



AI VET

Artificial Intelligence for VET providers

2024-1-PL01-KA220-VET-000253747

Charting the future of AI integration in EU Vocational Education and Training

Executive summary developed from compiled transnational
needs analysis

Task 1 of Work Package 2

*Assessing the readiness of VET ecosystem in adapting and adopting AI for
education and teaching*



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Introduction

Across the European Union, the potential of Artificial Intelligence (AI) as a powerful catalyst to transform Vocational Education and Training (VET) is both recognized and eagerly anticipated. **AI promises to reshape education by shifting away from traditional, rigid, one-size-fits-all instructional models** toward highly personalized, adaptive learning experiences tailored to the **unique needs, abilities, and career aspirations of each learner**. This transformation is especially critical in the VET sector, where the pace of technological change—propelled by Industry 4.0 innovations such as automation, robotics, and data analytics—**demands a continuous evolution of skills and knowledge**. The ability to deliver education that is relevant, responsive, and closely aligned with emerging labour market demands is no longer a luxury; it is a necessity.

Europe's strategic approach to this transformation is rooted in a **commitment to human-centric, ethical, and inclusive AI adoption**. Through frameworks such as the Digital Education Action Plan and the European Skills Agenda, policymakers emphasize the importance of equipping learners not only with technical competencies but also with critical thinking skills, ethical awareness, and digital resilience. The goal is to **prepare individuals to thrive alongside AI, leveraging its potential responsibly** while safeguarding privacy, fairness, and social cohesion.

Despite these visionary frameworks and substantial investment at the EU level, **the reality on the ground reveals a mosaic of progress, disparities, and challenges**. Member states vary significantly in the maturity of their AI-VET integration, influenced by factors such as governance structures, resource availability, teacher preparedness, and infrastructural readiness. While pilot programs and regional spots of excellence illustrate promising advances, **scaling these initiatives into systemic, sustainable practices remains a complex undertaking**.

Here below we provide for key insights extrapolated from a very comprehensive transnational analysis at pan-European level and country dimension (Italy, Poland, Spain). The full integral report is available here: www.aivet-training.eu/mapping.php



Italy: Enthusiasm meets deep structural barriers

Italy's journey toward AI integration in vocational education **exemplifies the nuanced interplay between optimistic potential and entrenched systemic challenges**. On one hand, there is a growing enthusiasm among students and educators for AI-driven tools, reflecting a recognition of their potential to enhance learning efficiency, provide up-to-date, labour-market-relevant information, and introduce engaging, interactive educational experiences. This enthusiasm indicates a fertile ground for innovation.

However, **these hopes are tempered by deeply rooted structural issues**. Chief among them is the status and remuneration of teachers. Italian educators often face significant disparities in salary compared to other professions, leading to low morale, recruitment difficulties, and high attrition rates. **This systemic undervaluation risks relegating AI adoption to the periphery of educational practice**, where it is used primarily in extracurricular or student-led contexts rather than integrated fully into formal instruction. The pressures of workload, societal expectations, and burnout further complicate the situation, **limiting educators' capacity and motivation to embrace new digital tools**.

Infrastructural shortcomings compound these human resource challenges. Italy's schools frequently suffer from insufficient and outdated technology; many classrooms have just over half a computer per student, with many devices unable to support advanced AI applications. The uneven distribution of infrastructure, with rural and economically disadvantaged areas lagging behind urban centres, threatens to widen educational inequalities. **The digital divide becomes a barrier not only to access but to the very quality and relevance of vocational education**.

Effective AI adoption therefore requires holistic policies that ensure safe, supportive, and inclusive learning environments alongside technological upgrades. Addressing these interwoven challenges demands a multi-pronged national strategy: substantial investment in modernizing infrastructure, **elevating teachers' professional conditions through better pay and career development, expanding comprehensive training programs focused on AI literacy and pedagogical integration**, and embedding robust safeguards for student protection. Only by confronting these foundational issues can Italy transform existing enthusiasm into widespread, equitable, and sustainable AI integration within its vocational education system.

Spain: Legislative ambition and innovation coupled with persistent inequities

Spain presents a compelling case of proactive, legislation-driven AI adoption in VET, reflecting both bold ambition and pragmatic challenges. **The 2022 VET Reform Law is a groundbreaking milestone**, establishing mandatory company internships and launching a dedicated vocational track in the embracement of digital technologies for education, training and professional development. This legislative innovation sends a **clear signal of national commitment to embedding AI** as a core component of vocational qualifications and workforce readiness.

Spain's approach is characterized by a holistic strategy that combines curricular innovation, public-private partnerships, and regional innovation hubs. AI modules are being woven across technical and vocational programs, **ensuring AI literacy is not confined to specialized courses but integrated throughout disciplines** like manufacturing, logistics, and health care. Regional centres like the AI Talent Hub at the Polytechnic University of Valencia serve as dynamic incubators for hands-on learning in Industry 4.0 technologies, automation, and digital manufacturing, linking education directly with contemporary industry needs.

Public-private collaboration is a cornerstone of Spain's AI ecosystem.

Initiatives such as Andalucía Emprende and Vintally leverage AI to assess entrepreneurial skills and facilitate employment matching, demonstrating how industry engagement can amplify educational impact. Platforms like ODILO utilize AI to personalize learning paths, enhancing engagement and outcomes.

Despite this forward momentum, significant obstacles remain. **A critical bottleneck is the uneven AI competency among educators.** Many teachers lack access to continuous, structured professional development programs, leaving them ill-equipped to integrate AI tools confidently and effectively. **This gap breeds uncertainty and resistance**, especially given concerns about how AI may alter traditional pedagogical roles and the teacher-student relationship.

Investment disparities also pose a threat to equitable AI integration. While some urban institutions benefit from robust technological infrastructure, **many rural and disadvantaged areas struggle with outdated equipment and poor connectivity**, risking the emergence of new digital divides that undermine inclusive education.



Cultural factors add further complexity. Resistance to change persists, often tied to traditional teaching mindsets and apprehensions about AI's ethical and regulatory implications. **Issues of data privacy, algorithmic transparency, and accountability loom large, prompting calls for clearer frameworks** that build trust among all stakeholders.

Nonetheless, Spain's innovative use of AI to automate administrative tasks offers a promising avenue to alleviate teacher workload and refocus efforts on pedagogy and student engagement.



Poland: Emerging momentum amid capacity and infrastructure challenges

Poland's vocational education system reveals a dynamic balance of emerging AI enthusiasm tempered by capacity and infrastructural hurdles. **The government's Action Plan for VET (2022–2025) articulates clear priorities focused on curriculum modernization to embed AI, data analytics, and digital skills; digitization of examinations with AI-based assessment pilots; and the promotion of micro-credentials enabling modular, flexible upskilling.**

Poland demonstrates notable innovation through projects like AI4Youth, which introduces AI **fundamentals across technical schools nationwide while providing teacher training and practical resources.** Other initiatives such as the AI Workshop in Poniatowa and AI-powered platforms like Wellms AI and EDUBOT showcase creative uses of AI to personalize learning and support diverse student needs, including those with fewer opportunities.

Despite this progress, systemic challenges remain. **Poland lacks a fully comprehensive, cohesive national strategy dedicated to AI in VET,** resulting in fragmented efforts and underfunded teacher training programs. Infrastructure disparities are pronounced, especially in rural regions where internet connectivity and access to modern devices are limited, risking inequitable learning environments.

Ethical considerations—particularly regarding AI's role in student assessment and data privacy—are subjects of active debate, **underscoring the need for transparent policies that build confidence among educators, learners, and families.**

Poland's flexible qualification frameworks and its early adoption of micro-credentials **position it well to respond agilely to labour market shifts.** Success will depend on securing investments for infrastructure upgrades, scaling teacher professional development, fostering industry partnerships, and engaging stakeholders to address cultural and ethical concerns.



Shared themes and critical success factors across Europe

Across Italy, Spain, Poland, and the broader EU context, several overarching themes emerge that illuminate the path forward for AI-VET integration:

- 1. Curricular innovation**

There is widespread recognition that AI knowledge cannot be siloed; **it must be integrated across vocational disciplines**, from technical manufacturing to healthcare, ensuring that learners acquire both specialized and transversal AI competencies.
- 2. Teacher professional development**

The availability of systematic, scalable, and continuous teacher training is a universal challenge and imperative. **Educators need not only AI technical skills but also pedagogical strategies** to leverage AI effectively, requiring substantial investment and innovative training models.
- 3. Public-private partnerships**

Collaboration between education providers and industry acts as a key driver for innovation, resource sharing, and relevance. Successful examples demonstrate how business engagement can enrich curricula and provide real-world learning contexts.
- 4. Micro-credentials and flexible learning pathways**

Modular certifications offer a responsive approach to rapidly evolving skill demands, supporting lifelong learning for new entrants and incumbent workers alike.
- 5. Digital infrastructure and equity**

Uneven access to AI labs, high-performance computing, and reliable connectivity risks **deepening existing educational inequalities** unless addressed through targeted, sustained investment.
- 6. Ethical and human-centric AI**

European AI education stresses **ethical use, privacy protection, algorithmic transparency, and socio-economic impacts**, cultivating learners who are informed, responsible users rather than mere technicians.



The road ahead: Toward a cohesive, inclusive, and impactful AI-VET ecosystem

As European VET systems stand on the cusp of transformation, a comprehensive, strategic, and multi-level approach is essential to unlock AI's full promise:

- 1. Embedding ai skills as a core pillar:**
AI literacy and competencies must become an integral part of all vocational qualifications across sectors, transcending isolated courses.
- 2. Designing accessible teacher development pipelines**
Professional learning must be continuous, inclusive, and aligned with emerging technologies, empowering educators to innovate confidently.
- 3. Fostering multi-level governance models**
Effective AI integration requires coordination that bridges local experimentation and innovation hubs with national policies and EU frameworks, ensuring coherence and scalability.
- 4. Investing in equitable digital infrastructure**
Targeted funding must prioritize underserved regions to guarantee universal access to AI-enhanced learning environments.
- 5. Harnessing AI as a learning enabler**
AI should support personalized, adaptive learning pathways, catering to diverse learner profiles and enhancing motivation and success.
- 6. Leveraging labour market Intelligence**
AI-driven analytics can provide real-time insights into skill needs, enabling curricula to adapt dynamically and remain aligned with employer demands.
- 7. Promoting cross-border recognition of AI micro-credentials**
Harmonizing qualification frameworks will facilitate learner mobility, lifelong learning, and a cohesive European skills ecosystem.

By embracing these priorities, Europe can build VET ecosystems that do more than equip learners with technical skills: they will cultivate values, resilience, and critical judgment essential to navigating and shaping an AI-augmented future.

This balanced approach preserves social cohesion while driving innovation, sustainability, and global competitiveness, ensuring Europe's place as a leader in responsible and inclusive AI-driven vocational education.

