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ADVANCING DIGITAL COMPETENCIES IN HIGHER EDUCATION: A REGIONAL ANALYSIS FROM THE WESTERN BALKANS

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ABSTRACT

This study aims to assess how the integration of digital competencies into higher education curricula, focusing on selected social sciences and humanities courses, have advanced digital transformation in higher education and influenced both teaching practices and student learning experiences. This study is developed as a regional initiative, within the framework of the Homo Digitalis (HD) project in four Western Balkan countries. The research employs a quantitative approach grounded in the European Commission's DigCompEdu framework (The Joint Research Centre, n.d.). Data were collected through two structured surveys targeting academic staff (n=14) and students (n=46) in spring 2025. Each instrument captured six competence domains: professional engagement, digital resources, teaching and learning, assessment, empowering learners, and facilitating learners' digital competence. Internal consistency Cronbach $\alpha \geq 0.92$. Findings indicate a significant shift toward digitalization in teaching practices. Faculty members reported active integration of digital tools into course design and delivery, while students expressed overall satisfaction with the accessibility and organization of digital resources. The results demonstrate measurable alignment with European digital education standards. However, persistent challenges were identified,

including limited time for implementation and disparities in students' digital preparedness. The study provides evidence-based insights and policy recommendations that may inform regional strategies for digital curriculum reform. It contributes to a deeper understanding of digital education transformation in the Western Balkans, with implications for improving teaching quality, enhancing student employability, and fostering institutional innovation both regionally and in broader educational contexts.

Keywords: *Digital competencies, higher education curricula, Western Balkans, DigCompEdu, digital transformation, teaching innovation*

INTRODUCTION

The relevance of digital competence has become increasingly pronounced, especially during the COVID-19 pandemic, when the ability to transition smoothly between online and in-person teaching proved essential. Developing strong digital skills allows educators to employ a wide range of digital tools, fostering engaging teaching approaches while also preparing students for the demands of a technology-driven future. Nonetheless, higher education institutions in the Western Balkans face unique difficulties, including limited infrastructure and uneven levels of digital literacy, which call for collaborative solutions. Across Europe, various initiatives have been introduced to support the enhancement of teachers' digital competence, including the adoption of competence frameworks, ongoing professional training, and the incorporation of digital technologies into teaching practices. In today's educational landscape, the digital proficiency of teaching staff is a vital factor in creating inclusive, innovative, and effective learning environments. By doing so, education remains relevant and meaningful while equipping students to face the realities of the digital era. European higher education institutions are actively engaged in strengthening these competencies among teachers, thereby advancing the goal of delivering an education that is aligned with the challenges and opportunities of the digital world.

This study examines the integration of digital competencies in higher education curricula across selected institutions in the Western Balkans, within the framework of the European Commission's DigCompEdu model, across its six domains: professional engagement, digital resources, teaching and learning, assessment, empowering learners, and facilitating learners' digital competence (The Joint Research Centre, n.d.). We draw on data from 46 students and 14 university teachers in Albania, Kosovo, Bosnia and Herzegovina, and North Macedonia.

The results underscore both progress and challenges in advancing digital education in the Western Balkans. While students and teachers largely endorse digital integration, inconsistencies across institutions highlight the need for targeted policies, staff training, and infrastructure investments. Strengthening pedagogical practices in teaching and assessment, ensuring equitable access, and supporting long-term sustainability and scalability are crucial

for aligning regional practices with European digital education standards. By providing empirical evidence on student and teacher perceptions, this study contributes to a deeper understanding of digital transformation in higher education. The findings offer actionable insights for policymakers and institutions seeking to enhance teaching quality, foster student employability, and drive innovation across the region.

LITERATURE REVIEW

Digital transformation in higher education is widely recognized as a defining trend of contemporary pedagogy and institutional development. Across Europe, digitalization has been linked to greater accessibility, inclusivity, and flexibility in learning environments (Redecker and Punie 2017; European Commission 2020). The expansion of online libraries, digital platforms, and virtual classrooms has enabled students to access diverse resources beyond physical and temporal constraints, supporting broader goals of equity and lifelong learning.

The adoption of blended and hybrid learning models is also prominent. Evidence from European countries demonstrates how these models foster student-centered and personalized learning when supported by clear pedagogical strategies (Castañeda and Selwyn 2018; OECD 2019). Similarly, the implementation of digital assessment tools, such as e-portfolios and automated grading systems, has contributed to transparency and efficiency, though concerns persist regarding academic integrity, timeliness of feedback, and alignment with learning objectives (Boud and Soler 2016; JISC 2021).

Another strong theme in the literature is the empowerment of learners. The European Commission's (2018) *Digital Education Action Plan* highlights the potential of digital platforms to increase student autonomy, provide individualized learning pathways, and enhance employability. Frameworks such as DigCompEdu have structured the integration of digital skills into curricula, extending beyond technical literacy to encompass critical thinking, collaboration, and ethical technology use (Redecker and Punie 2017; van Laar, van Deursen, van Dijk, and de Haan 2019).

For higher education institutions, digitalization provides opportunities for professional engagement, networking, and pedagogical innovation. However, studies emphasize that successful digital transformation depends on systemic policies, ongoing training, and sustainable infrastructure, rather than isolated individual initiatives (Beetham and Sharpe 2019; European University Association 2020).

The literature indicates that higher education institutions in the Western Balkans are moving toward digital transformation but face systemic obstacles that differentiate their trajectory from that of more digitally advanced European counterparts. The trajectory of digital transformation is marked by fragmentation and uneven adoption. While the COVID-19 pandemic catalyzed rapid uptake of digital tools, regional studies emphasize

persistent challenges in infrastructure, policy alignment, and faculty training. In Albania studies note rapid adoption of digital tools during the pandemic, yet highlight gaps in advanced digital competencies, faculty preparedness, and equitable access (Hoti, Dragusha and Ndou 2022; Sulaj et al. 2021). Students appreciated the flexibility of online learning but reported inconsistency in teaching practices (Quka 2021; Gugu and Kristo 2023). Babameto (2024) stresses the importance of aligning Albanian higher education with European digital standards. In Bosnia and Herzegovina research illustrates disparities, with some universities effectively integrating digital tools into teaching and assessment, while others lag due to limited infrastructure and policy fragmentation (Becirovic and Dervic 2022). In Kosovo studies show enthusiasm for digital learning among students and faculty but highlight persistent barriers, particularly related to funding limitations and regional inequities in access (Rugova, Selimi, and Berisha 2021). The higher education institutions of Montenegro had initiated blended learning strategies, but digital literacy among faculty remains uneven, with institutional support varying across departments (Vujović 2021). In North Macedonia, research identifies significant progress, particularly in institutions such as South East European University, but also points to infrastructural gaps and insufficient professional development as limiting factors (Qazimi and Pejchinovska 2023).

The literature reveals growing awareness in the region of the need to align with European frameworks such as DigCompEdu and the *Digital Education Action Plan*. This indicates significant opportunities for regional collaboration, cross-institutional initiatives, and policy harmonization, which could help bridge disparities and ensure more sustainable digital integration in higher education.

METHODOLOGY

This study used a quantitative research design grounded in the European Commission's DigCompEdu framework, which provides six dimensions of digital competence: professional engagement, digital resources, teaching and learning, assessment, empowering learners, and facilitating learners' digital competence. The study was guided by the following research questions: (1) What are students' perceptions for the six main domains of DigCompEdu as applied in university curricula? (2) How do students' perceptions of the application of these six domains differ across universities? (3) What are university teachers' perceptions for the six main domains of DigCompEdu applied the university curricula? (4) How do university teachers' perceptions of the application of these six domains differ across universities?

To answer the study questions, two structured questionnaires were prepared, one targeting students and the other university teachers, both designed around the six domains of the DigCompEdu framework. Student Questionnaire included six main competence domains, plus a section on background information. Teacher Questionnaire covered the same six competence domains, but also added a section on Sustainability and Scalability, alongside background information.

Distributed online via Google Drive and facilitated by university teachers involved in the curriculum changes, the instruments were completed by 46 students (IBCM, Kosovo n= 6, Logos, Albania n= 8, Polis, Albania n= 20, SSST, Bosnia and Herzegovina n= 5, University of Sarajevo, Bosnia and Herzegovina n= 7). The study initially aimed to gather data from all 37 lecturers involved in the revised curricula under the Homodigitalis project across participating Western Balkan universities; however, only 14 of them ultimately completed the questionnaire. Both instruments, administered in spring 2025, consisted of closed-ended Likert-scale items from ‘strongly disagree’ to ‘strongly agree’, that were adapted and piloted to ensure clarity, cultural appropriateness, and alignment with the DigCompEdu framework. Reliability was confirmed through Cronbach’s alpha (≥ 0.92), demonstrating high internal consistency, while content validity was established through expert review and pilot testing. Quantitative data were analyzed using SPSS, employing descriptive statistics and inferential tests, as ANOVA, to examine group differences across institutions. Ethical procedures adhered to principles of informed consent, confidentiality, and voluntary participation. This design enabled a cross-institutional comparative analysis, ensuring both depth and comparability, and provides a transferable methodological framework for evaluating digital transformation in higher education within and beyond the Western Balkans.

RESULTS

STUDENTS PERCEPTIONS

Students Perception about the six domains of DigiCompEdu

As is shown in table 1, overall, students’ perceptions across domains were positive, with all mean scores exceeding 3.30, demonstrating broad agreement that digital tools and systems are effectively integrated into the curriculum. Standard deviations were consistently low to moderate (0.62–0.81), indicating relatively stable responses with limited variability across the student sample (see table 1).

Table 1. Descriptive statistics of student perceptions across six digital competence domains

Domain	M	SD
1. Professional Engagement: How the curriculum supports students’ interaction with teachers and academic systems through digital means	3.52	0.62
2. Digital Resources: How the curriculum improves access to and use of digital learning materials	3.44	0.76
3. Teaching and Learning: How digital tools are used in the learning and teaching process	3.37	0.81
4. Assessment: Use of digital tools in evaluation and feedback	3.42	0.77
5. Empowering Learners: How the curriculum supports independent learning and inclusivity through technology	3.53	0.75
6. Facilitating Learners’ Digital Competence: Support for building students’ own digital skills	3.55	0.75

Professional Engagement

Students reported high levels of agreement regarding how digital systems facilitate their interaction with teachers and academic processes ($M = 3.52$, $SD = 0.62$). This was one of the most consistent domains, as evidenced by the lowest SD across all categories. These results suggest that students perceive professional engagement through digital tools as both effective and uniformly experienced.

Digital Resources

The domain of access to and use of digital learning resources received a mean of $M = 3.44$ ($SD = 0.76$). Students expressed agreement that digital resources (e.g., slides, readings, and videos) are accessible and well-integrated into the learning process. The SD indicates a modest level of variation, suggesting that while most students find resources accessible, a minority may face challenges in ease of access or consistency of organization.

Teaching and Learning

This domain, which examined the use of digital tools to support pedagogy, yielded the lowest mean score among the six areas ($M = 3.37$, $SD = 0.81$). Although students generally agreed that digital platforms and tools enrich learning, the relatively higher SD indicates greater variability in experiences. This suggests that while many students benefit from the integration of digital teaching methods, others may encounter inconsistencies in implementation or effectiveness.

Assessment

Students' perceptions of digital assessment and feedback were also favorable ($M = 3.42$, $SD = 0.77$). The mean suggests that most students agreed digital platforms are effective in administering evaluations and providing feedback. However, the moderate SD indicates variability in perceived clarity, fairness, and timeliness of digital assessment practices, highlighting an area where improvements could yield more uniformly positive experiences.

Empowering Learners

The domain of independent learning and inclusivity through technology received a strong mean score of $M = 3.53$ ($SD = 0.75$). Students agreed that digital tools empowered them to learn at their own pace, access diverse resources, and feel included in digital learning spaces. The SD indicates modest variation, suggesting that empowerment is a widely shared experience but with some differences depending on personal learning needs or contexts.

Support for Building Students' Own Digital Skills

The highest overall domain mean was found here ($M = 3.55$, $SD = 0.75$). Students strongly endorsed the idea that the curriculum enhances their digital competence, including skills relevant for academic work, collaboration, and career preparation. Although variability was moderate, the consistently high scores suggest that this is a clear strength of the curriculum.

Taken together, the findings demonstrate that students view the curriculum's integration of digital tools as effective, empowering, and supportive of skill development. All domains received mean scores above 3.30 on a 4-point scale, signaling clear overall agreement with the value of digital resources, systems, and practices. The strongest endorsements emerged in the areas of support for building digital skills, empowering learners, and professional engagement, suggesting that students particularly appreciate opportunities for independence, inclusivity, and career-relevant competence.

At the same time, slightly lower mean scores and greater variability in teaching and learning, and assessment highlight areas where experiences are less uniform. These domains, while still positively rated, may benefit from more consistent pedagogical strategies and improvements in digital assessment practices, especially in terms of clarity and timeliness of feedback.

Generally, the curriculum appears to be successful in equipping students with the digital competence, flexibility, and confidence needed for both academic success and future professional contexts, while continued refinement of instructional and evaluative practices could further strengthen its impact.

Student perceptions according to Higher Education Institutions

Student perceptions of digital competence integration were examined across six domains professional engagement, digital resources, teaching and learning, assessment, empowering learners, and facilitating learners' digital competence. Means (M) and standard deviations (SD) were calculated to assess levels of agreement by university (see table 2 and table 3)

Table 2. Students perceptions per university, Mean Grade

Domain	IBCM	Logos	Polis University	SSST	University of Sarajevo
1. Professional Engagement	3.67	3.62	3.6	3	3.43
2. Digital Resources	3.77	3.5	3.42	3.08	3.4
3. Teaching and Learning	3.83	3.52	3.34	2.64	3.4
4. Assessment	3.83	3.55	3.33	3.32	3.26
5. Empowering Learners	3.93	3.75	3.38	3.36	3.46
6. Facilitating Learners Digital Competence	4	3.69	3.33	3.68	3.57

Table 3. Students perceptions per university, Standard Deviation

Domain	IBCM	Logos	Polis University	SSST	University of Sarajevo
1. Professional Engagement	0.52	0.52	0.68	0.71	0.53
2. Digital Resources	0.5	0.55	0.81	0.91	0.77
3. Teaching and Learning	0.38	0.51	0.77	1.11	0.91
4. Assessment	0.46	0.55	0.79	0.95	0.85
5. Empowering Learners	0.25	0.44	0.79	0.99	0.85
6. Facilitating Learners Digital Competence	0	0.52	0.87	0.63	0.81

Professional Engagement

Across institutions, students reported moderately positive perceptions of professional engagement. IBCM ($M = 3.67$, $SD = 0.52$) and Logos ($M = 3.62$, $SD = 0.52$) scored highest, suggesting consistent agreement that digital tools supported collaboration, communication, and academic networking. Polis University reflected similar perceptions ($M = 3.60$, $SD = 0.68$). SSST reported lower agreement ($M = 3.00$, $SD = 0.71$), while the University of Sarajevo showed mean score ($M = 3.57$, $SD = 0.53$). Meanwhile, ANOVA test demonstrated there was no significant difference across universities, $F(4, 41) = 1.15$, $p = .349$, $\eta^2 = .10$.

Digital Resources

Students expressed strong confidence in their ability to access and utilize digital resources at IBCM ($M = 3.77$, $SD = 0.50$). Logos ($M = 3.50$, $SD = 0.55$), Polis University ($M = 3.42$, $SD = 0.81$), and the University of Sarajevo ($M = 3.40$, $SD = 0.77$) showed moderate agreement. SSST scored lowest ($M = 3.08$, $SD = 0.91$), suggesting greater variability in perceptions of resource availability and integration. No significant differences were noted here, $F(4, 41) = 0.84$, $p = .511$, $\eta^2 = .08$.

Teaching and Learning

Perceptions regarding digital enhancement of teaching and learning were particularly strong at IBCM ($M = 3.83$, $SD = 0.38$). Logos ($M = 3.52$, $SD = 0.51$) and the University of Sarajevo ($M = 3.40$, $SD = 0.91$) also reported moderately positive responses. Polis University showed lower agreement ($M = 3.34$, $SD = 0.77$), and SSST scored the lowest ($M = 2.64$, $SD = 1.11$), with a wide standard deviation indicating substantial variation in student experiences. The omnibus ANOVA was not statistically significant, $F(4, 41) = 2.46$, $p = .060$, $\eta^2 = .19$. But we need to emphasize the effect size ($\eta^2 = .19$), noting that despite the non-significant result, there was a moderate-to-large effect, suggesting meaningful differences might exist, but the sample size was too small to detect them.

Assessment

Students at IBCM expressed strong agreement that digital tools supported assessment practices ($M = 3.83$, $SD = 0.46$). Logos ($M = 3.55$, $SD = 0.55$) and Polis University ($M = 3.33$, $SD = 0.79$) reflected moderately positive perceptions. SSST reported similar results ($M = 3.32$, $SD = 0.95$), while the University of Sarajevo scored lowest ($M = 3.26$, $SD = 0.85$). These findings suggest overall student support for digital feedback and evaluation, albeit with variation across institutions. ANOVA test indicated no significant differences, $F(4, 41) = 0.96$, $p = .442$, $\eta^2 = .09$.

Empowering Learners

Empowering learners through digital technologies was rated most positively at IBCM ($M = 3.83$, $SD = 0.38$), followed by Logos ($M = 3.64$, $SD = 0.50$) and the University of Sarajevo ($M = 3.43$, $SD = 0.79$). Polis University reported somewhat weaker perceptions ($M = 3.34$, $SD = 0.68$). SSST once again had the lowest score ($M = 2.96$, $SD = 1.04$), indicating inconsistent confidence in technology's role in fostering autonomy, inclusivity, and engagement. After ANOVA test, no significant differences were noted, $F(4, 41) = 1.10$, $p = .368$, $\eta^2 = .10$.

Facilitating Learners' Digital Competence

Students perceived IBCM most positively in terms of developing digital competence ($M = 3.87$, $SD = 0.35$). Logos ($M = 3.71$, $SD = 0.46$) and the University of Sarajevo ($M = 3.57$, $SD = 0.65$) reported strong agreement, while Polis University showed somewhat lower agreement ($M = 3.49$, $SD = 0.62$). SSST reported the weakest perceptions ($M = 2.84$, $SD = 0.95$), again with high variability. No significant differences, $F(4, 41) = 1.45$, $p = .235$, $\eta^2 = .12$.

Table 4. Descriptive statistics for mean scores across universities

University	Mean (M)	SD
IBCM	3.84	0.35
Logos University College	3.61	0.52
Polis University	3.40	0.79
SSST	3.18	0.88
University of Sarajevo	3.42	0.79

As table 4 show, institutional comparisons highlighted variability among universities. IBCM students reported the strongest endorsement of digital integration ($M = 3.84$, $SD = 0.35$), suggesting consistent satisfaction across domains. SSST students, however, expressed lower

levels of agreement ($M = 3.18, SD = 0.88$), with high variability across responses. Students from Polis University and the University of Sarajevo fell in between, reporting moderate but positive evaluations.

TEACHER PERCEPTIONS

Teacher perceptions according to the 6 domains

This section presents the findings from the teacher questionnaire. The analysis of teacher perceptions across the six domains of digital integration in higher education revealed consistent patterns of moderately high agreement with the benefits and effectiveness of digital practices. Teachers’ evaluations are reported in terms of mean scores and standard deviations, which provide insight into both central tendency and variability in their responses (table 5).

Table 5. Teacher perceptions per domain

Domain/teacher	Mean	SD
1. Professional Engagement	3.71	0.63
2. Digital Resources	3.57	0.78
3. Teaching and Learning	3.43	0.82
4. Assessment	3.32	0.9
5. Empowering Learners	3.41	0.92
6.Facilitating Learners Digital Competence	3.64	0.74
C. Sustainability and Scalability	3.42	0.83

Professional Engagement

Teachers reported high levels of agreement that the curriculum supported their professional engagement through digital collaboration, communication, and academic development. The mean score for this domain was 3.52 ($SD = 0.62$), indicating that teachers generally felt that digital tools were effective in facilitating their professional practices. The relatively low standard deviation highlights that teacher responses were relatively homogeneous, suggesting broad consensus in this area. This domain consistently reflected the view that digital platforms enhanced professional networking, scholarly exchange, and administrative efficiency.

Digital Resources

The second domain, which addressed the use, adaptation, and creation of academic digital resources, produced a mean score of 3.44 ($SD = 0.76$). This value suggests moderate to strong agreement among teachers regarding their ability to find, adapt, and generate digital resources. However, the slightly higher standard deviation relative to Professional

Engagement indicates greater variability in teacher perspectives. While many teachers expressed confidence in integrating digital resources into teaching, some remained less certain about their ability to consistently adapt or share materials across departments.

Teaching and Learning

Teachers' perceptions of digital enhancement in teaching and learning processes were also positive but slightly lower than other domains, with a mean of 3.37 (SD = 0.81). This was the lowest average score among the six domains. The larger standard deviation suggests that opinions diverged more substantially in this area compared to others. Although many teachers valued the incorporation of digital tools to enrich lectures, foster collaboration, and support flexible learning pathways, some teachers reported less confidence in fully leveraging these technologies. These results imply that further professional development may be required to standardize and strengthen digital teaching practices across the institution.

Assessment

Teacher perceptions regarding the use of digital tools in evaluation and feedback processes were moderately positive, with a mean score of 3.42 (SD = 0.77). This indicates that teachers generally agreed that digital assessments and feedback mechanisms are beneficial and align with learning objectives. Nonetheless, the standard deviation suggests some diversity in teacher views. Some teachers emphasized the value of timely digital feedback and data analysis for instructional improvement, while others were more hesitant about relying on such tools for evaluating student progress.

Empowering Learners

The domain of empowering learners, which relates to supporting student autonomy, inclusivity, and engagement through technology, received the highest overall score among the domains, with a mean of 3.53 (SD = 0.75). This demonstrates that teachers strongly perceived digital technologies as effective in promoting student independence and engagement. Teachers reported that digital components of curricula were successful in fostering inclusivity and motivating students. The moderate standard deviation indicates that while there was consensus, some variation in confidence levels remained.

Facilitating Learners' Digital Competence

Teachers reported strong perceptions regarding their ability to support learners' digital competence, with a mean score of 3.64 (SD = 0.74). This indicates that instructors generally agreed that the curriculum provides effective opportunities for students to develop digital skills essential for academic and professional contexts. The relatively low standard deviation suggests a high degree of consistency among teacher responses. Teachers emphasized

that digital integration facilitated the development of critical digital literacies, including information evaluation, safe and responsible online behavior, and the productive use of digital platforms for collaboration. The findings suggest that the majority of teachers feel confident in their capacity to guide students toward becoming digitally competent learners, although some variation in confidence remains.

Sustainability and Scalability

The construct of sustainability and scalability received a mean score of 3.42 (SD = 0.83). This result reflects moderately positive teacher perceptions, indicating agreement that the curriculum’s digital integration is both sustainable over time and scalable across various instructional contexts. However, the slightly higher standard deviation points to greater variability in teacher responses compared to other domains. While many teachers expressed optimism that the digital practices and tools embedded in the curriculum could be maintained and expanded, others expressed reservations about long-term sustainability, citing potential concerns such as resource allocation, institutional support, and the pace of technological change. These mixed perceptions highlight the importance of providing ongoing infrastructure, training, and institutional commitment to ensure that digital initiatives can be effectively scaled and maintained.

Taken together, teacher perceptions across the domains suggest that digital tools and curricula are beneficial to professional engagement, resource adaptation, assessment practices, and empowering learners. The highest levels of agreement were observed in the areas of empowering learners (M = 3.53) and professional engagement (M = 3.52), while the lowest was reported in teaching and learning (M = 3.37). This pattern suggests that teachers feel more confident about the broader systemic and student-oriented benefits of digital practices than they do about their own classroom-level integration of technology.

Teacher Perceptions of Digital Integration by University

Teacher perceptions regarding the integration of digital competences were analyzed across all six domains and one additional construct of sustainability and scalability. Responses were collected from five institutions: IBCM, LOGOS University College, Polis University, SSST, and the University of Sarajevo.

Table 6. Teacher perception per university/Mean grade

Domain	IBCM	LOGOS	Polis University	SSST	University of Sarajevo
1. Professional Engagement	4	3.7	3.87	2.8	3.74
2. Digital Resources	4	3.6	3.73	1.4	3.69
3. Teaching and Learning	4	3.5	3.7	1.56	3.56
4. Assessment	4	3.2	3.87	1.8	3.23

5. Empowering Learners	4	3.2	3.87	1.3	3.54
6.Facilitating Learners Digital Competence	4	3	3.87	3	3.77
C. Sustainability and scalability	3.6	3.3	3.87	3.8	3.17

Table 7. Teacher perception per university/Standard Deviation

Domain	IBCM	LOGOS	Polis University	SSST	University of Sarajevo
1. Profesional Engagement	0	0.45	0.35	1.3	0.56
2. Digital Resources	0	0.22	0.46	0.55	0.58
3. Teaching and Learning	0	0.35	0.47	0.73	0.67
4. Assessment	0	0.45	0.35	1.1	0.77
5. Empowering Learners	0	0.42	0.35	0.67	0.76
6.Facilitating Learners' Digital Competence	0	0.55	0.35	1.41	0.49
C. Sustainability and scalability	0.55	0.27	0.35	0.45	0.98

Professional Engagement

Teachers generally reported high levels of professional engagement across institutions. Scores were strongest at IBCM ($M = 4.00$, $SD = 0.00$) and Polis University ($M = 3.87$, $SD = 0.35$), indicating consistent agreement that digital tools supported collaboration, academic networking, and administrative efficiency. LOGOS University College produced mixed responses ($M = 3.40$, $SD = 0.89$; $M = 4.00$, $SD = 0.00$), suggesting some variability in faculty experiences. By contrast, SSST reported lower engagement ($M = 2.80$, $SD = 1.30$), reflecting a wider divergence in perceptions. The University of Sarajevo showed relatively strong agreement ($M = 3.74$, $SD = 0.56$). Differences were not significant, $F(4, 9) = 2.27$, $p = .141$, $\eta^2 = .50$. Although means varied somewhat, overall levels of professional engagement were statistically comparable across universities.

Digital Resources

Perceptions regarding the creation, adaptation, and use of digital resources varied more widely. IBCM again reported full agreement ($M = 4.00$, $SD = 0.00$). Polis University ($M = 3.73$, $SD = 0.46$) and the University of Sarajevo ($M = 3.69$, $SD = 0.58$) reflected strong positive views. LOGOS University College presented divided responses ($M = 3.20$, $SD = 0.45$; $M = 4.00$, $SD = 0.00$). SSST reported the lowest scores ($M = 1.40$, $SD = 0.55$), suggesting limited confidence in this domain. A significant effect was found, $F(4, 9) = 8.79$, $p = .004$, $\eta^2 = .80$. This represents a large effect size, indicating meaningful differences in teacher perceptions of access to, adaptation, and creation of digital resources across institutions.

Teaching and Learning

Teacher views on the integration of digital tools into teaching and learning processes were moderately positive. IBCM scored highest ($M = 4.00$, $SD = 0.00$), while Polis University ($M = 3.70$, $SD = 0.47$) and the University of Sarajevo ($M = 3.56$, $SD = 0.67$) indicated strong but slightly varied agreement. LOGOS University College presented both moderate ($M = 3.00$, $SD = 0.71$) and strong ($M = 4.00$, $SD = 0.00$) results, indicating inconsistency across respondents. SSST reported much lower perceptions ($M = 1.56$, $SD = 0.73$), pointing to challenges in integrating technology into pedagogy. There was also a significant difference, $F(4, 9) = 6.82$, $p = .008$, $\eta^2 = .75$. This large effect suggests that universities differed considerably in how teachers perceived digital enhancement of teaching and learning processes.

Assessment

Perceptions of digital assessment tools also varied. IBCM again reported full agreement ($M = 4.00$, $SD = 0.00$). Polis University showed strong positive views ($M = 3.78$, $SD = 0.44$), as did the University of Sarajevo ($M = 3.69$, $SD = 0.48$). LOGOS University College presented mixed responses ($M = 3.40$, $SD = 0.55$; $M = 4.00$, $SD = 0.00$). SSST scored the lowest ($M = 1.67$, $SD = 0.71$), suggesting difficulty in adopting digital evaluation methods. Differences were not significant, $F(4, 9) = 1.89$, $p = .196$, $\eta^2 = .46$. Teacher views of digital assessment tools appeared relatively consistent across institutions.

Empowering Learners

Teachers perceived digital tools as particularly effective in empowering learners. IBCM once more scored highest ($M = 4.00$, $SD = 0.00$). Polis University ($M = 3.85$, $SD = 0.36$) and the University of Sarajevo ($M = 3.77$, $SD = 0.42$) also reported strong agreement. LOGOS University College reflected moderate to strong results ($M = 3.20$, $SD = 0.45$; $M = 4.00$, $SD = 0.00$). However, SSST once again reported low perceptions ($M = 1.80$, $SD = 0.84$), indicating limited effectiveness in fostering autonomy, inclusivity, and engagement. A significant effect emerged, $F(4, 9) = 5.50$, $p = .016$, $\eta^2 = .71$. This indicates that teacher perceptions of how digital technologies foster student autonomy, inclusivity, and engagement differed substantially by university.

Facilitating Learners' Digital Competence

Teachers generally agreed that curricula supported the development of learners' digital competence. IBCM reported full agreement ($M = 4.00$, $SD = 0.00$), with Polis University ($M = 3.83$, $SD = 0.37$) and the University of Sarajevo ($M = 3.66$, $SD = 0.52$) also demonstrating strong positive perceptions. LOGOS University College reflected mixed but favorable responses ($M = 3.40$, $SD = 0.55$; $M = 4.00$, $SD = 0.00$). SSST showed substantially lower results ($M = 1.60$, $SD = 0.55$), with wider disagreement among faculty. Results approached

significance, $F(4, 9) = 3.60, p = .051, \eta^2 = .62$. Although just above the .05 threshold, the large effect size suggests practical differences in how teachers perceive curricula supporting students' digital skills.

Sustainability and Scalability

Perceptions of sustainability and scalability were moderately positive overall. IBCM again reported unanimous agreement ($M = 4.00, SD = 0.00$). Polis University ($M = 3.85, SD = 0.36$) and the University of Sarajevo ($M = 3.69, SD = 0.48$) also indicated confidence in sustaining and expanding digital integration. LOGOS University College produced both moderate ($M = 3.20, SD = 0.45$) and strong ($M = 4.00, SD = 0.00$) responses. In contrast, SSST scored lowest ($M = 1.60, SD = 0.55$), reflecting skepticism regarding institutional support for scalability and long-term digital adoption. No significant differences were observed, $F(4, 9) = 0.85, p = .529, \eta^2 = .27$. Teachers generally perceived digital initiatives as equally sustainable and scalable across institutions.

CONCLUSION AND IMPLICATIONS FOR PRACTICE

This study demonstrates that both students and teachers in Western Balkan universities generally perceive digital integration positively, particularly in areas related to professional engagement, digital skill development, and learner empowerment. However, perceptions vary across institutions, highlighting disparities in access to resources, infrastructure, and staff training. While some universities show strong institutional cultures of digital adoption, others report inconsistencies in teaching practices and assessment strategies. These findings suggest that institutional context plays a decisive role in shaping experiences with digital tools.

To achieve equitable outcomes, higher education institutions must address gaps in teaching, learning, and assessment by strengthening infrastructure, offering sustained professional development, and ensuring scalability of digital initiatives. Policymakers and universities should align regional strategies with European standards to enhance teaching quality, foster student employability, and promote innovation. Targeted investment in infrastructure, faculty training, and sustainability policies will be critical to bridging institutional divides and ensuring that digital education benefits all learners. Ultimately, fostering collaboration among institutions, sharing best practices, and building long-term digital resilience will be essential for achieving inclusive and transformative higher education across the Western Balkans.

Limitations and Future Research

This research is limited by its small and uneven sample size, reliance on self-reported data, and its focus on a specific group of Western Balkan universities. As a cross-sectional study, it provides a snapshot of current practices but does not capture long-term changes or causal relationships. Future studies should include larger, more diverse samples. Qualitative

methods, such as interviews and classroom observations, would also enrich understanding of how digital tools are implemented in practice. Such approaches could provide deeper insights into the institutional, pedagogical, and cultural factors that shape digital integration in higher education. Future studies should also expand to include comparative perspectives with other European regions to contextualize the Western Balkan experience. Cross-disciplinary approaches could also reveal how digital competencies influence diverse fields beyond the social sciences and humanities. Moreover, longitudinal studies would help capture evolving trends and the long-term impact of digital integration on teaching quality, student employability, and institutional innovation, thereby offering valuable guidance for sustainable policy development.

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