows at popular destinations. Industry projections suggest that digital transformation, with AI at its core, will contribute approximately 305 billion USD to the tourism sector between 2015 and 2025 [1]. This technological shift has created corresponding pressure on the labor market: employers increasingly seek candidates who can navigate data dashboards, interpret algorithmic recommendations, and leverage automated tools for customer engagement [2]. Yet a troubling disconnect persists between what the industry demands and what educational institutions deliver. Particularly in Vietnam, where tourism represents a strategic economic sector, undergraduate programs remain anchored in traditional competencies-tour guiding techniques, foreign language proficiency, and conventional service operations. Students graduate with limited exposure to the digital tools reshaping their profession. Meanwhile, faculty members often lack both the training and institutional support needed to integrate rapidly evolving technologies into their courses [3]. This gap carries real consequences: recent research indicates that graduates with demonstrable AI proficiency secure field-relevant employment at significantly higher rates than their less digitally-equipped peers [4].

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1.1. Research Gap and Problem Statement

Existing scholarship has examined AI applications in general higher education contexts and documented the operational impact of AI on tourism businesses. However, a notable gap exists in research addressing the specific curricular and pedagogical transitions required to embed AI as a core professional competency-rather than merely a supplementary teaching tool-within tourism programs in developing economies. Most studies treat AI integration superficially, overlooking the institutional capacity building, ethical frameworks, and assessment redesign that meaningful implementation demands. This research directly addresses this gap by contrasting advanced international practices with Vietnam's current limitations, offering not just description but actionable remediation strategies.

1.2. Objectives and Contribution

This study pursues three interconnected objectives. First, it synthesizes best practices from four nations recognized for progressive tourism education-Singapore, Canada, the United States, and France-to establish a benchmark framework. Second, it maps Vietnam's current curricular landscape against these benchmarks to identify specific deficiencies. Third, it proposes a localized implementation roadmap that accounts for resource constraints, faculty readiness, and accreditation requirements. The research contributes a practical transition model that moves beyond theoretical advocacy to address the operational realities institutions face when attempting curricular modernization.

2. Literature Review

2.1. The Shifting Foundations of Tourism Education

Tourism education has historically emphasized interpersonal skills, cultural knowledge, and operational procedures. However, bibliometric analyses reveal a pronounced acceleration in AI-related educational research since 2019, with particular attention to adaptive learning systems and data-informed instruction [5]. This shift reflects a broader recognition that traditional curricula-designed for an analog service industry-are inadequately preparing students for workplaces increasingly mediated by intelligent systems. Contemporary scholarship argues that "AI literacy" must now rank alongside language skills and cultural competence as a foundational capability, enabling graduates to collaborate effectively with automated systems rather than being displaced by them [6].

Demir and Demir's comprehensive review documented both the promise and pitfalls of AI integration in tourism curricula [7]. Their analysis confirmed that thoughtful implementation enhances practical competencies and industry readiness, yet cautioned against overlooking critical success factors: faculty preparedness, institutional resource allocation, and ethical governance structures. These findings underscore that technology adoption without corresponding capacity building risks superficial integration that fails to deliver genuine educational value.

2.2. The Vietnam Context: Industry Demand Outpacing Education

The Vietnamese tourism market presents a compelling case study in technological adoption outpacing educational response. Booking.com's 2025 Global AI Sentiment Report found that 99% of Vietnamese travelers expressed interest in incorporating AI into their travel planning-among the highest enthusiasm rates globally [8]. Nearly half of the Vietnamese respondents qualified as "AI Enthusiasts," actively engaging with intelligent travel tools. This consumer readiness has prompted businesses to deploy chatbots, recommendation engines, and automated customer service systems at accelerating rates.

Yet educational institutions have not kept pace with this market transformation. Research on AI adoption at Vietnamese tourist destinations reveals that while businesses recognize AI's potential for enhancing visitor experiences, they struggle to find graduates equipped to manage these systems [9]. A persistent "skills gap" emerges: graduates possess strong hospitality attitudes and traditional service competencies but lack the digital

literacy to operate-let alone optimize-modern technology-enabled operations [10]. RMIT Vietnam researchers have noted that the tourism sector requires approximately 40,000 trained professionals annually, yet current programs produce only half that number, with an even smaller fraction possessing meaningful digital skills [11].

2.3. Generative AI: New Possibilities and Pedagogical Challenges

The emergence of Generative AI tools, particularly large language models like ChatGPT, has introduced both opportunities and complications for tourism education. Experimental studies demonstrate that structured GenAI integration can deepen critical thinking when students must verify, critique, and refine AI-generated outputs rather than passively accepting them [12]. Walia and colleagues found that comparative assignments-where students evaluate AI-produced itineraries against their own work-fostered sophisticated analytical skills while highlighting AI's limitations in handling nuanced, context-dependent tourism scenarios [13].

GenAI platforms can serve as personalized academic assistants, offering real-time feedback, language support, and research guidance [14]. Portuguese tourism students surveyed about AI tool usage reported that immediate feedback and accessibility ranked among the most valued features, contributing to enhanced learning confidence [15]. However, this integration requires careful management. Concerns about academic integrity, over-reliance on automated outputs, and the erosion of foundational skills demand that institutions establish clear usage guidelines and redesign assessments to evaluate process alongside product [16].

2.4. International Quality Standards and Accreditation

The UNWTO's TedQual certification has established global benchmarks for the quality of tourism education. Accreditation criteria emphasize industry relevance, continuous curriculum improvement, and stakeholder engagement-requirements that increasingly presuppose the integration of digital competency [17]. Programs seeking TedQual recognition must demonstrate that graduates possess skills aligned with current industry practices, creating implicit pressure to incorporate AI training. An analysis of 65 tourism programs worldwide revealed that technology-related courses currently constitute the smallest curricular component, despite their growing importance, identifying this as a critical area for development [18]. These findings suggest that AI integration serves not only pedagogical objectives but also strategic positioning for international recognition.

3. Methodology

3.1. Research Design

This study employs a qualitative comparative case-study methodology to evaluate AI integration in tourism education across multiple national contexts. The research framework positions international benchmarks against Vietnam's current pedagogical landscape, enabling systematic identification of gaps and formulation of contextually appropriate remediation strategies. This approach was selected over quantitative methods because the research questions center on institutional processes, policy frameworks, and pedagogical philosophies that resist meaningful numerical reduction.

3.2. Data Collection

Data were synthesized from three primary streams. Policy documents and industry reports from 2020 to 2025 provided insight into national strategies and sectoral initiatives, including the Singapore Tourism Board's Industry Digital Plan and Tourism HR Canada's workforce development frameworks. Academic literature was drawn from peer-reviewed journals focusing on AI in vocational and higher education, with particular attention to studies published since 2023 to capture recent developments. Accreditation frameworks, specifically UNWTO TedQual certification criteria, established baseline requirements for "international standards" against which national programs were evaluated.

3.3. Comparative Analysis Strategy

Four comparison markets-Singapore, Canada, the United States, and France-were selected based on their demonstrated leadership in digital technology adoption within tourism or higher education sectors. A gap analysis matrix structured the comparison, examining dimensions including: curricular content, faculty development programs, industry partnership models, assessment approaches, and ethical governance frameworks. Vietnam's current practices were mapped against each dimension to identify specific deficiencies and opportunities for adaptation. The matrix approach ensured systematic coverage while allowing for the identification of cross-national patterns.

4. Results and Discussion

4.1. International Case Studies: Diverse Pathways to AI Integration

The comparative analysis revealed distinct but instructive approaches across the four benchmark nations:

Singapore exemplifies government-led ecosystem development. The Tourism Industry Digital Plan directly links academic training to operational requirements, ensuring students learn the same AI tools deployed by national tourism operators [19]. This alignment between classroom instruction and workplace expectations produces graduates with immediate job readiness-a model particularly relevant for countries seeking rapid workforce upgrading.

Canada demonstrates the power of industry-education partnerships. Tourism HR Canada's memorandum with academic institutions ensures AI is taught as a vocational competency rather than abstract theory [20]. Students learn applied skills-such as AI-enhanced customer service and data-driven marketing-through a curriculum co-developed with employers. This partnership model addresses a common complaint that graduates lack practical readiness despite holding relevant credentials.

The United States showcases experimental pedagogy that positions students as AI auditors rather than passive users. Leading hospitality programs task students with evaluating AI-generated content, identifying errors, and proposing improvements [13]. This approach develops critical thinking while acknowledging that AI outputs require human oversight. However, U.S. institutions also confront persistent challenges around academic integrity as generative AI tools proliferate.

France illustrates a specialization strategy. The partnership between Les Roches and Aivancity produced a dedicated AI certificate for hospitality professionals, validating AI proficiency as a distinct credential [21]. The French government's appointment of an AI Ambassador for Tourism signals national commitment to digital transformation across the sector [22]. This approach positions AI expertise as a differentiating qualification rather than a baseline expectation.

4.2. Structural Deficiencies in Vietnamese Tourism Education

Contrasted with these international models, Vietnamese tourism education reveals significant structural gaps. Curricula remain predominantly focused on traditional competencies-such as tour guiding, hospitality operations, and language skills-with minimal attention to digital transformation. Where AI appears in student activities, usage tends to be informal and unsanctioned rather than pedagogically structured. Students employ tools like ChatGPT for assignment assistance without guidance on appropriate use, critical evaluation, or ethical boundaries [10].

Several barriers impede progress. Faculty training programs rarely address digital pedagogy, leaving instructors without the knowledge or confidence to integrate AI meaningfully. Infrastructure limitations-such as insufficient computer labs, outdated software, and unreliable connectivity-constrain hands-on learning opportunities. Localized teaching materials remain scarce; instructors lack Vietnamese-language case studies

demonstrating AI applications in domestic tourism contexts. Perhaps most critically, accreditation pressures and policy frameworks have not yet explicitly mandated digital competency development, reducing institutional urgency for reform [3].

4.3. Proposed Strategic Framework for Vietnam

Addressing identified deficiencies requires a coordinated intervention across multiple dimensions:

4.3.1. Curriculum Modernization

AI competencies must transition from peripheral electives to core requirements. Programs should introduce dedicated modules on tourism data analytics, smart destination management systems, and AI-driven marketing. Existing courses should incorporate practical assignments utilizing actual AI tools-students might analyze social media sentiment data, develop prototype chatbots, or evaluate algorithmic recommendations for tourism services. Curriculum design should reference TedQual criteria to ensure alignment with international quality expectations [17].

4.3.2. Faculty Development

A "train-the-trainer" approach is essential. Instructors require structured professional development covering both technical competencies and pedagogical strategies for AI integration. Faculty should be positioned as "digital facilitators" who guide students in productive AI collaboration rather than serving as sole knowledge authorities. Cross-disciplinary partnerships-tourism faculty working with information technology colleagues-can accelerate capacity building while institutions develop internal expertise [23].

4.3.3. Active Learning Integration

Pedagogical approaches must shift from passive lecture delivery to project-based learning where AI serves as a tool for creation rather than a shortcut. Assignments should require students to design solutions, such as itinerary optimization systems, customer service chatbots, and predictive visitor flow models, rather than simply consuming AI outputs. This approach develops both technical proficiency and the critical evaluation skills essential for responsible AI deployment [12].

4.3.4. Industry Partnership

Drawing on the Canadian model, Vietnamese institutions should establish formal collaboration agreements with tourism businesses and technology providers. These partnerships can provide student access to commercial AI platforms, facilitate industry expert guest instruction, and ensure the curriculum remains responsive to evolving workplace requirements. Joint projects and hackathons offer opportunities for applied learning while building professional networks.

4.3.5. Infrastructure Investment

Hardware, software, and connectivity upgrades are foundational prerequisites. Institutions should seek government grants, international development funding, or industry sponsorship to establish AI-capable learning environments. The development of Vietnamese-language teaching materials-such as case studies, datasets, and instructional videos-will enhance accessibility and relevance for both students and instructors.

5. Ethical Considerations

This research relied exclusively on analysis of published literature, policy documents, and institutional reports; no human subjects were involved, and no personal data were collected. Consequently, formal ethical approval was not required. All sources have been appropriately cited, and the research adhered to established standards of academic integrity.

Beyond research ethics, the study's findings carry implications for ethical AI deployment in educational settings that warrant explicit acknowledgment. Academic integrity presents ongoing challenges as generative AI tools become ubiquitous; institutions must redesign assessment approaches to evaluate learning processes alongside outputs, potentially incorporating oral defenses, portfolio demonstrations, and observed practical examinations [16]. Data privacy concerns arise when AI platforms process student information or simulation data; clear protocols ensuring compliance with data protection standards are essential. Additionally, curricula should address algorithmic bias, training students to identify and mitigate discriminatory patterns in AI systems before they impact tourism operations [24]. These ethical dimensions deserve systematic attention as institutions move toward AI integration.

6. Study Limitations

Several limitations should be acknowledged when interpreting these findings. This study is primarily qualitative and conceptual, relying on secondary data analysis rather than primary empirical investigation. The direct quantitative impact of proposed interventions on Vietnamese graduate employment outcomes has not been measured; such an assessment would require longitudinal tracking following implementation. The four comparison countries, while informative, do not represent the full range of possible models; ASEAN neighbors with closer cultural and economic proximity to Vietnam were not examined. Additionally, the rapid evolution of AI technologies means that specific tools and platforms discussed may require frequent reassessment as capabilities advance and new applications emerge.

7. Future Research Directions

The findings suggest several productive avenues for future investigation. Empirical pilot studies implementing proposed curriculum modifications at Vietnamese institutions would enable pre-post assessment of student competency development and industry readiness. Quantitative surveys of tourism employers could systematically evaluate graduate preparedness under current versus reformed training approaches. Comparative research encompassing other ASEAN nations would situate Vietnam's progress within the regional context while identifying potential collaborative opportunities. Finally, longitudinal tracking of graduates entering AI-integrated workplaces would illuminate whether educational interventions translate into sustained career advantages and enhanced organizational contributions.

8. Conclusion

The digital transformation reshaping global tourism represents a structural evolution rather than a passing trend. This research confirms that elevating Vietnamese undergraduate tourism education to international standards requires more than passive technology adoption-it demands strategic curricular overhaul, harmonizing course content with global competency expectations, empowering faculty with digital fluency, and institutionalizing ethical frameworks for AI deployment.

The comparative analysis of Singapore, Canada, the United States, and France reveals diverse but instructive pathways, each offering lessons adaptable to Vietnam's context. Singapore demonstrates government-led coordination; Canada highlights industry-education partnership value; the United States showcases critical thinking pedagogy; and France illustrates specialized credentialing approaches. Vietnam does not need to replicate any single model but can selectively adapt elements aligned with local resources and priorities.

By transitioning from traditional vocational training to an AI-enhanced pedagogical model, Vietnamese institutions can effectively bridge the widening skills gap between graduate capabilities and industry demands. This transformation ensures that emerging tourism professionals are not merely employable but positioned to lead innovation-fulfilling the requirements of international accreditation while meeting the evolving expectations of a

technology-mediated industry. The path forward requires a coordinated effort among universities, government agencies, and industry stakeholders; however, the alternative-continued educational stagnation amid accelerating technological change-carries far greater costs.

Data Availability

This study utilized publicly available secondary data sources, including published academic literature, government policy documents, industry reports, and institutional publications. All data supporting the conclusions are accessible through the cited references. No primary datasets were generated during this research.

Authors' Contributions

Conceptualization, V.P.; Methodology, V.P.; Investigation, V.P. and T.P.T.T.; Writing – Original Draft Preparation, V.P.; Writing – Review & Editing, V.P. and T.P.T.T.; Supervision, V.P. All authors have read and approved the final version of the manuscript.

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