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Application of AI, AR, and VR Technologies in BA and MA Tourism Programs at Georgian Higher Education Institutions: Challenges and Benefits

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Abstract

AI, AR, and VR technologies are increasingly reshaping higher education, including tourism and hospitality programs, by creating innovative opportunities for interactive learning. This study examines the application and integration of AI, AR, and VR technologies in BA and MA tourism programs at Georgian higher education institutions, with particular emphasis on their educational benefits and implementation challenges. The study employs qualitative and quantitative research approaches to analyze tourism education programs offered in the Republic of Georgia during the 2025-2026 and 2026-2027 academic years. According to data from the National Center for Educational Quality Enhancement, 15 higher education institutions in Georgia currently offer 19 tourism programs, comprising 14 Bachelor's and 5 Master's programs. The findings indicate that although Georgian universities have adopted digital educational practices, the systematic integration of AI-, AR-, and VR-based technologies into tourism program curricula remains moderate and inconsistent. The study reveals that the application of AI, AR, and VR technologies positively influences student engagement, interactive learning, digital skills development, and the development of smart and green tourism ecosystems. Despite these benefits, broader implementation faces financial barriers, limited technological infrastructure, insufficient availability of qualified academic and industry-based staff, and underdeveloped institutional digital transformation policies. The research contributes to the evolving scholarly discourse on technology-driven tourism education and offers recommendations for fostering innovative educational practices across Georgian higher education institutions in the tourism and hospitality sector.

Keywords: Higher education; AI technologies; AR technologies; VR technologies; BA programs; MA programs; Georgia

1.0 Introduction

Higher education in Georgia is regulated by the Law of Georgia on Higher Education, the Law of Georgia on Educational Quality Enhancement, and other relevant legislative acts. The Georgian higher education system covers three academic levels: Bachelor's, Master's, and Doctoral. Higher education institutions in Georgia are mainly categorized as colleges and universities. Colleges offer only first-cycle (Bachelor's level) programs, while universities provide all three levels. These institutions may be public or private. Educational programs follow the European Credit Transfer and Accumulation System (ECTS). Bachelor's degree programs comprise 180 or 240 ECTS credits, whereas Master's degree programs consist of 60 or 120 ECTS credits. According to data published by the National Center for Educational Quality Enhancement on May 1, 2025, there are 57 authorized universities, one college, and six Orthodox divinity higher education institutions in Georgia. Among the 57 universities, 15 offer 19 tourism education programs.

BA and MA Tourism Education Programs at Georgian Higher Education Institutions

Table 1

City	Institutions (15)	Language	Programs (19)	Qualification	Admission Capacity (Total: 1,300)
Tbilisi	001 Ivane Javakhishvili Tbilisi State University	Georgian	0010145 World Sociopolitical and Tourism Geography	Bachelor of Tourism Geography	20
		Georgian	0010152 Tourism	Bachelor and Master of Business Administration in Tourism/Bachelor and Master of Tourism	360
Tbilisi	004 Shota Rustaveli Theatre and Film Georgia State University	Georgian	0040112 Cultural Tourism	Bachelor of Tourism	15
Kutaisi	009 Akaki Tsereteli State University	Georgian	0090147 Tourism	Bachelor and Master of Business Administration in Tourism/Bachelor and Master of Tourism	115
Tbilisi Batumi	033 Grigol Robakidze University	Georgian	0330113 Tourism (Tbilisi)	Bachelor of Business Administration in Tourism	40
		Georgian	0330112 Tourism (Batumi)	Bachelor of Business Administration in Tourism	70
Tbilisi	064 International Black Sea University	Georgian	0640110 Tourism	Bachelor of Business Administration in Tourism	27
		English	0640111 Tourism	Bachelor of Business Administration in Tourism	27
Telavi	071 Iakob Gogebashvili Telavi State University	Georgian	0710108 Tourism	Bachelor of Tourism	50
Tbilisi	088 Sulkhan-Saba Orbeliani University	Georgian	0880103 Tourism	Bachelor of Business Administration in Tourism	60
Batumi	114 Batumi Shota Rustaveli State University	Georgian	1140130 Tourism	Bachelor and Master of Business Administration in Tourism/Tourism Management	205
Tbilisi	115 Caucasus International University	Georgian	1150116 Tourism	Bachelor of Business Administration in Tourism	40
Tbilisi	122 Caucasus University	Georgian	1220137 Tourism	Bachelor and Master of Tourism	30
Batumi	130 Batumi Art Teaching University	Georgian	1300106 Cultural Tourism	Bachelor of Tourism	10

Gori	133 Gori State University	Georgian	1330109 Tourism	Bachelor of Business Administration in Tourism/Master of Hotel Management	50
Tbilisi	143 Georgian International University, GIU	Georgian	1430106 Tourism	Bachelor of Business Administration in Tourism	50
		English	1430107 Tourism	Bachelor of Business Administration in Tourism	20
Tbilisi	152 Georgian National University	Georgian	1520116 Tourism	Bachelor of Tourism	80
Tbilisi	181 New Higher Education Institute	Georgian	1810105 Tourism	Bachelor of Business Administration in Tourism	30

The data on BA and MA tourism education programs offered by Georgian higher education institutions demonstrate the expansion and diversification of tourism studies across the country. Table 1 presents 15 higher education institutions that offer 19 tourism education programs with a total admission capacity of 1,300 places for the 2026-2027 academic year. These programs are distributed among major cities, including Tbilisi, Batumi, Kutaisi, Telavi, and Gori. The analysis clearly indicates that Tbilisi serves as the central hub for tourism higher education in Georgia, as most of the universities listed in Table 1 are located in the capital city. This reflects the concentration of educational infrastructure, academic resources, and employment opportunities within the country's political and economic center.

Among public universities, Ivane Javakhishvili Tbilisi State University has one of the highest admission quotas, offering programs in Tourism and Tourism Geography with approximately 380 places. Similarly, Batumi Shota Rustaveli State University offers approximately 205 places, reflecting the strategic importance of Batumi as one of the most popular seaside tourism destinations on the Black Sea coast in western Georgia. Akaki Tsereteli State University in Kutaisi offers tourism programs with an enrollment capacity of 115 students, while Iakob Gogebashvili Telavi State University supports tourism education in the Kakheti region through its BA Tourism program. Gori State University contributes through programs in tourism and hotel management. Regional institutions play an important role by supporting local students who are unable to move to other cities, strengthening the local tourism industry, and reducing educational centralization.

According to Table 1, the overwhelming majority of programs are delivered in Georgian, while only a limited number are available in English. English-language BA and MA tourism and hospitality programs are mainly offered by private universities, such as International Black Sea University, Caucasus University, and Georgian International University. The small number of English-medium BA and MA programs in tourism suggests that internationalization within Georgian tourism higher education is still developing.

The analysis also reveals that most programs focus mainly on Tourism/Tourism Management

and/or Business Administration in Tourism. Common qualifications include Bachelor of Tourism, Bachelor of Business Administration in Tourism, Master of Tourism, Master of Hotel Management, and Master of Tourism and Hospitality Management. Among the 15 higher education institutions, only two, Shota Rustaveli Theatre and Film Georgia State University and Batumi Art Teaching University, offer programs in Cultural Tourism, while Ivane Javakhishvili Tbilisi State University also offers Tourism Geography within its academic portfolio. Public universities continue to dominate in terms of student capacity and institutional reputation, yet private institutions are increasingly active, competitive, and innovative. Universities such as Caucasus International University, Sulkhan-Saba Orbeliani University, Georgian International University, International Black Sea University, Caucasus University, and Georgian National University contribute to educational diversity and provide modern approaches to tourism education. The coexistence of public and private institutions promotes competition in larger cities and provides local students in the regions with greater accessibility.

Overall, the data on public and private higher education institutions and tourism programs demonstrate that tourism education in Georgia is actively developing and expanding in response to labor market demands. Employment opportunities in the tourism and hospitality sector are diverse and available at the regional level. Nevertheless, several challenges have been observed regarding the qualifications offered at BA and MA levels. BA Tourism programs award either a Bachelor of Business Administration in Tourism or a Bachelor of Tourism, while MA programs offer qualifications such as Master of Business Administration in Tourism, Master of Tourism and Hospitality, Master of Hotel Management, and Master of Cultural Tourism. However, narrower specializations or qualifications, such as sustainable tourism, ecotourism, e-tourism, event management, recreational tourism, and medical/wellness/spa tourism, are not represented as separate programs, modules, or concentrations at higher education institutions. Furthermore, internationalization and alignment with tourism industry requirements at both national and international levels need to be strengthened in order to bring Georgian higher education tourism programs closer to international standards and global labor market expectations.

2.0 Literature Review

AI, AR, and VR technologies have taken a leading position in the tourism and hospitality industry. According to Tussyadiah (2020), AI, AR, and VR technologies are used in tourism for customer service automation, tourism forecasting, hotel operations, monitoring, and smart destination management. Similarly, Gretzel et al. (2015) argue that a smart tourism ecosystem is based on advanced digital technologies, particularly artificial intelligence and communication services. In the context of higher education institutions and tourism programs, AI-driven technologies facilitate the development of adaptive learning environments, smart tutoring applications, automated assessment mechanisms, and personalized learning experiences, thereby enhancing tourism and hospitality students' engagement and learning effectiveness.

Scholars state that the integration of AI applications into tourism education contributes significantly to the development of analytical thinking, digital literacy, and technology-focused tourism management competencies among students. Xiang and Fesenmaier (2017) emphasize that the evolution of smart tourism systems increasingly demands graduates equipped with technological expertise and data-driven decision-making capabilities. As a result, higher education institutions worldwide are

progressively incorporating AI-supported learning tools, tourism software, and smart tourism management-related subjects into Bachelor's and Master's degree tourism education curricula.

Augmented reality (AR) technologies also play a significant role in tourism education. By integrating digital content with real-world environments, AR facilitates immersive and interactive learning experiences that enhance students' practical understanding and engagement within educational settings. According to tom Dieck and Jung (2018), AR applications improve tourism destination interpretation, cultural heritage visualization, and tourism marketing education by allowing students to interact with virtual tourism environments in real time. Similarly, Williams, Yao, and Nurse (2020) emphasize that AR-supported tourism applications increase student participation, destination understanding, and experiential learning opportunities.

Virtual reality (VR) technologies have likewise become increasingly significant in tourism higher education due to their immersive and simulation-based capabilities. Guttentag (2010) defines VR as a technology capable of creating realistic virtual environments that simulate tourism destinations, hospitality operations, and tourism management scenarios. Beck, Rainoldi, and Egger (2019) further argue that VR technologies support experiential tourism learning by enabling students to participate in virtual hotel management exercises, destination simulations, crisis management scenarios, and virtual field trips.

Despite the growing international literature on technology-enhanced tourism education, limited academic attention has been devoted to the implementation of AI-, AR-, and VR-based educational practices in developing countries and post-Soviet education systems, including Georgia. The Ministry of Education, Science, and Youth of Georgia emphasizes the modernization of higher education institutions, support for innovation, digital learning systems, and international cooperation within the framework of the Bologna Process and the European Higher Education Area. The Ministry's strategic documents and educational reforms indicate growing attention to digitization and technology-enhanced learning environments within Georgian universities. Recent government initiatives focus on strengthening digital competencies, promoting e-learning platforms, improving technological infrastructure, and supporting innovation-oriented educational programs. These priorities create favorable conditions for integrating AI, AR, and VR technologies into tourism Bachelor's and Master's degree programs. An analysis of Georgian university websites also demonstrates that many higher education institutions follow the Ministry's strategic orientation toward digital transformation and innovation. Universities such as Ivane Javakhishvili Tbilisi State University, Ilia State University, Georgian Technical University, International Black Sea University, Caucasus University, and Georgian National University increasingly promote digital education, innovation, internationalization, and interdisciplinary learning approaches within their institutional development strategies. These universities use online learning platforms, digital teaching methods, and technology-supported educational resources that may support the future implementation of smart tourism education models.Ministry of Education, Science, and Youth of GeorgiaIvane Javakhishvili Tbilisi State UniversityIlia State UniversityGeorgian Technical UniversityInternational Black Sea University

According to reports published by the European Association for Quality Assurance in Higher Education (ENQA) and the NCEQE, Georgia has made significant progress in aligning its higher education quality assurance mechanisms with European educational frameworks. However, several challenges remain, including unequal access to technological resources, insufficient digital

infrastructure in some universities, limited academic staff training, and financial constraints affecting the implementation of advanced technologies. International reports also emphasize that digital transformation has become one of the key priorities of higher education institutions after the COVID-19 pandemic. UNESCO reports highlight the growing importance of AI-supported learning systems, virtual simulation technologies, and educational environments in preparing students for modern labor markets.European Association for Quality Assurance in Higher Education (ENQA)European Association for Quality Assurance in Higher Education (ENQA)

A review of institutional reports and university websites in Georgia demonstrates that while many universities actively promote innovation and digitization, the actual integration of AI, AR, and VR technologies into tourism curricula remains relatively limited. Most higher education institutions use standardized e-learning systems, but some academic and invited staff from older generations remain strongly attached to traditional teaching methods, such as lecture-based instruction, printed materials, and limited classroom interaction. As a result, the effective integration of digital tools, interactive platforms, and student-centered learning approaches is sometimes slow and inconsistent across regional universities. However, some lecturers actively use advanced AI technologies and smart tourism simulation tools. These approaches encourage students to focus on innovation, critical thinking, and practical skills development. Furthermore, some lecturers integrate international examples and case studies into their teaching, enabling students to access more information, understand global tourism trends, and gain broader professional perspectives. This indicates that Georgian tourism higher education is currently in a transitional phase between traditional educational approaches and modern technology-enhanced tourism education systems.

3.0 Research Methodology

This study applies a mixed-method research approach that combines qualitative and quantitative methods to examine the implementation of artificial intelligence (AI), augmented reality (AR), and virtual reality (VR) technologies within Bachelor's (BA) and Master's (MA) tourism programs at Georgian higher education institutions. The mixed-method design was selected to provide a comprehensive understanding of both measurable trends and subjective perspectives regarding digital transformation in tourism education. The research focused on 15 Georgian higher education institutions offering 19 tourism-related education programs and examined the extent to which innovative technologies, smart tourism concepts, and digital educational practices are incorporated into tourism curricula and extracurricular activities.

The first stage of the research involved desk research and document analysis. Official university websites, tourism program descriptions, curricula, syllabi, accreditation materials, institutional reports, strategic development plans, and social media platforms were analyzed to identify evidence of AI, AR, and VR implementation within BA and MA tourism education programs at higher education institutions. Particular attention was given to digital learning environments, smart and green tourism-related courses, technology-based educational practices, online and hybrid learning options, and innovation-focused initiatives. Based on the data obtained, the higher education institutions were classified according to four levels of technological integration: High, Moderate, Limited, and None/Traditional. This

classification was used for the comparative evaluation of digital transformation across Georgian tourism higher education institutions.

The qualitative component of the research was conducted through interviews with approximately 50 academic and invited staff members involved in developing tourism education programs at Georgian higher education institutions. The interviews explored academic and invited staff members' attitudes, opinions, and future perspectives regarding curriculum modernization, digital transformation, institutional readiness, the implementation of AI, AR, and VR technologies, technological infrastructure, and employer-related challenges associated with innovative and interactive tourism education.

The quantitative component involved surveys of around 170 students enrolled in BA and MA programs in Tourism. The student survey examined awareness and perceptions regarding AI, AR, and VR technologies; the use of digital learning tools within tourism courses; experience-based learning opportunities; student engagement; lecturers' competencies and readiness to implement innovative approaches during the study process; and curriculum modernization.

The study also incorporated a comparative case study of three Georgian higher education institutions: International Black Sea University, Caucasus International University, and The University of Georgia. The case studies examined the alignment of BA Tourism programs with the United Nations Sustainable Development Goals (SDGs), particularly SDG 4 (Quality Education), SDG 8 (Decent Work and Economic Growth), SDG 11 (Sustainable Cities and Communities), and SDG 17 (Partnerships for the Goals). Official university websites, strategic development plans, institutional missions, and tourism program descriptions were analyzed to evaluate how sustainability principles, stakeholder engagement, practical learning opportunities, and international cooperation are incorporated into tourism education.

Finally, the collected qualitative and quantitative data were integrated through SWOT analysis to identify the major strengths, weaknesses, opportunities, and threats associated with the implementation of AI, AR, and VR technologies within Georgian tourism higher education institutions.

The study was guided by the following questions: Are AI, AR, and VR technologies used in BA and MA tourism programs at Georgian higher education institutions? How are they integrated, and what are the major benefits and challenges associated with their implementation? How is the future integration and development of AI, AR, and VR technologies envisioned within BA and MA Tourism programs? The study also incorporated a comparative case study of three Georgian higher education institutions (IBSU, CIU, and UG), examining how BA programs in Tourism are aligned with the Sustainable Development Goals (SDGs).

4.0 Findings

4.1 SWOT Analysis of AI, AR, and VR Technologies in Tourism Higher Education Programs at Georgian Universities

Strengths	Weakness

- ✓ Increasing awareness of digital transformation in tourism education among Georgian universities
- ✓ Growing implementation of digital learning platforms and AI-supported educational tools
- ✓ Availability of tourism Bachelor's and Master's programs across multiple higher education institutions
- ✓ Development of students' digital and technological competencies
- ✓ Use of virtual simulations and interactive educational environments in some institutions
- ✓ English-language tourism programs support internationalization and global educational standards

- ✓ Limited integration of AI, AR, and VR technologies into Bachelor's and Master's tourism program curricula
- ✓ Insufficient technological infrastructure and laboratory facilities at HEIs
- ✓ Lack of specialized academic staff trained in AI-, AR-, and VR-based teaching methods
- ✓ Limited HEI financial resources for advanced technological investment
- ✓ Dependence on traditional lecture-based teaching approaches
- ✓ Absence of comprehensive institutional digital transformation strategies
- ✓ Limited practical implementation of AR and VR technologies in tourism courses

Opportunities

- ✓ Global growth of smart tourism and digital tourism technologies
- ✓ Potential international academic partnerships and research collaborations
- ✓ Access to European educational frameworks and digital innovation initiatives
- ✓ Development of virtual tourism laboratories and simulation centers
- ✓ Increasing demand for digitally skilled tourism professionals in the labor market
- ✓ Integration of AI and VR into destination management, hospitality, and tourism education
- ✓ Expansion of online and hybrid tourism education models

Threats

- ✓ High costs of AI, AR, and VR software and hardware applications
- ✓ Technological inequality between public and private universities
- ✓ Cybersecurity and data privacy challenges
- ✓ Risk of outdated curricula if institutions fail to modernize tourism and hospitality educational programs
- ✓ Lack of qualified academic and industry-based staff.

The SWOT analysis reveals that higher education institutions in Georgia have significant potential for integrating AI, AR, and VR technologies into tourism education. The findings demonstrate a growing institutional commitment to digital transformation and innovation in tourism and hospitality programs. The use of AI-driven educational tools, AR and VR simulations, and interactive learning environments contributes to the development of students' technological competencies and practical skills. In addition, the availability of English-language tourism programs at International Black Sea University, Caucasus University, and Georgian International University supports internationalization,

academic competitiveness, and alignment with global higher education standards, thereby preparing graduates for the tourism industry. Despite gradual institutional efforts to advance technologically, many constraints remain. The integration of AI, AR, and VR technologies into the study process and curricula of BA and MA tourism programs remains limited due to insufficient technological infrastructure, limited laboratory facilities, a lack of skilled personnel, and financial constraints. Traditional lecture-based approaches used by some older-generation academic and invited staff members, who often lack AI competencies and skills, as well as the absence of comprehensive institutional digital transformation strategies, also hinder modernization. Meanwhile, the global growth of smart tourism and digital technologies has increased demand for digitally skilled tourism professionals. International academic partnerships and access to European educational initiatives may support curriculum modernization, funding opportunities, and knowledge exchange. The establishment of virtual laboratories, simulation centers, and hybrid learning models can further improve practical education and institutional competitiveness.

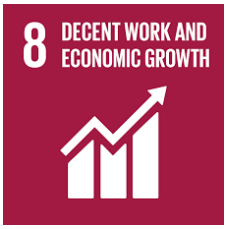
4.2 Case Study: IBSU, CIU, and UG BA Tourism Programs and Sustainable Development Goals

In addition to examining the integration of AI, AR, and VR technologies in BA and MA tourism education program curricula and extracurricular activities, the study explored the alignment of BA programs in Tourism with the Sustainable Development Goals (SDGs) at three Georgian higher education institutions: International Black Sea University, Caucasus International University, and The University of Georgia.

Scenario of International Black Sea University

IBSU offers a bilingual (Georgian and English) BA Program in Tourism designed to prepare competitive professionals equipped with theoretical knowledge and soft skills tailored to the tourism labor market.

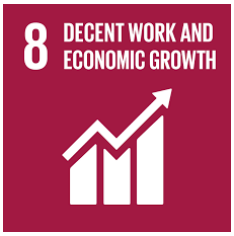
Goals	Alignment
	IBSU's BA in Tourism program is bilingual (Georgian and English), enhancing accessibility and inclusivity, which supports SDG 4.3 and SDG 4.7. The program's accreditation and continuous updates are based on labor market needs, demonstrating a commitment to maintaining high-quality education standards aligned with sustainable development principles.

	Graduates are prepared to work as line or middle managers in public, private, and international organizations in the tourism sector, contributing to productive employment and entrepreneurship (SDG 8.3). IBSU's engagement with government agencies and private sector entities aligns with SDG 8.9, promoting sustainable tourism that creates jobs and promotes local culture and products.
	IBSU's BA in Tourism education program prepares graduates to work with agencies responsible for cultural heritage, protected areas, and sustainable tourism development (SDG 11.4).
	IBSU's bilingual BA in Tourism program and international orientation foster global partnerships and knowledge exchange, which are essential for SDG 17.6. The program actively involves academic staff, students, graduates, and potential employers in curriculum development, reflecting multi-stakeholder partnerships (SDG 17.16).

Scenario of Caucasus International University

CIU offers a BA program in Tourism that integrates sustainable development principles and aligns closely with several Sustainable Development Goals.

Goals	Alignment
	CIU's BA program in Tourism includes courses on sustainable tourism development. Practical components such as internships and project-based learning equip students with relevant skills for the labor market, supporting SDG 4.4 on skills for employment and entrepreneurship. CIU actively participates in capacity-building initiatives and aligns its educational offerings with EU strategies for sustainable tourism, promoting lifelong learning and quality education.

	CIU's BA program in Tourism prepares graduates for employment in various areas of the tourism sector, including sustainable and green tourism, contributing to productive employment and entrepreneurship (SDG 8.3). CIU's engagement with tourism businesses through internships and collaborative projects helps bridge the skills gap between education and labor market demands, fostering economic growth.
	The program fosters awareness of community engagement and responsible tourism development, encouraging students to contribute to resilient and sustainable urban and rural communities. Through collaboration with local stakeholders, students learn to support community-based tourism initiatives that enhance social and environmental sustainability.
	CIU actively promotes international cooperation through student exchange programs and participation in EU-funded projects, supporting SDG 17.3 on enhancing global partnerships in education. The university collaborates closely with tourism businesses, local communities, NGOs, and government agencies to co-develop curricula, internships, and research initiatives, exemplifying multi-stakeholder partnerships (SDG 17.16).

Scenario of The University of Georgia

The UG BA program in Tourism is designed to equip students with comprehensive theoretical knowledge and soft skills in tourism, with a strong emphasis on cultural heritage, environmental sustainability, and civic responsibility.

The BA Tourism programs at International Black Sea University, Caucasus International University, and The University of Georgia are strongly aligned with sustainable tourism principles and the Sustainable Development Goals through curriculum modernization, innovative teaching and learning methods, and international collaboration. The programs offer internships and project-based learning opportunities for students in cooperation with tourism industry stakeholders. The universities also support internationalization, multi-stakeholder partnerships, and educational quality assurance, thereby contributing to the development of competitive and socially responsible tourism professionals.

5.0 Discussion

The findings of the study demonstrate that the integration of artificial intelligence (AI), augmented reality (AR), and virtual reality (VR) technologies within Bachelor's (BA) and Master's (MA) tourism education programs at Georgian higher education institutions remains uneven and transitional. Although digital transformation processes have become increasingly visible within Georgian higher education after the COVID-19 pandemic and the acceleration of global technological modernization, the systematic implementation of immersive and smart tourism technologies within tourism curricula is still developing gradually. The study reveals that AI technologies are considerably more widespread within tourism education programs than AR and VR applications. Most analyzed higher education institutions currently utilize AI-supported tools primarily for digital learning management, online communication, research assistance, automated academic support, and hybrid educational delivery systems.

The relatively stronger implementation of AI technologies within Georgian tourism education may be explained through several interconnected institutional and economic factors. First, AI-supported educational systems generally require lower infrastructural investment compared with VR laboratories and immersive simulation environments. Learning management systems, automated communication tools, AI-assisted research applications, and online educational platforms can often be integrated into existing digital infrastructure without substantial financial transformation. In contrast, AR and VR implementation requires advanced technological infrastructure, specialized laboratories, simulation venues, software licensing systems, technical maintenance, and qualified personnel.

The classification of the 15 analyzed universities demonstrates that only a limited number of institutions may be categorized as having High or Moderate levels of technological integration, while the majority remain within the Limited or Traditional categories.

Many universities continue to experience a shortage of academic or invited personnel trained in innovative digital teaching methodologies. Even when technological infrastructure is partially available, the absence of qualified staff capable of integrating digital tools into pedagogical processes may significantly reduce the effectiveness of technological implementation. Furthermore, resistance to technological change and reliance on traditional teaching methods may slow curriculum modernization. Therefore, continuous faculty retraining, interdisciplinary cooperation, and international academic exchange programs are essential components of successful digital transformation strategies.

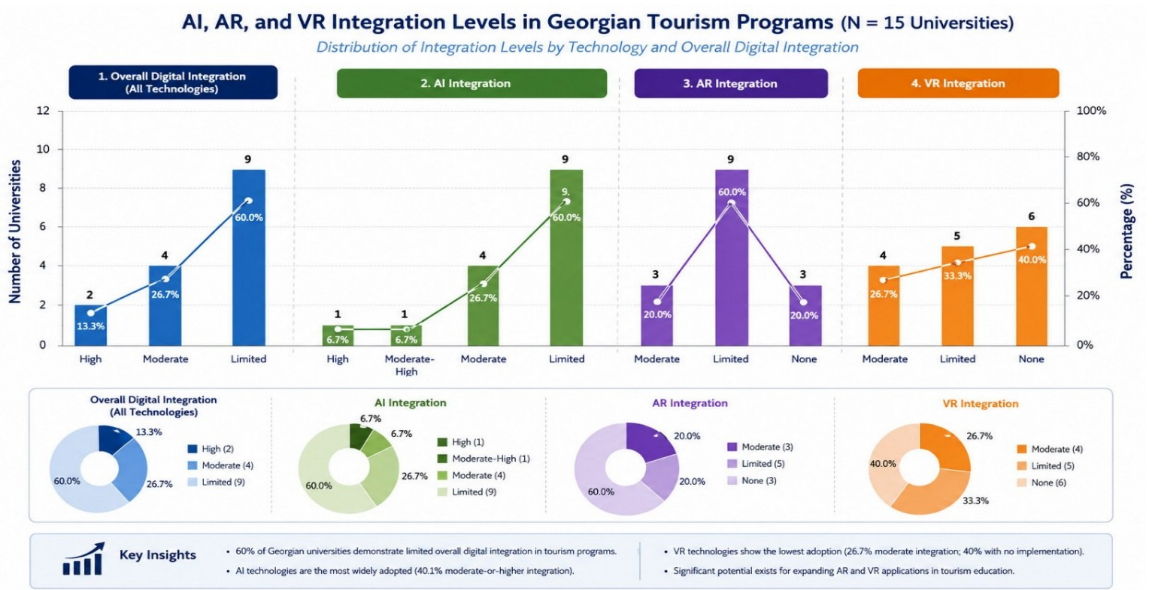
The findings further indicate that tourism higher education in Georgia remains primarily focused on general tourism management and business administration rather than specialized directions. Although several universities demonstrate attempts at diversification through cultural tourism, tourism geography, and hotel management specializations, there remains limited representation of emerging fields such as digital tourism, sustainable smart tourism, event management, health/wellness/spa tourism, recreational tourism, and tourism entrepreneurship. Consequently, Georgian tourism education programs may require greater interdisciplinary integration.

AI, AR, and VR Integration Levels in Georgian Tourism Programs

Table 2

Universities (15)	AI Use	AR Use	VR Use	Overall Level of Digital Integration
Ivane Javakhishvili Tbilisi State University	Moderate	Limited	Limited	Moderate

Shota Rustaveli Theatre and Film Georgia State University	Limited	Moderate	Limited	Limited
Akaki Tsereteli State University	Limited	Limited	Limited	Limited
Grigol Robakidze University	Limited	Limited	Limited	Limited
International Black Sea University	Moderate	Limited	Moderate	Moderate
Iakob Gogebashvili Telavi State University	Limited	Limited	None	Limited
Sulkhan-Saba Orbeliani University	Limited	None	None	Limited
Batumi Shota Rustaveli State University	Moderate	Limited	Moderate	Moderate
Caucasus International University	Limited	None	None	Limited
Caucasus University	Moderate–High	Moderate	Moderate	High
Batumi Art Teaching University	Limited	Moderate	Limited	Limited
Gori State University	Limited	Limited	None	Limited
Georgian International University (GIU)	Moderate	Limited	Limited	Moderate
Georgian National University (SEU)	High	Limited	Moderate	High
New Higher Education Institute	Limited	None	None	Limited



The findings show that the integration of AI, AR, and VR technologies is generally moderate and inconsistent across Georgian universities. Only a few institutions incorporate innovative technologies into tourism program curricula, while most retain traditional educational approaches with limited digital tool adoption. This underscores broader challenges facing post-Soviet higher education institutions, which continue to struggle with infrastructural, financial, and institutional constraints.

Caucasus University (CU) and Georgian National University (SEU) demonstrate the highest levels of AI integration within BA and MA tourism program curricula, including digital learning platforms, innovation-focused teaching methods and activities, and modern tourism management

approaches. Caucasus University demonstrates a Moderate-High level of AI, AR, and VR use, resulting in an overall High digital integration classification.

Similarly, Georgian National University (SEU) focuses on digital innovation, modern educational infrastructure, technology-supported learning environments, and smart learning approaches. Several universities, including Ivane Javakhishvili Tbilisi State University, International Black Sea University, Batumi Shota Rustaveli State University, and Georgian International University (GIU), demonstrate Moderate overall digital integration. These universities show evidence of partial technological adaptation through digital learning environments, online and smart tourism-related educational content, and some innovative teaching practices. However, their implementation of AR and VR technologies remains limited.

The majority of analyzed institutions fall within the Limited category of technological integration. Universities such as Akaki Tsereteli State University, Grigol Robakidze University, Iakob Gogebashvili Telavi State University, Sulkhan-Saba Orbeliani University, Caucasus International University, Gori State University, and New Higher Education Institute demonstrate only minimal publicly available evidence of the implementation of AI, AR, or VR technologies within tourism education programs.

6.0 Best Practice Evidence: International Recognition of Innovative and Technology-Enhanced Tourism Education at International Black Sea University

One significant example of international recognition is the participation of International Black Sea University in the international PROFFORMANCE+ initiative, a large-scale European higher education collaboration project focused on teaching excellence, innovation, quality enhancement, and professional development within the European Higher Education Area (EHEA). The final PROFFORMANCE+ event, held in Budapest on October 16, 2025, brought together approximately 90 higher education professionals from 14 countries and represented the culmination of a five-year international cooperation process dedicated to improving higher education teaching and learning practices through innovation, assessment tools, professional training, and international networking.

The Tourism BA Program of IBSU received international recognition as an example of innovative and sustainability-oriented tourism education. The Head of the Tourism BA Program at IBSU was awarded the PROFFORMANCE Higher Education Teacher Award 2024/2025, recognizing excellence in innovative teaching methodologies, student-centered educational approaches, digital integration, and academic leadership within tourism higher education. Moreover, International Black Sea University received third place in the Sustainability category. The recognition particularly reflected the university's efforts to integrate modern technologies, experience-based learning methods, interdisciplinary teaching practices, and sustainable tourism concepts into tourism and hospitality program curricula.

This practice fostered the sustainable preservation of intangible cultural heritage (ICH), specifically Gideli spinning, by actively involving students in documenting, promoting, and safeguarding traditions through participatory activities, namely:

- ✓ Identifying key partners, including local artisans, cultural custodians, NGOs, and governmental bodies, to ensure a community-driven approach.
- ✓ Organizing workshops with community members and experts to transfer traditional knowledge to students and raise awareness within the local context.

- ✓ Supporting the development of digital tools (e.g., apps and online platforms) to document and share ICH globally.
- ✓ Guiding students in integrating academic learning with practical, community-based projects.

The PROFFORMANCE concept demonstrated that successful digital transformation within tourism education does not depend exclusively on technological infrastructure, but also on academic leadership, pedagogical innovation, institutional strategy, and continuous professional development through a lifelong learning cycle.

7.0 Recommendations

Open positions in the tourism and hospitality labor market in Georgia increasingly require graduates who are equipped not only with tourism-specific managerial and communication competencies, but also with digital literacy, analytical thinking, and technological adaptability. Consequently, Georgian BA and MA Tourism Education Programs must develop in accordance with global technological trends and tourism labor market expectations. The future competitiveness and long-term sustainability of Georgian tourism higher education will largely depend on the ability of universities to implement comprehensive digital transformation strategies that integrate AI, AR, and VR technologies into study processes, scientific research, and project-based activities. This transformation should focus not only on technological modernization, but also on strengthening interdisciplinary education, internationalization, innovation capacity, and collaboration with the tourism industry, government institutions, and regional tourism entities. Based on the findings and analytical observations of the study, the following recommendations are proposed for Georgian higher education institutions offering tourism and hospitality BA and MA programs:

- ✓ Georgian higher education institutions should systematically integrate AI, AR, and VR technologies into tourism program curricula to improve practical and digital learning experiences.
- ✓ Georgian higher education institutions should invest in modern technological infrastructure, including virtual laboratories and simulation centers.
- ✓ HR and career service offices at Georgian universities should provide professional training for academic and invited staff in AI-, AR-, and VR-based teaching methods and smart tourism technologies.
- ✓ Stronger cooperation among universities, tourism businesses, and international organizations should be encouraged to support innovation, sustainable tourism education, and the sharing of successful practices.
- ✓ Georgian higher education institutions should develop comprehensive digital transformation strategies aligned with the Sustainable Development Goals (SDGs).

8.0 Future Vision

The leading universities in Tbilisi, Kutaisi, and Batumi are likely to become regional centers for smart tourism education, innovation, and digital transformation. Meanwhile, regional universities may gradually specialize in more focused, concept-based areas, such as sustainable destination management, health tourism, and event management. Private higher education institutions may possess several competitive advantages within this transformation process. Compared with public universities, private

institutions often demonstrate greater flexibility in curriculum modernization, faster decision-making processes, stronger market orientation, and a greater ability to establish partnerships with international universities and tourism businesses. Universities such as International Black Sea University, Caucasus University, Georgian National University (SEU), and Georgian International University (GIU) already demonstrate comparatively stronger digital integration and internationalization potential. If these institutions continue investing in smart tourism education, immersive technologies, bilingual programs, and international cooperation, they may become regional leaders in technology-enhanced tourism education.

Technological transformation within tourism and hospitality in Georgia may increase, rather than reduce, the need for highly qualified tourism graduates. Although automation and AI technologies may replace some routine administrative functions, the tourism and hospitality industry still requires professionals who can combine technological competencies with human-centered communication, intercultural interaction, creativity, and strategic management. Tourism is a service-oriented industry that fundamentally depends on emotional intelligence, customer experience management, and cultural understanding, which cannot be fully replaced by AI technologies.

9.0 Conclusion

Georgian BA and MA Tourism and Hospitality Higher Education Programs are gradually transitioning from traditional lecture-based educational models toward smart, immersive, and experiential learning ecosystems aligned with global tourism industry trends and the Sustainable Development Goals (SDGs). Technological transformation within tourism education programs should not be perceived as a replacement for human intellectual, creative, and interpersonal competencies. Although AI-supported systems may automate certain routine administrative and analytical functions, the tourism and hospitality industry fundamentally remains a service-oriented sector dependent on emotional intelligence, communication skills, cultural understanding, creativity, and ethical decision-making. The most effective and sustainable approach will involve a balanced integration of technological innovation and human-centered competencies, where digital technologies support and enhance, rather than replace, the human dimension of the tourism and hospitality sector.

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