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Digital transformation and AI integration in accounting education: Evidence from Albania

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Abstract: The ongoing digital transformation of higher education has profoundly reshaped accounting pedagogy, redefining how knowledge is delivered, assessed, and applied in professional practice. As Artificial Intelligence (AI) and Information Technology (IT) increasingly influence learning environments, universities face the dual challenge of modernizing their curricula while maintaining educational quality and ethical integrity. This study investigates how AI and IT integration enhance teaching and learning outcomes in Albanian universities, focusing on the mediating role of digital literacy and the moderating influence of institutional support. Using a mixed-method design, the research combines quantitative survey data from 215 respondents (170 students and 45 instructors) with qualitative interviews of academic leaders. Statistical analysis employing PROCESS models (4 and 7) validates the conceptual framework and confirms that AI–IT integration improves student performance directly (H1) and indirectly through digital literacy (H2), while institutional support partially moderates this relationship (H3). Reliability (α = 0.87) and factor diagnostics ensure methodological rigor. The findings emphasize that successful digital transformation in accounting education depends not only on technological infrastructure but also on human capacity, leadership engagement, and ethical use of AI tools. By aligning its implications with the EU Digital Education Action Plan (2021–2027), this study contributes practical guidance for higher-education institutions seeking sustainable modernization and serves as a replicable model for other transitional economies in the Western Balkans and beyond.

Keywords: *Accounting education, Albania, Artificial intelligence, Digital literacy, Digital transformation, Higher education.*

1. Introduction

Digital transformation has become a central driver of change in accounting education worldwide [1]. AI and IT tools are now critical in developing data-driven analytical competence, automation, and accuracy in reporting [2]. In Albania, universities are in the process of aligning with the EU Digital Education Action Plan [3] but face challenges in infrastructure, digital literacy, and governance [4].

This study examines the extent to which AI and IT integration enhance learning outcomes and educational quality in accounting programs in Albania. It also evaluates how institutional support and faculty training mediate or moderate these effects. The research contributes to global debates by providing empirical evidence from a transitional economy within the European Higher Education Area [5, 6].

2. Literature Review

2.1. Global Developments in Accounting Education

Global research underscores the urgency of redesigning accounting education to prepare graduates for AI-driven workplaces. According to Apostolou et al. [1], the digital transformation of accounting

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education is not merely a technological upgrade but a paradigm shift toward data-based reasoning. Sangster et al. [2] highlight that universities increasingly use simulation platforms and cloud-based accounting software to replicate professional environments and foster experiential learning.

Nguyen and Lee [7] demonstrate that institutions investing in digital literacy training for both faculty and students achieve better learning outcomes and higher satisfaction rates. Similarly, Zhou et al. [8] found that the integration of AI tools improves student motivation and retention. However, research by Santos and Costa [9] warns that unstructured digital adoption without proper ethical frameworks may reinforce bias and reduce transparency in learning assessment. These findings align with the broader argument of Kozlowski et al. [10], who propose that AI-driven education must balance efficiency with critical thinking to preserve academic integrity.

Beyond tool adoption, a consistent message across meta-reviews is that curriculum redesign, including data analytics, process mining, and algorithmic auditing, yields the most durable gains in competencies [1, 2]. Evidence from business schools shows that hybrid instructional models such as studio labs, flipped classrooms, and problem-based analytics sprints improve higher-order skills (evaluation, synthesis) compared to lecture-only formats [11]. In parallel, assessment design is shifting toward authentic tasks (dashboards, ERP cases, audit analytics) that evaluate judgment under uncertainty rather than rote calculation [12]. Importantly, the post-ChatGPT era has reframed plagiarism concerns into broader questions of AI-supported originality, prompting universities to define transparent guidelines for disclosure, prompt archiving, and model explainability in coursework [10, 13]. These changes signal a long-term migration from "teaching software" to teaching with software, where tools become vehicles for conceptual understanding of controls, assurance, and accountability.

2.2. The Role of Institutional Support and Policy Frameworks

Institutional readiness plays a crucial role in enabling sustainable digital transformation. Studies across the European Higher Education Area (EHEA) confirm that leadership engagement, faculty development, and infrastructure investment are essential for integrating emerging technologies [5]. In Croatia and Serbia, universities with clear digital strategies supported by EU-funded initiatives have reported measurable improvements in student performance and teaching quality [6].

In Albania, however, progress remains inconsistent. While the University of Tirana and several private institutions have piloted AI-supported systems, many public universities still face budgetary constraints and lack dedicated digital training programs [4]. According to the World Bank [14] disparity between institutional capacities underscores the need for comprehensive policy frameworks that integrate digital skills into national higher-education strategies.

Policy alignment with the EU Digital Education Action Plan (2021–2027) is repeatedly associated with stronger outcomes, particularly where institutions create multi-year investment plans, adopt centralized learning analytics platforms, and formalize faculty development pathways with micro-credentials in digital pedagogy [3, 5]. Comparative evidence from the Western Balkans suggests that networked cooperation (such as joint degrees, shared laboratories, and inter-institutional repositories) helps smaller systems overcome scale constraints [6, 14]. Within universities, governance mechanisms, ethics boards for AI in teaching, procurement standards for EdTech, and data-protection protocols are critical for trust and adoption [13]. Where these are absent, uptake remains pilot-bound and fragile, with limited diffusion beyond early adopters.

2.3. Emerging Pedagogical Approaches and Digital Literacy

Pedagogical innovation is the backbone of digital transformation. Nguyen and Lee [7] argue that educators must move from knowledge delivery to facilitation, enabling students to engage in project-based and problem-solving activities. AI applications such as intelligent tutoring systems and automated grading mechanisms enhance interactivity, freeing instructors from repetitive administrative tasks [9].

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Recent research emphasizes digital literacy as both an outcome and a prerequisite of modern accounting education [8]. It empowers students to analyze, interpret, and communicate data effectively, a critical skill in the era of automation [10]. Moreover, Hall [15] identifies digital literacy as the key mediator linking IT integration to learning performance, confirming that technology amplifies but does not replace human cognition in education.

Ethical issues also remain central. The European Commission [3] and Apostolou et al. [1] recommend that accounting curricula integrate modules on AI ethics, data privacy, and professional responsibility to ensure trustworthy AI use. These perspectives resonate with global calls for balancing innovation with ethical and pedagogical oversight. Operationalizing digital literacy in accounting requires mapping proficiency levels from basic spreadsheet fluency to advanced competencies in data governance, algorithmic transparency, and model risk awareness [12]. Programs that scaffold literacy through sequenced modules (intro data handling → visualization → audit analytics → AI-assisted decision cases) report steeper learning gains and lower attrition [7, 11]. Equally, assessment rubrics that explicitly reward documentation of AI tool use (prompt journals, reflection on model limitations) cultivate metacognitive control and reduce overreliance on automation [10, 13]. For faculty, communities of practice and peer-observed micro-teaching accelerate the diffusion of effective AI-supported pedagogies and help standardize quality across courses [5].

3. Research Hypotheses and Theoretical Framework

Grounded in socio-technical systems theory [15] and recent evidence on AI-enabled pedagogy [1, 2], the following hypotheses were proposed:

H_1: IT and AI integration in accounting education positively and significantly affect students' learning outcomes.

H_2: Digital literacy mediates the relationship between IT–AI integration and learning outcomes.

H_3: Institutional support and faculty motivation moderate the relationship between IT–AI integration and digital literacy.

Conceptually, the framework follows the path AI–IT → Digital Literacy → Learning Outcomes, with Institutional Support as a moderating variable.

4. Methodology

4.1. Research Design

This research employs a mixed-methods design, integrating both quantitative and qualitative approaches to ensure a comprehensive understanding of how AI and IT impact accounting education. The quantitative component captures measurable relationships, while the qualitative element explores deeper institutional factors [16]. Triangulation between numeric and narrative data enhances validity [17]. The design followed a convergent parallel approach, collecting survey and interview data within the same period and integrating results at the interpretation stage to corroborate patterns [16]. This allowed quantitative estimates of effects (H1–H3) to be contextualized with administrator narratives on strategy, resources, and change management. To minimize common method bias, items were randomized, negatively keyed statements were included, and respondents were assured of anonymity; Harman's single-factor test did not indicate a dominant factor.

4.2. Research Population and Sampling

The research population consisted of students and faculty members from Albanian higher education institutions offering undergraduate and postgraduate programs in accounting, finance, or business administration. A stratified random sampling approach was used to ensure representativeness across both public and private universities and different geographic regions of Albania.

Out of 250 distributed questionnaires, 215 valid responses were obtained, achieving an 86% response rate. The final sample included 170 accounting students enrolled in undergraduate programs

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and 45 university instructors (faculty members) teaching accounting or finance-related courses. Including both students and instructors allowed for a multidimensional perspective on digital transformation, capturing both the learners' experiences and the educators' approaches to AI and IT adoption in accounting education.

This dual-sample approach is consistent with prior research by Sangster et al. [2] and Nguyen and Lee [7], who argue that integrating perceptions from both sides of the educational process enhances the validity of findings related to digital innovation in higher education. It also strengthens the empirical contribution of this study by reflecting not only individual learning effects but also institutional and pedagogical readiness for technological transformation. Sampling quotas ensured balance across years of study, program types, and teaching ranks (assistant → full professor). Post-stratification weights were computed to correct minor imbalances between public and private institutions. Nonresponse analysis comparing early vs. late respondents indicated no significant mean differences on key constructs ($p > .10$), mitigating concerns about nonresponse bias.

4.3. Data Collection Instruments

Data were collected via:

1. Questionnaire (25 Likert-scale items, 1–5) measuring:
   - Technological Integration (TI)
   - Digital Literacy (DL)
   - Institutional Support (IS)
   - Learning Outcomes (LO)
2. Semi-structured interviews with 10 academic administrators.

The questionnaire was pre-tested for clarity. All items exceeded Cronbach's $\alpha = 0.80$ threshold for reliability. Constructs were adapted from validated scales in digital-education research and refined for the accounting context [1, 7, 12]. Content validity was reviewed by a panel of three experts (two accounting educators, one learning-design specialist). The interview protocol probed strategy formation, faculty incentives, data governance, and AI ethics [13], enabling triangulation with survey indicators of IS and DL.

4.4. Reliability and Validity

Cronbach's alpha values were: TI (.86), DL (.88), IS (.84), and LO (.89). Exploratory factor analysis confirmed construct validity. Interviews validated survey themes, showing that universities with training policies achieve more sustainable outcomes (Miller & Davis, 2025). Confirmatory factor analysis (CFA) supported a four-factor structure ($\chi^2/df < 3$; CFI > .94; TLI > .93; RMSEA < .06). Average Variance Extracted (AVE) exceeded .50 for all constructs, and composite reliability was > .80, indicating convergent validity. Discriminant validity is held as the square root of AVE exceeded inter-construct correlations. Common latent factor checks suggested negligible inflation of relationships. Multicollinearity diagnostics (VIF < 3) were within recommended thresholds.

4.5. Data Analysis Procedures

SPSS 28 and PROCESS (models 4 & 7) were used to test mediation and moderation. Bootstrapping (5,000 resamples, 95% CI) ensured robustness. Qualitative data were coded with NVivo 14 to identify institutional and pedagogical patterns. For H1, an OLS model estimated the effect of TI on LO, controlling for age, gender, program level, and institution type. H2 tested indirect effects of TI on LO via DL using PROCESS Model 4 with bias-corrected bootstraps. H3 estimated the interaction between TI and IS on DL (Model 7), with simple-slope analyses at ±1 SD of IS. Sensitivity analyses employed robust standard errors and alternative operationalizations (e.g., dichotomized IS), producing substantively similar results. Qualitative themes were coded inductively and then mapped to the socio-technical lens (technology, people, structure) to explain quantitative patterns [16].

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4.6. Ethical Considerations

Participation was voluntary with informed consent; data were anonymized and stored on secure university servers in line with institutional policy and EU GDPR principles. Interviewees validated summary notes (member checking) to enhance credibility [13].

5. Results and Discussion

Table 1.
Hypothesis Testing Results.

Hypothesis	Relationship Tested	β (std)	t/Sobel	p-value	Supported
H1	TI → LO	0.62	t=9.74	<.001	✅ Yes
H2	TI → DL → LO	0.27	Sobel=4.13	<.001	✅ Yes
H3	IS × TI → DL	0.19	t=1.95	.054	⚠ Partial

Table 2.
Comparative Overview of Digital Transformation in Accounting Education (Western Balkans).

Country	Digital Readiness	Faculty Training	AI Integration Level	Policy Support	Main References
Croatia	High	Continuous national programs funded by Erasmus+; systematic faculty certification.	Advanced (ERP systems, AI labs, and cloud-based accounting platforms)	Strong and aligned with the EU Digital Education Action Plan.	Vašiček and Roje [5] and the European Commission [3]
Serbia	Moderate–High	Ongoing digital workshops and government-backed teacher training programs.	Moderate–High (AI use in accounting and auditing modules)	Strong national strategy through the Digital Serbia Initiative	Sangster et al. [2] and World Bank [14]
North Macedonia	Moderate	Short-term EU-funded digital pedagogy projects; limited institutional follow-up.	Moderate (basic AI applications and cloud systems in pilot universities)	Partial alignment; weak sustainability post-project	Miller and Davis [13] and World Bank [14]
Montenegro	Moderate	Sporadic and donor-driven; limited participation in regional research networks.	Early stage (focus on digital reporting systems, not yet AI-based)	Partial framework under development	World Bank [14] and European Commission [3]
Albania	Emerging	Fragmented and project-based; dependent on external support for IT training.	Early Moderate (AI integration at Epoka and UT; sporadic elsewhere)	Developing efforts to align with the EU Digital Education Plan	Lleshaj and Çika [4], Vašiček and Roje [5], and the European Commission [3]

5.1. Interpretation

The comparative analysis shows that Croatia leads the Western Balkans in implementing structured digital education and AI-based accounting curricula [3, 5]. Serbia follows, driven by its *Digital Serbia Strategy* and continuous faculty training [6, 14].

North Macedonia and Montenegro remain moderate performers, with donor-supported projects but limited long-term sustainability [13, 14].

Albania, though still emerging, shows progress through targeted reforms at the University of Tirana and Epoka University [3, 4].

Overall, regional alignment and policy coherence remain essential for achieving digital convergence [14].

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5.2. Regional Cooperation and Practical Implications

The results highlight the need for sustained cooperation among Western Balkan universities to strengthen their capacity for digital transformation [14].

Joint master's programs in *Accounting, Finance, and Digital Transformation* can harmonize educational standards [5, 6].

Establishing regional digital laboratories and AI research centers will enable knowledge sharing and attract EU funding [3, 14].

Faculty exchange and certification programs are crucial to standardize competencies and promote ethical AI adoption [12, 13].

Finally, regional accreditation frameworks can ensure sustainable quality standards across the Western Balkans [3, 7].

6. Results and Discussion

Quantitative patterns mirrored interview insights: institutions with formal digital strategies and scheduled training reported higher TI and DL means, while ad-hoc adopters showed greater variance and lower mediation strength of DL. Administrators emphasized budget earmarks, LMS integration, and ethical-use policies as prerequisites for scaling pilots. Students highlighted how AI-assisted feedback accelerated iterative learning but stressed the need for clear disclosure rules and calibrated grading when generative tools are permitted [10, 11]. These narratives align with the partial moderation by IS institutions and can amplify TI's impact on DL, yet human capital and pedagogy remain decisive for converting DL into sustained LO gains [1, 12].

7. Conclusion and Policy Implications

The findings of this research confirm that the integration of Artificial Intelligence (AI) and Information Technology (IT) has a transformative impact on accounting education in Albania, both from a pedagogical and institutional standpoint. Statistical analyses validated all major hypotheses: H1 demonstrated that the direct use of AI–IT tools significantly enhances student learning outcomes and analytical performance, while H2 established that digital literacy acts as a strong mediating factor, bridging the gap between technology adoption and effective learning. The third hypothesis (H3) received partial support, suggesting that institutional support and faculty motivation are necessary conditions for achieving consistent and scalable digital transformation across universities.

From a theoretical perspective, this study contributes to the socio-technical systems theory, confirming that successful educational innovation depends on the balanced interaction between technology, human capability, and institutional culture. The Albanian context, as a transitional higher-education system, demonstrates that digital transformation cannot be achieved solely through technological investments; it requires a human-centered approach, where digital literacy, faculty readiness, and ethical AI awareness form the backbone of sustainable progress.

From a practical standpoint, the research highlights several key implications for higher education institutions:

1. Curriculum reform – Accounting programs must embed AI applications, data analytics, and digital ethics modules as mandatory components to align with labor-market expectations and the EU Digital Education Action Plan (2021–2027).

2. Faculty development – Continuous professional training in digital pedagogy and AI-based assessment should become institutional policy, ensuring that instructors remain adaptive to technological changes.

3. Institutional strategy – Universities should adopt long-term digitalization strategies with dedicated budgets, clear performance metrics, and technology partnerships that extend beyond isolated pilot projects.

4. Infrastructure and governance – Sustainable digital transformation requires stable ICT infrastructure, reliable connectivity, and effective data governance policies.

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5. Quality assurance – Establishing evaluation frameworks that monitor the ethical use of AI in teaching, fairness in algorithmic grading, and transparency in digital platforms.

On a regional level, the study emphasizes that Albania's progress can accelerate through collaboration with other Western Balkan universities. By participating in joint programs, virtual research hubs, and regional centers of excellence, Albanian higher education can achieve economies of scale and knowledge transfer. Such collaboration would also strengthen integration into the European Higher Education Area (EHEA) and foster shared academic standards across Southeastern Europe.

In summary, the study provides a holistic framework showing that AI and IT integration improve educational outcomes only when institutions invest in human capital and ethical governance. It bridges the gap between digital policy and educational practice, offering a model that can be replicated in other developing economies. By adopting these recommendations, Albanian universities can transition from fragmented digital initiatives to a strategic, evidence-based, and sustainable digital transformation that modernizes accounting education and enhances global competitiveness.

7.1. Practical Roadmap

Short-term actions include mapping curricula to AI literacy outcomes and launching faculty micro-credentials in learning analytics. Medium-term actions require shared regional labs and integration of assurance-of-learning dashboards. Long-term sustainability hinges on embedding AI ethics governance across program accreditation cycles [3, 13, 14].

8. Research Significance and Contribution

This paper makes a practical contribution by transforming theoretical insights into applicable strategies for higher education in developing economies. Empirically validating the relationship between technology, digital literacy, and institutional support provides a replicable model for policy and practice.

The study's results can inform university administrators on how to design digital roadmaps, train faculty, and ensure ethical AI governance. The Albanian case illustrates how developing institutions can transition from isolated technology projects to systemic innovation. By aligning institutional practices with European policies, this research provides a bridge between policy frameworks and local implementation, supporting sustainable modernization of accounting education across the Western Balkans.

Transparency:

The author confirms that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

Conflict of Interest:

The author declares no conflict of interest. The manuscript is original, has not been published elsewhere, and is not under consideration by another journal.

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