| | |
|---|---|
| **Project title** | Augmented Intelligence for Pedagogically Sustained Training and Education |
| **Project acronym** | augMENTOR |
| **Grant agreement No.** | 101061509 |
| **Start date of project** | 01/01/2023 |
| **Duration of project** | 36 months |
| **Project website** | https://augmentor-project.eu/ |

# D7.6 Policy Briefs Final

| | |
|---|---|
| **Related work package** | WP7 |
| **Document reference** | D7.6 |
| **Related deliverables** | D7.4, D7.5 |
| **Status** | Final |
| **Version** | 1.0 |
| **Due date** | 31/12/2025 |
| **Submission date** | 30/12/2025 |
| **Lead partner** | CSI |
| **Contributing partners** | NVCR, ACP |
| **Reviewers** | IASIS, UNIGR |
| **Keywords** | policy brief, recommendations, artificial intelligence in education |

| **Dissemination level** | |
|---|---|
| ✔ | PU: Public |
| | Sen: Sensitive |
| | R-UE/EU-R: EU Classified |
| | S-UE/EU-S: EU Classified |
| | C-UE/EU-C: EU Classified |

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The augMENTOR project (GA No. 101061509) is funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. The European Union cannot be held responsible for them.

# Document information

| List of contributors | |
|---|---|
| Name | Partner (short name) |
| Elisavet Kiourti | CSI |
| Popi Aresti | CSI |
| Nikos Alimbertis | NVCR |
| Nathan Coyle | ACP |

| Document History | | | |
|---|---|---|---|
| Version | Date | Change editors | Changes |
| 0.1 | 30/09/2025 | Popi Aresti (CSI) | Initial version of the document |
| 0.2 | 30/10/2025 | Popi Aresti (CSI),<br>Nathan Coyle (ACP)<br>Nikos Alimpertis (NVCR) | Consolidated inputs from consortium workshop, first draft |
| 0.3 | 27/11/2025 | Elisavet Kiourti (CSI) | Draft for internal review |
| 0.4 | 15/12/2025 | Eleftheria Tsourlidaki (UNIGR)<br>Chara Spryropoulou (IASIS) | Reviewed version |
| 0.5 | 19/12/2025 | Popi Aresti (CSI) | Addressing reviewers' comments |
| 0.6 | 23/12/2025 | Elisavet Kiourti (CSI) | Pre-final version |
| 0.7 | 26/12/2025 | Eleftheria Tsourlidaki | Pre-final check |
| 1.0 | 30/12/2025 | George Garofalakis | Final check, release and submission |

| Quality control | | |
|---|---|---|
| Role | Partner (short name) | Approval date |
| Internal reviewers | IASIS, UNIGR | 15/12/2025 |
| Deliverable leader | CSI | 23/12/2025 |
| Quality manager | UNIGR | 26/12/2025 |
| Project coordinator | UN | 30/12/2025 |

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# List of acronyms

| Acronym | Description |
|---|---|
| 4Cs | Creativity, Critical thinking, Collaboration and Communication |
| AI | Artificial Intelligence |
| augMENTOR | Augmented Intelligence for Pedagogically Sustained Training and Education |
| DEAP | Digital Education Action Plan |
| DigComp 2.2 | Digital Competence Framework for Citizens |
| EC | European Commission |
| EEA | European Education Area |
| ET | Emerging Technologies |
| EU | European Union |
| GDPR | General Data Protection Regulation |
| LMS | Learning Management System |
| ML | Machine Learning |
| MOOC | Massive Open Online Courses |
| PII | Personally Identifiable Information |
| TESA | Technology-augmented Educational Scenarios and e-Activities |

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# Executive summary

This third and final augMENTOR policy brief brings together the key insights generated through the project's technical development, pilot implementations, and extensive policy engagement across Europe. Building on the foundations of the previous briefs (D7.4 & D7.5) which examined the regulatory landscape for trustworthy Artificial Intelligence in education and introduced the augMENTOR Pedagogical Framework, this document focuses on how these principles operate in real educational environments. It synthesises evidence from diverse pilot settings, expert consultations, and institutional workshops to support stakeholders in navigating the practical, pedagogical, and ethical dimensions of AI adoption. Central to this brief is the augMENTOR platform, built on three core models that transform heterogeneous learning data into transparent, explainable, and pedagogically meaningful insights. The system's integration of clustering, classification, dimensionality reduction, and explainable AI aligns directly with EU priorities on transparency, accountability, accessibility, and human oversight. Pilot activities across Greece, Serbia, and Lithuania highlight both the added value of AI generated recommendations for personalised learning and the persistent challenges educators face in interpreting these outputs without targeted professional development. The brief also brings forward broader policy issues, including the need for multimodal accessibility, the risks of vendor lock-in, and the importance of open and interoperable infrastructures. The recommendations offered here address stakeholders at international, national, and institutional levels, reflecting Europe's wider policy discourse on ethical and equitable AI deployment. Educators are encouraged to strengthen their AI literacy and integrate explainable recommendations into pedagogical decision-making. Learners are invited to develop responsible and informed engagement with AI tools. Institutions and policymakers are urged to establish robust governance structures, promote interoperability, and support sustainable implementation strategies. Collectively, augMENTOR contributes to the EU's vision for high-quality digital education and provides a concrete pathway for scaling inclusive, transparent, and pedagogically grounded AI-enhanced learning across Europe.

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# 1 Introduction

Building on the foundations established in the first two augMENTOR policy briefs (D7.4 and D7.5), this final brief turns to the insights emerging from the project's pilot phase, analysing how educators and learners engaged with the pedagogical framework and the augMENTOR platform in authentic classroom environments. The first augMENTOR policy brief (D7.4) established the overarching policy context for the responsible integration of AI in education. It synthesised European Union frameworks, including the Digital Education Action Plan, the EU AI Act, the AI HLEG Ethics Guidelines, and UNESCO recommendations and translated them into actionable directions for international, national, and local stakeholders. Its primary contribution was the articulation of the systemic enablers required for effective AI adoption. In parallel, it positioned augMENTOR as an initiative capable of operationalising these principles through its AI-enhanced toolkit and pedagogical vision. The second policy brief (D7.5) advanced the discussion from policy-level priorities to pedagogical and design-level implementation, showing how Emerging Technologies (ET), AI generated recommendations, and transversal competencies (particularly the 4Cs) can shape adaptive learning pathways and how these elements connect to the project's technical foundations.

This third and final policy brief brings the series full circle by analysing empirical evidence from the augMENTOR pilot implementations, including lessons learned from participating institutions and the policy recommendations generated by the augMENTOR platform. Drawing on quantitative surveys, qualitative focus groups, educator logs, rubric-based assessments of the 4Cs, platform analytics, user-experience data, and insights from policy-making events, it synthesises findings across diverse educational settings to produce evidence-informed recommendations for scaling AI-enhanced pedagogies.

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# 2 Evidence-based design principles for trustworthy AI in education

Contemporary research on AI in education demonstrates that adaptive learning and personalised recommendations systems can enhance learner performance, engagement, and self-regulation when they are grounded in transparent and pedagogically aligned design principles (Gligorea et al., 2023; Tan et al., 2025; Vorobyeva et al., 2025). Studies further show that AI-driven personalisation is most effective when based on multidimensional learner models that are continuously updated and capable of translating complex behavioural and cognitive indicators into meaningful instructional insights (Gligorea et al., 2023; Wang et al., 2024). At the same time, scholars underline that explainability, ethical safeguards, and human oversight are essential to ensure that AI complements rather than replaces educators' professional judgment, thereby maintaining trustworthy and rights-respecting learning environments (Bond et al., 2024; European Digital Education Hub Squad on Explainable AI in Education, 2025; Zawacki-Richter et al., 2019). These insights from the literature directly reinforce the architectural choices operationalised in augMENTOR.

A critical enabler of augMENTOR's policy relevance lies in its technical foundation: a multilayered microservices architecture and a suite of core AI, Machine Learning (ML) pipelines, as detailed in Deliverable D5.2. This architecture is not merely a technological asset, but a structural mechanism that operationalises transparency, accountability, accessibility, and pedagogical alignment in real educational settings which are key policy priorities according to the European Education Area (EEA)[1] and the Digital Education Action Plan (DEAP) 2021-2027[2]. Through the integration of the Learner Model and the pedagogical framework produced, augMENTOR transforms heterogeneous learning data into meaningful, explainable, and pedagogically grounded insights. The platform's AI/ML pipelines ensure that generated recommendations remain interpretable and trustworthy, supporting educators in exercising informed professional judgment. By embedding these capabilities within a scalable, interoperable microservices environment, augMENTOR demonstrates how advanced AI systems can be deployed responsibly in alignment with the EU AI Act, GDPR provisions, and wider global principles for ethical AI in education.

[1] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021G0226(01)

[2] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0624

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## 2.1 The core elements of augMENTOR and their interconnected structure

The augMENTOR deploys interconnected structures that work together to produce a transparent, context-aware, and educationally relevant AI-driven platform. augMENTOR employs a learner model which aims to provide a structured, evidence-based representation of each learner's evolving state (D3.3). According to this learner model, augMENTOR collects and processes information from three domains:

- **Cognitive** (e.g., attention, prior knowledge),
- **Affective** (e.g., motivation, engagement informed by Self-Determination Theory),
- **21st century skills** (more specifically, Creativity, Critical thinking, Collaboration and Communication, also known as the '4Cs').

The learner model serves as the foundational abstract representation of the learner's cognitive and non-cognitive characteristics. It is the conceptual architecture that precisely dictates the learner characteristics to be tracked and guides how the corresponding quantifiable indicators (data) should be organized. This architecture enables personalized learning pathways and interventions, ultimately producing the augMENTOR Profiles to ensure the delivery of evidence-based personalized learning and support.

These profiles do not group learners based on their performance; they are created by utilizing a wide range of information like surveys, grades, and in-course behavioral metrics based on the learner model. They represent groups of learners with similar learning styles and characteristics going beyond mere performance metrics. Thus, augMENTOR profiles support targeted guidance and interventions, enabling educators to collect useful insights about their students and targeted recommendations for inclusive course design.

augMENTOR's AI-models use the profiles to meaningfully connect the information collected from different sources (activity logs, performance data, metadata, and derived metrics like engagement/struggle scores from a Learning Management System) turning them into a coherent dynamic knowledge structure (Knowledge Graph). This is the organizational backbone of the platform and enables the system to understand relationships between educational content, student performance, and skill development providing the contextual evidence necessary for generating explainable, personalized recommendations.

To generate explainable, personalized recommendations aside from the input from the aforementioned knowledge graph, augMENTOR's AI models, also use as its primary input for pedagogical guidance the Technology-augmented Educational Scenarios and e-Activities (TESA) framework. TESA also makes use of the creative pedagogy framework, designed in the framework of the project. Both these frameworks are presented in D7.5 - 'Interim Policy

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Brief' along with related policy recommendations. Thus all generated recommendations are pedagogically grounded, meaningful for educators, and support course design.

Altogether, augMENTOR interweaves the profiles generated, information from the dynamic knowledge graph and the pedagogical framework to form the core of the augMENTOR platform which enables an explainable, and pedagogically anchored approach to AI-supported learning on three different levels:

a. **Recommendations for learners** to improve their performance and skills
b. **Course design guidelines for educators** to support them in creating inclusive courses for diverse groups of learners
c. **Recommendations for policy makers and education stakeholders** to inform decision making for curriculum design and future courses.

Depending on the level addressed, augMENTOR utilizes the TESA framework along with the corresponding information from the Knowledge Graph to generate the requested recommendations.

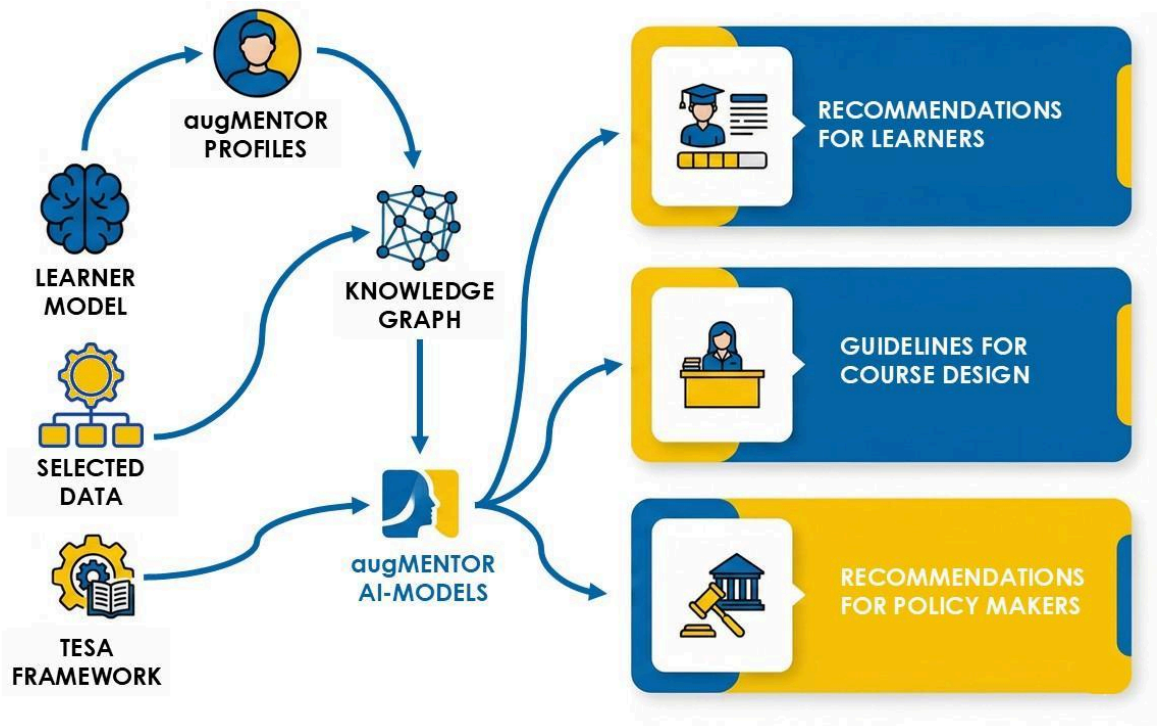


***Figure 1.*** *augMENTOR core elements and their interconnected structure*

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## 2.2 Generating policy recommendations through the augMENTOR solution

As mentioned above, the augMENTOR platform delivers policy recommendations through a specialised system designed to offer strategic guidance to educational leaders, course providers, and policy makers. augMENTOR produces these recommendations per course using as input the TESA framework, course data and the profiles produced.

The process starts by retrieving the data from the platform's database, including metrics, course information, and the specific 'augMENTOR profiles' that characterise different learning styles and needs. The AI models then analyse this information, combining the raw data with the project's pedagogical framework (TESA) to generate insights that are not just data-driven but also educationally sound and relevant to the specific context.

To make these insights actionable, the system formats the output into a structured, five-part report that is easy to read and understand. This includes an executive summary of the course's overall performance, detailed descriptions of the learner profiles present, and specific policy advice for supporting both students and educators. Users can view these recommendations directly on the platform, where sections can be expanded for more detail, or download the entire set of insights as a PDF document to assist in offline decision-making and institutional planning. In the framework of the project, 5 different sets of recommendations were produced, all available in the policy recommendations section of the augMENTOR platform[3].

[3] https://augmentor-app.eu-dev.novelcore.org/login

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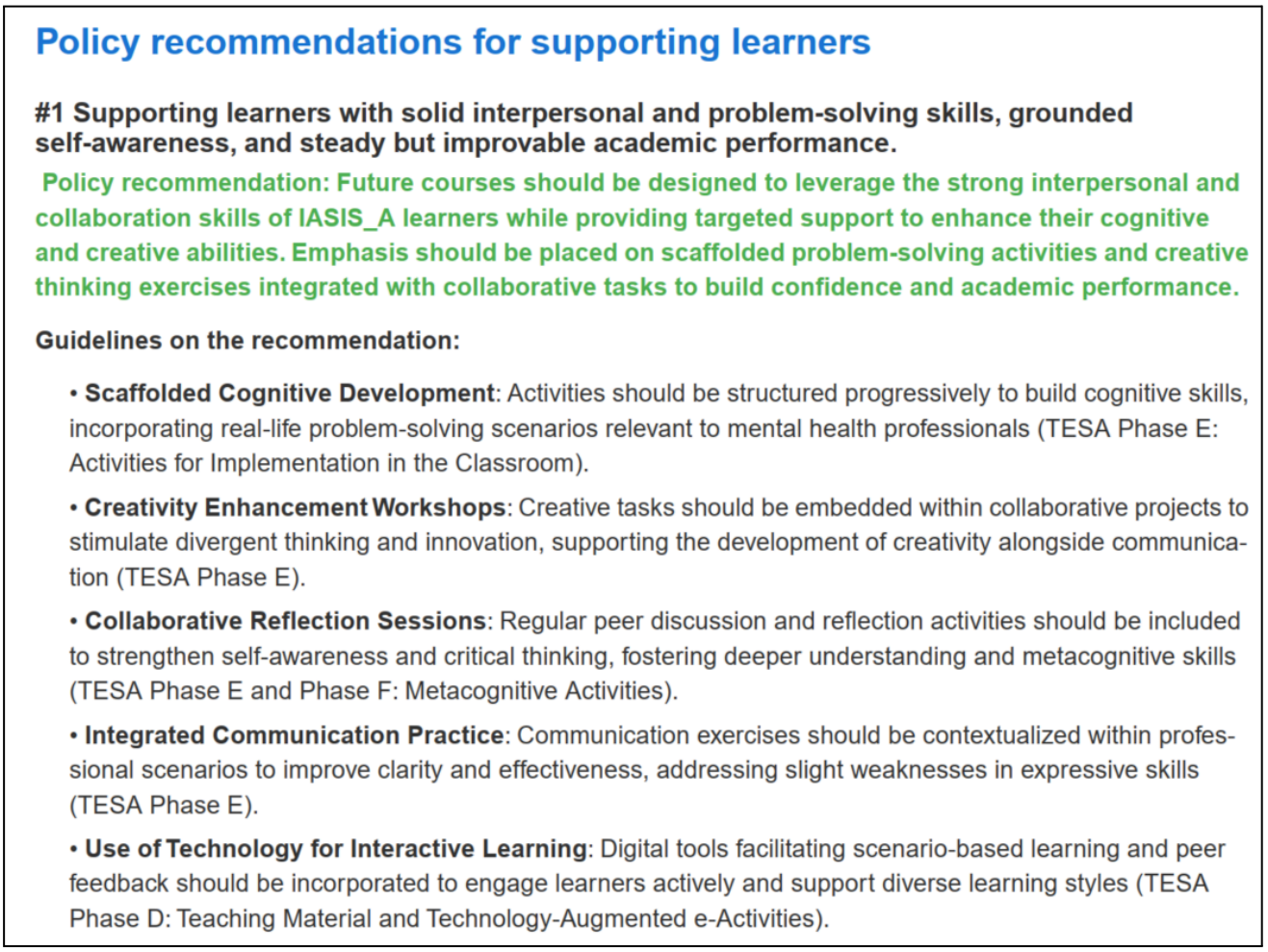

## Policy recommendations for supporting learners

**#1 Supporting learners with solid interpersonal and problem-solving skills, grounded self-awareness, and steady but improvable academic performance.**

**Policy recommendation: Future courses should be designed to leverage the strong interpersonal and collaboration skills of IASIS_A learners while providing targeted support to enhance their cognitive and creative abilities. Emphasis should be placed on scaffolded problem-solving activities and creative thinking exercises integrated with collaborative tasks to build confidence and academic performance.**

**Guidelines on the recommendation:**

- **Scaffolded Cognitive Development**: Activities should be structured progressively to build cognitive skills, incorporating real-life problem-solving scenarios relevant to mental health professionals (TESA Phase E: Activities for Implementation in the Classroom).
- **Creativity Enhancement Workshops**: Creative tasks should be embedded within collaborative projects to stimulate divergent thinking and innovation, supporting the development of creativity alongside communication (TESA Phase E).
- **Collaborative Reflection Sessions**: Regular peer discussion and reflection activities should be included to strengthen self-awareness and critical thinking, fostering deeper understanding and metacognitive skills (TESA Phase E and Phase F: Metacognitive Activities).
- **Integrated Communication Practice**: Communication exercises should be contextualized within professional scenarios to improve clarity and effectiveness, addressing slight weaknesses in expressive skills (TESA Phase E).
- **Use of Technology for Interactive Learning**: Digital tools facilitating scenario-based learning and peer feedback should be incorporated to engage learners actively and support diverse learning styles (TESA Phase D: Teaching Material and Technology-Augmented e-Activities).

***Figure 2.*** *Part of the policy recommendations generated by the platform*

## 2.3 Ethical safeguards and technical resilience

The augMENTOR architecture integrates robust ethical safeguards and technical resilience features that directly support its policy relevance and its alignment with emerging regulatory frameworks for AI in education. These safeguards ensure that advanced AI capabilities operate within boundaries that protect learner rights, uphold educator agency, and enable institutions to adopt the system with confidence in its compliance and integrity.

**Human-in-the-Loop oversight:** A foundational safeguard in the augMENTOR ecosystem is the requirement that all AI-generated personalised recommendations pass through educator review. Teachers retain full authority to validate, adapt, or disregard recommendations based on their professional judgment and contextual knowledge of learners.

**Privacy-by-Design protections:** The platform adheres to stringent privacy and data-protection standards through pseudonymisation, ensuring that no Personally

Identifiable Information (PII) is processed or stored by the core AI engine. This approach supports GDPR compliance while reinforcing trust in AI-supported learning environments. By minimising exposure of sensitive data, augMENTOR demonstrates how privacy-preserving design can coexist with sophisticated recommendations and personalised learning capabilities.

**Scalability and interoperability:** Built on a modular, layered microservices foundation, the architecture is inherently scalable and designed to integrate additional learning environments by relying on a fundamental domain-agnostic ontology (Course, Learner, Activity, Profile) to seamlessly integrate new Learning Management Systems (LMS) (D5.2 section 2.4 ).

Together, these safeguards position augMENTOR as a trustworthy pedagogical partner, demonstrating how AI technologies can be deployed responsibly and ethically in real educational settings. By combining transparent data processes, human oversight, and resilient system design, the platform aligns with both the spirit and operational requirements of contemporary AI governance frameworks, supporting sustainable and compliant adoption across the education sector.

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# 3 Insights and lessons learned from pilot activities

The augMENTOR pilots unfolded across markedly different educational, social, and institutional contexts, offering a rich evidence base for understanding how AI-enabled pedagogical tools operate in real-world settings. These contextual differences are essential for shaping policy directions that remain sensitive to diverse levels of digital maturity, organisational structures, and socio-political environments.

## 3.1 Pilot implementation insights

**Pilot #1 - Emerging technologies in Adult Education and Life-Long Learning settings (IASIS):** This pilot served as a critical validation case for deploying the augMENTOR solution with adult trainers who work with vulnerable groups. Implemented over six months, the pilot engaged more than 250 adult trainers, primarily mental health professionals, educators, and volunteers. These trainers, engaged as trainees (learners) in one of IASIS' training courses. This cohort of learners were characterised by low digital readiness and limited prior exposure to AI. This context allowed augMENTOR to be examined not as a generic educational platform, but as a human-centred system embedded in real-world training settings with professional trainers as learners.

The IASIS experience demonstrated that augMENTOR's added value lies in its capacity to support reflective practice and competency-based development rather than automation alone. Despite initial resistance to AI, digital skill gaps, and heavy professional workloads, the platform's explainable guidelines and personalised recommendations helped participants recognise concrete skill needs, particularly in communication, collaboration, and problem solving, while increasing confidence in the ethical use of AI. A key lesson for the augMENTOR project is that effective adoption depends on sustained capacity building, inclusive and adaptive pedagogical design, and strong institutional mediation between humans and AI systems. These findings directly inform augMENTOR-related policy recommendations, highlighting the need for structured support frameworks, digital inclusion measures, and ethical safeguards when scaling AI-enhanced learning solutions in sectors where trust, care, and equity are paramount.

**Pilot #2 - Innovative Training Programmes for Pre-service Teachers (UPATRAS)**
The UPATRAS pilot was implemented within a large-scale, formal higher-education environment, fully embedded in a mandatory undergraduate course at the Department of Educational Sciences and Early Childhood Education of the University of Patras. Of the 245 enrolled students, 221 completed the pilot, alongside 4 educators, over an 11-week semester. During this period, augMENTOR was tested under authentic university conditions characterised by high student numbers, continuous assessment demands, and increasing pressures linked to the use of generative AI in academic work. Its integration within a

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standard curriculum course allowed augMENTOR to operate as part of routine teaching, assessment, and feedback processes, rather than as an external intervention.

The key lesson from this pilot is that augMENTOR demonstrates strong scalability and institutional compatibility in higher-education contexts, particularly in pre-service teachers' education and ICT-related programmes. Learning analytics and AI generated recommendations enabled systematic monitoring of engagement and progression across large cohorts, while supporting more reflective and transparent formative assessment practices. At the same time, the pilot highlighted the importance of robust onboarding processes, clear pedagogical alignment, and technical support when deploying AI tools at scale. From a policy perspective, the pilot's experience underscores the value of embedding AI-enhanced support tools for educators within existing curricula and courses to support learners monitoring, manage instructor workload, and promote responsible, pedagogically grounded use of AI in university settings.

**Pilot #3 - STEAM-based Programs for Environmental Education in a Network of Eco-schools (EASD)**

Pilot 3 was implemented within formal school education settings, in Serbia's Eco-schools network, and it was embedded in the curriculum through a project course related to Carbon Footprint. It involved 26 educators and a cohort of approximately 200 learners. The pilot progressed from a technical and pedagogical perspective, with structured integration of augMENTOR into weekly instructional activities and systematic enrolment through schools.

A first key lesson concerns parental consent and trust. Despite repeated and sustained outreach efforts by educators, including mediated communication with families, follow-up meetings, and the extension of consent collection, parental reluctance to sign consent forms was observed. According to the pilot representatives, in Serbia parents do not consider their active participation in their children's school life a given. In some cases, this notion, in combination with low digital literacy skills also led parents to refuse and did not want their children to participate in the project as they were suspicious as to why they were asked for their consent. Notably, this resistance persisted even though the information sheet accompanying the consent form was translated into Serbian and written in simplified, easy-to-understand language.

A second key lesson relates to the fragility of educational innovation under socio-political disruption. National school closures, prolonged protests, and strikes between December 2024 and March 2025 resulted in widespread discontinuity of education, halting planned activities across many participating schools. While augMENTOR remained technically functional, its pedagogical deployment was constrained by reduced instructional time, school closures, and uncertainty. Thus, the implementation context became unstable and

revealed structural barriers that significantly shaped outcomes. This disruption underscores the need for robust digital educational tools apt for use not just in cases of global pandemics (like the COVID-19 case) but also in cases where local or national incidents interfere with the roll-out of a school year enabling learning activities to be adaptable to fluctuating operational conditions. Tools like augMENTOR, can provide AI-enhanced support to educators in such cases and help them continue their work, not just in terms of mediating content knowledge but also in developing their students skills.

The EASD pilot also brought to light critical insights related to inclusion, accessibility, and the limits of text-based AI recommendations in special education contexts. A recurring challenge concerned learners' reading abilities, particularly when engaging with scientific content that required interpreting written questions and abstract concepts (e.g., chemical elements, particles, methane). While learners were able to participate meaningfully in activities, sustained teacher mediation was essential to support reading, comprehension, and task completion. In this context, AI-generated recommendations in written form were not directly usable by learners with disabilities, as they presupposed reading fluency and independent interpretation. Educators therefore acted as intermediaries, translating, explaining, and contextualising both course content and recommendations. This experience highlighted the importance of multimodal and assistive features, such as text-to-speech, voice-based input, and screen readers not as optional enhancements but as enabling conditions for equitable AI use. From a policy perspective, these findings reinforce the need to embed AI initiatives within inclusive, resilient institutional frameworks that (a) prioritise accessibility-by-design, (b) recognise teachers' mediating role in vulnerable contexts, (c) allow sufficient implementation time for trust, familiarity, and skill development to emerge, and (d) support continuity beyond short pilot cycles so that AI systems can mature alongside learners and educators rather than being evaluated in isolation or under time pressure.

**Pilot #4 - Leapfrogging Industry 4.0 technologies for Civic Society watchdogs and EU Civilian Missions (KTU)**

Pilot 4 was implemented in a specialised cybersecurity training context targeting non-IT professionals, including peacebuilders, NGO staff, and watchdog organisations. The pilot was designed around the TryHackMe platform, drawing on its established learning structure and its initial compatibility with augMENTOR. Originally TryHackMe's structure enabled learners to choose the rooms (small learning course) they wished to engage in. This provided the perfect opportunity for augMENTOR to demonstrate its capabilities in terms of allowing learners to directly personalise their learning path and select what to learn next based on their interests, learning performance and skills development.

Early planning and pre-piloting activities indicated high learner engagement and demonstrated that cybersecurity content could be meaningfully adapted for

non-technical audiences. However, this design choice also exposed a set of structural vulnerabilities linked to reliance on a third-party commercial platform.

As the pilot progressed, significant changes introduced by TryHackMe disrupted the learning process. Changes in TryHackMe's policy dictated that learners were no longer free to select rooms on their own, instead the platform set them on a pre-defined path based on a preliminary questionnaire learners had to answer upon registration. This change eliminated the option of personalized learning pathways and hindered the platform's potential. In response, KTU migrated the learning activities to Moodle in order to safeguard pedagogical continuity and institutional control. Although the course was successfully completed within a stable institutional environment, technical and governance constraints prevented the integration of learning data into the augMENTOR platform, thereby limiting the pilot's contribution to testing the platform's ability to deliver personalised recommendations.

Nevertheless, feedback collected from eight adult participants who participated in an additional small pilot and engaged with augMENTOR, provided valuable insight into conditions for effective AI adoption in such contexts. Educators highlighted the need for improved system stability, interactive onboarding for first-time users and the ability to analyse multiple learners simultaneously. They also pointed to the potential value of more granular and customisable recommendations, clearer differentiation between novice and advanced learners, and analytics that trace individual learning trajectories over time.

Within the KTU context, the pilot aimed to enable educators to use augMENTOR to provide personalised recommendations and adapt both *how* learners study and *what* they study, based on individual needs and learning patterns. However, the TryHackMe platform did not allow the pilot to meaningfully test these capabilities. A major platform-level change severed learners' ability to choose their own learning paths and instead imposed rigid, predefined trajectories. This shift significantly reduced flexibility and learner autonomy, resulting in increased disengagement and dropouts. The inability of the pilot to progress as planned therefore does not reflect a lack of learner motivation, but rather confirms a core value and gives us a valuable lesson learned: Learners, particularly in adult and vocational training require flexible, differentiable, and personalisable learning environments. The KTU experience underscores that when embedded in adaptable LMS infrastructures that respect learner diversity and pedagogical agency, AI-supported personalisation like that delivered by augMENTOR can be of great value.

## 3.2 Insights from recommendations delivered by the augMENTOR platform

While the section above presents the insights based on the experience of the pilot implementation, this section presents insights based on the overall outcome of the courses based on its augMENTOR profiles.

augMENTOR's policy maker's view, enables users to retrieve valuable insights and policy recommendations based on the overall roll-out of a course. Currently augMENTOR has delivered five (5) sets of recommendations one for each distinct course that ran in the platform which are currently available in the platform. An example set of such recommendations is presented in Annex I. These sets essentially already constitute policy recommendations at institutional level.
As the detailed insights for each course are already presented in the policy recommendations generated by the platform, this section is meant to give further insights based on two cases, where thanks to the pre-pilot and pilot implementations, the team was able to collect useful insights on the implementation of the same course in two consecutive academic years engaging different groups of learners. More particularly Pilot #1 (IASIS) and Pilot #2 (UPATRAS) ran the same course for both implementations.

The comparative analysis of the two recommendation sets for IASIS and UPATRAS pilots respectively leads to the distinct conclusion that the augMENTOR platform functions as a dynamic and context-aware pedagogical companion, capable of distinguishing the actual performance of a specific cohort. The platform successfully detects significant year-on-year deviations in performance. For instance, the system identified that the 2024-2025 *UPAT_A* cohort possessed exceptional critical thinking skills compared to the previous year's group, which had struggled in that area.

Consequently, the platform demonstrated agility by avoiding generic advice; instead of issuing standard recommendations for a specific learner type, it tailored its guidance to the specific reality of the academic year. This involved shifting focus from cognitive scaffolding to social collaboration support when the data indicated a change in learner needs, ensuring that interventions remained pedagogically sound by consistently anchoring them in the TESA framework. Ultimately, the findings confirm that the platform effectively bridges the gap between static learner modelling and the evolving nature of classroom dynamics, providing educators with actionable strategies that evolve alongside their students.

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# 4 Policy engagement & co-creation activities across Europe

To strengthen policy relevance and ensure that augMENTOR's recommendations are grounded in real institutional practice, the project implemented a coordinated programme of policy engagement and co-creation activities across Europe. Through seven national workshops in six countries and a consolidation workshop in Brussels, augMENTOR created structured spaces for dialogue between educators, policymakers, researchers, civil society actors, and EdTech stakeholders. These activities functioned as "policy laboratories", enabling the project to test its pedagogical assumptions, validate technical choices, and critically examine regulatory implications in diverse educational and socio-institutional contexts. These workshops are presented in detail in deliverable D7.2, while below we briefly present the key insights which were used to form related policy briefs for the project.

A key insight from these engagements was the persistent gap between EU-level regulatory frameworks, most notably the EU AI Act and everyday educational practice. Across countries, participants expressed strong interest in AI-enabled personalisation, efficiency, and recommendations mechanisms, while simultaneously highlighting uncertainty around legal responsibilities, data protection, bias, transparency, and accountability. These discussions directly informed the policy briefs by clarifying where guidance, interpretation, and institutional support are most urgently needed to translate regulation into practice.

The workshops also revealed substantial differences in national readiness, digital infrastructure, and linguistic coverage, underscoring that a "one-size-fits-all" approach to AI in education is neither realistic nor equitable. Insights from contexts such as mental health and social innovation (IASIS), higher education (University of Patras), peace and civic education (ACP), sustainability education (EASD), and cybersecurity training (KTU) highlighted the importance of adaptability, inclusive design, and human-in-the-loop governance. These findings shaped policy recommendations emphasising flexibility, contextual sensitivity, and institutional autonomy within common European ethical standards. Importantly, the co-creation process elevated educators' and practitioners' voices in policy formulation. Concerns about workload, consent, trust, academic integrity, and educator autonomy emerged consistently and were integrated into the policy briefs as core conditions for sustainable AI adoption. The Brussels consolidation workshop further enabled cross-national synthesis, surfacing shared concerns around data sovereignty, dependency on non-European AI providers, and long-term sustainability.

Overall, the policy engagement activities provided an evidence-based foundation for the augMENTOR policy briefs. They ensured that recommendations are not only aligned with EU priorities, but also informed by the lived realities of educational institutions across Europe, reinforcing the need for human-centred, ethically grounded, and context-responsive approaches to AI in education.

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# 5 Policy recommendations and implementation strategies

The policy recommendations and implementation strategies presented in this section are grounded in a consolidated body of empirical evidence generated throughout the augMENTOR project and informed by sustained, structured engagement with stakeholders across Europe. Developed in line with the European Commission's guide on writing policy briefs for impact[4], this section brings together insights from the project's pilot implementations and its multi-layered programme of policy dialogue and co-creation, as presented in the preceding chapters. Taken together, this combined evidence base provides a coherent foundation for policy action across multiple levels of governance, capturing both implementation realities and broader regulatory, ethical, and organisational considerations. The recommendations that follow are therefore designed to be actionable, context-sensitive, and aligned with EU policy priorities, supporting the responsible, inclusive, and sustainable deployment of AI-enabled learning systems within Europe's evolving educational ecosystems. A concise presentation of the policy briefs, together with key project information and links to relevant EU initiatives, has also been assembled in a four-page leaflet, available in the Resources section of the project website and included in Annex II.

## 5.1 Policy briefs for stakeholders and educational policy makers at INTERNATIONAL level

**Promote explainable, pedagogically meaningful learning recommendations**

**Policy brief:** To support the meaningful integration of AI-driven recommendations in education, increased attention needs to be given to the interpretability and pedagogical relevance of AI-generated indicators for educators and learners. As AI systems are progressively embedded within learning management environments, the way in which recommendations are presented and contextualised becomes critical for their effective pedagogical use. Experiences emerging from augMENTOR pilot implementations suggest that, when indicators remain insufficiently transparent or difficult to interpret, educators may encounter challenges in translating data into informed instructional decisions. In this context, recommendations that are explainable and grounded in pedagogical logic could contribute to more reflective teaching practices, strengthen professional judgement, and support responsible use of AI in educational settings.

**Implementation strategy:** To support a shared understanding and effective use of AI generated recommendations, the development of broader policy guidance and reference frameworks could be considered. At European level, such guidance could

[4] https://rea.ec.europa.eu/publications/sharing-scientific-evidence-policymakers-0_en

outline general principles for transparent metric design, clarify how AI-generated recommendations may be contextualised within learning processes, and encourage the inclusion of comparative or longitudinal perspectives where appropriate. AI-enabled educational platforms could increasingly incorporate supportive interpretative features, such as visual cues, explanatory annotations, or narrative descriptions, that assist educators in making sense of analytic outputs. Furthermore, capacity-building initiatives, including professional development programmes under Erasmus+ Teacher Academies, could place greater emphasis on pedagogical data literacy and Explainable AI, enabling educators to engage with learning analytics in a critical, informed, and educationally meaningful manner.

## Safeguard human oversight to prevent deskilling and protect pedagogical integrity

**Policy brief:** To preserve the professional agency of educators and support the intellectual and social development of learners, particular attention needs to be given to how AI systems are positioned within pedagogical decision-making processes. As AI technologies become more deeply embedded in educational practices, concerns have been raised that extensive automation may unintentionally limit opportunities for critical reflection, contribute to the erosion of professional expertise, or affect the relational dynamics between educators and learners. Insights emerging from stakeholder discussions suggest that maintaining a clear role for human judgement remains central to ensuring that AI functions as an augmentative tool, reinforcing, rather than displacing ethical, contextual, and emotionally informed pedagogical practice.

**Implementation strategy:** In order to strengthen human-centred governance of AI in education, international policy frameworks could give greater visibility to the principle of human oversight across AI-supported educational processes. Such guidance could emphasise that decisions related to assessment, learner placement, or monitoring are designed to remain open to human review and interpretation by qualified professionals. At institutional level, training programmes and policy instruments could incorporate guidance on the pedagogical mediation of AI generated recommendations, supporting educators in critically contextualising algorithmic outputs. In parallel, AI systems developed for educational use could increasingly include indicators of uncertainty or confidence, enabling educators to recognise the scope and limitations of automated recommendations and to exercise informed professional judgement accordingly.

## Promote accessible, multimodal AI systems to ensure equity in AI supported learning across Europe

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**Policy brief:** To reduce the risk of new forms of exclusion associated with the use of AI in education, particular attention needs to be given to the accessibility and inclusiveness of AI-powered learning systems. As AI generated recommendations increasingly mediates learning processes, its pedagogical value is closely linked to learners' ability to access, interpret, and act upon it. Experiences emerging from augMENTOR pilot activities suggest that learners in special education settings, as well as adolescents facing literacy-related challenges or limited language proficiency, may not fully benefit from AI generated recommendations without additional forms of human mediation. In such cases, the absence of accessibility-oriented design could unintentionally reinforce existing educational and digital inequalities. Within this context, international policy discussions could increasingly frame accessibility-by-design and multimodal recommendations as core conditions for the responsible and inclusive use of AI in education, in alignment with broader European priorities on ethical AI, disability inclusion, and digital equity.

**Implementation strategy:** To ensure more inclusive AI-enabled learning environments, international and European policy frameworks could place stronger emphasis on accessibility and universal design principles when shaping guidance on AI in education. Such approaches could encourage closer alignment with existing regulatory and strategic instruments addressing accessibility, inclusion, and ethical digital transformation. At an operational level, reference frameworks or technical guidance could point towards the integration of features such as text-to-speech functionality, compatibility with assistive technologies, simplified language options, multilingual interfaces, and visual representations of learning progress. Large-scale pilot initiatives could also be encouraged to document systematically how accessibility features are implemented in practice and to identify areas where learners continue to rely on human mediation, contributing evidence to inform future policy refinement. In parallel, public funding instruments could increasingly prioritise demonstrable commitments to accessibility and inclusive design, supporting AI solutions that promote broad participation alongside pedagogical innovation.

## Advancing future-oriented STEM Education through 21st century skills and explainable AI

**Policy brief:** Strengthening STEM education is a global priority as education systems adapt to rapid technological change, evolving labour-market demands, and increasing social complexity. Beyond expanding STEM provision, there is a growing need to improve the quality, relevance, and inclusiveness of STEM learning. Evidence from the augMENTOR project verifies that effective STEM education needs to intentionally integrate 21st century skills such as critical thinking, creativity, communication, and collaboration (4Cs) within flexible, learner-centred pedagogical frameworks. Explainable and ethically grounded AI can support this transformation by enabling personalised learning pathways and formative assessment for skills, supporting educators' judgement, and aligning STEM curricula with

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real-world and workplace requirements. International policy frameworks could therefore integrate the use of AI-boosted platforms such as augMENTOR as a vehicle to promote STEM education strategies that combine advanced digital skills, inclusive design, educator empowerment, and strong governance to ensure sustainable and equitable learning outcomes.

**Implementation strategy:** International policymakers are encouraged to support the adoption of interoperable and LMS-independent AI systems that support skills development within STEM education across schools, vocational education and training, higher education, and lifelong learning. Sustained investment in professional development for STEM educators is essential to enable meaningful interpretation of AI-supported insights and their translation into pedagogical practice. Education providers should be empowered to co-design flexible and sector-relevant STEM learning pathways in cooperation with industry and social partners, including the use of micro-credentials for upskilling and reskilling. Finally, policy action could strengthen governance frameworks that ensure transparency, ethical data use, and long-term infrastructure sustainability, enabling STEM education systems to remain resilient, inclusive, and responsive to future skills needs.

## Promote sustainability and digital sovereignty in AI-Enabled education

**Policy brief:** To ensure that the adoption of AI in education aligns with long-term sustainability goals and respects institutional and national autonomy, growing attention needs to be given to the environmental and infrastructural implications of AI-driven educational systems. As AI technologies increasingly rely on energy-intensive computational processes and external cloud infrastructures, concerns have emerged regarding their carbon footprint, resource consumption, and dependence on non-European technological providers. Reflections raised during international policy workshops, highlighted that without explicit sustainability and sovereignty considerations, AI integration in education may place additional pressure on already resource-constrained educational systems and limit strategic control over data, infrastructures, and pedagogical priorities. Within this perspective, sustainability and digital sovereignty could be increasingly framed as complementary dimensions of responsible AI use in education, supporting both environmental responsibility and long-term system resilience at international level.

**Implementation strategy:** In order to support a more sustainable and resilient integration of AI in education, policy frameworks could gradually place greater emphasis on the environmental implications of large-scale AI adoption. Such approaches could encourage the consideration of environmental impact assessments when planning or procuring AI-powered educational systems, alongside the inclusion of sustainability-related indicators

within existing quality assurance processes. In parallel, AI developers and providers could be incentivised to prioritise the design of energy-efficient and resource-conscious solutions that are well aligned with the needs and capacities of educational settings. At system level, the exploration of shared or federated infrastructure models could help minimise unnecessary duplication of computationally intensive resources. Finally, public funding mechanisms could increasingly recognise and support initiatives that demonstrate thoughtful, sustainable approaches to AI design, deployment, and long-term use in education.

## 5.2 Policy briefs for stakeholders and educational policy makers at NATIONAL level

**Strengthen national teacher training frameworks to build AI literacy and competence among educators**

**Policy brief:** Findings emerging across augMENTOR pilot implementations indicate that, while educators increasingly engage with AI-supported learning environments, many continue to experience uncertainty when interpreting AI-generated insights and recommendations. This challenge does not appear to stem from resistance to technology, but rather from limited opportunities to develop the conceptual and interpretive competences needed to translate data into pedagogically meaningful action. When educators are unfamiliar with the basic logic of AI systems, the assumptions behind indicators, or the ethical considerations surrounding automated recommendations, the pedagogical value of AI input may remain under-realised. These observations suggest that existing national approaches to teacher education and professional development may not yet fully reflect the emerging demands associated with AI-supported teaching and learning. Within this context, national policy discussions could increasingly consider how AI literacy, understood as the ability to interpret, contextualise, and critically engage with AI-generated insights, might be more systematically embedded within teacher-training frameworks, supporting responsible, reflective, and pedagogically grounded use of AI in education.

**Implementation strategy:** In order to strengthen educators' capacity to engage meaningfully with AI-supported pedagogical tools, national education strategies could explore the gradual integration of AI-related competences within existing teacher education and professional development structures. Such integration might involve the enrichment of teacher standards and continuous professional development frameworks with components focusing on the interpretation of learning analytics, foundational principles of AI systems, and ethical and pedagogical considerations related to automated

recommendations. National teacher-training institutes could collaborate with higher education institutions to develop flexible learning opportunities, such as short courses, addressing AI-supported pedagogy in practice. At school and institutional level, policies could encourage the allocation of time and access to practical resources that support educators in engaging with these learning opportunities. In parallel, national digital education strategies could articulate shared expectations regarding AI literacy within institutional training cycles, while partnerships with educational technology providers could increasingly emphasise transparent documentation, educator-oriented explainability features, and sustained technical support. Through such coordinated and supportive measures, national systems could create the conditions for educators to develop the interpretive and ethical competences needed to engage confidently and responsibly with AI in teaching and learning.

**Promote tools that increase trust in AI generated recommendations through explainability features**

**Policy brief:** While many learners reported that recommendations and evaluation were helpful, some responses raised concerns regarding objectivity, standardisation, or unclear criteria (e.g., recommendations perceived as "somewhat standardised"). This suggests that even positive experiences may be accompanied by questions about how recommendations are generated and what it is based on, particularly when learners cannot easily identify the underlying assessment logic. These findings indicate that national "AI in education" approaches may benefit from increased emphasis on transparency and criteria communication, so that AI-supported assessment and recommendations reinforce trust and pedagogical legitimacy.

**Implementation strategy:** National policy frameworks could encourage institutions to use tools that accompany AI generated recommendations with clear explanations and short interpretive notes that connect recommendations to learning objectives. Institutional guidance could also support educators in clarifying where AI generated recommendations end and where human grading and pedagogical judgement begins. In addition, national standards for AI-enabled learning tools could increasingly value explainability features (e.g., criteria highlights, rationale statements, confidence/uncertainty cues) that enable learners to interpret recommendations as fair, meaningful, and educationally grounded.

**Strengthen usability, and technical reliability as conditions for pedagogical benefit**

**Policy brief:** Learners frequently described augMENTOR as friendly, easy to navigate, fast, and supportive, suggesting that usability can significantly influence the perceived value of AI systems in learning. At the same time, some comments point to practical barriers, mainly

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at the early stages, such as difficulties locating recommendations, occasional system "freezing", or limitations in tracking study time through the LMS. These experiences indicate that the pedagogical benefit of AI-supported learning may be closely tied to reliable technical performance and intuitive interaction design. When access to recommendations is complicated, or when system behaviour appears inconsistent, learners may disengage even if the recommendations content itself is valuable.

**Implementation strategy:** National-level quality expectations for AI-supported learning environments could increasingly include usability and reliability criteria, by encouraging institutions to standardise performance and usability tests before scaling. National support mechanisms could promote the use of user-centred design and iterative improvement cycles (including learner feedback loops) as part of implementation.

**Align regulatory frameworks with classroom realities through practical implementation guidance**

**Policy brief:** To enhance the practical relevance of AI-related regulatory frameworks in education, increased attention may be needed to how policy intentions are translated into everyday pedagogical and institutional practices. Insights emerging from stakeholder exchanges indicate that educators and institutions often encounter uncertainty when attempting to interpret regulatory requirements in relation to concrete teaching activities, assessment practices, data use, and internal workflows. In the absence of clear, practice-oriented guidance, regulatory frameworks may be experienced as abstract reference points rather than as supportive instruments for responsible and effective AI use. Within this context, national-level policy approaches could place greater emphasis on bridging regulatory objectives with the realities of classroom practice, institutional capacity, and sector-specific constraints.

**Implementation strategy:** To support this alignment, national authorities could consider developing structured implementation guidance tailored to different educational contexts, such as schools, universities, and vocational or adult training providers. This guidance might take the form of a national "AI in Education Implementation Handbook", offering concrete examples, workflow scenarios, and step-by-step considerations that illustrate how regulatory principles can be operationalised in teaching, assessment, data governance, and quality assurance processes. In parallel, national support mechanisms, such as dedicated helpdesks or advisory services could be explored to provide ongoing consultation, respond to context-specific questions, and support institutions in navigating compliance while maintaining pedagogical flexibility. Through such supportive measures, regulatory

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frameworks could become more actionable, coherent, and responsive to the realities of educational practice.

## 5.3 Policy briefs for educational organisations, educational associations, educators & trainers

**Position AI as a pedagogical companion that supports, rather than replaces, human judgment**

**Policy brief:** Evidence emerging across the augMENTOR pilots (including EASD, IASIS, and UPATRAS) suggests that AI-generated recommendations is experienced as most valuable pedagogically-wise when it functions as a starting point for dialogue, and reflection, rather than as a definitive or automated judgement. Educators reported that learners frequently sought clarification of recommendations, while teachers used AI outputs to initiate reflective discussions, support goal-setting, and provide personalised scaffolding. These practices indicate that the educational value of AI lies less in automated decision-making and more in its capacity to surface patterns, structure recommendations, and inform human-led pedagogical reasoning. Within this perspective, educational organisations and professional communities could increasingly frame AI systems as pedagogical companions that complement instructional practice, while ensuring that human judgement, contextual awareness, and relational pedagogy remain central.

**Implementation strategy:** To support this positioning in practice, educational organisations and associations could explore ways to integrate AI recommendations in existing pedagogical practices through structured, human-centred approaches that reinforce the educator's agency. This may include embedding short interpretive routines, such as guided class discussions, reflective prompts, or learning journals, within learning cycles to help learners make sense of AI-generated insights. Professional development activities could place greater emphasis on hybrid pedagogical approaches that combine AI outputs with dialogue, collaborative learning, and formative assessment practices. In addition, teaching teams could be encouraged to co-develop shared protocols clarifying when and how AI recommendations are discussed with learners, including processes for addressing recommendations that require contextualisation or professional judgement. At institutional level, these principles could be reflected within teaching and learning strategies, codes of practice, and evaluation frameworks, reinforcing a shared understanding of AI as a supportive pedagogical resource rather than a substitute for human expertise.

**Use AI recommendations to strengthen continuous, iterative learning cycles**

**Policy brief:** Findings from the augMENTOR pilots suggest that AI mentor tools are most beneficial when they are thoughtfully integrated into the regular rhythm of teaching and learning, rather than applied only after a course has concluded. Educators valued access to timely, clear, and manageable insights that could support formative assessment and early awareness of learner needs, signal potential disengagement, and inform small adjustments to pacing or workload. Used in this way, AI has the potential to support learning as a continuous process, helping to structure activities into shorter cycles that encourage positive study habits and reduce cognitive overload, particularly in hybrid and asynchronous learning environments.

**Implementation strategy:** Institutions are encouraged to promote formative assessment and gradually incorporate iterative feedback loops into course design, supported by AI tools. These may include brief AI generated engagement summaries for educators, short progress oriented messages for learners, and planned opportunities for mid-week reflection or adjustment. Course teams can identify regular checkpoints where AI generated recommendations inform tutoring, activity refinement, or targeted scaffolding. At a broader level, associations and training providers may support this approach by developing adaptable templates for AI-assisted instructional cycles suitable for diverse contexts, including MOOCs, blended learning, adult education, and teacher training programmes.

## Expand recommendations beyond learners to include course design recommendations for educators

**Policy brief:** A recurring theme emerging from educators relates to the potential value of recommendations that address not only learner performance, but also the structure and pedagogical design of courses. Reflections from practice suggest that learner progress, particularly with regard to the development of transversal skills, is closely shaped by the quality of task design, the coherence of scaffolding, and the sequencing of learning activities established by teaching teams. Within this context, recommendations mechanisms that extend to course-level design features could play a constructive role in supporting reflective teaching practice and ongoing pedagogical improvement, while also helping to avoid an overemphasis on learner-related explanations for challenges that may be rooted in instructional design.

**Implementation strategy:** Educational organisations could increasingly encourage the use of tools that provide educator oriented insights into course design and delivery. Such insights could include identifying which activities facilitate sustained engagement, where learners tend to disengage, and how workload accumulates across the semester. Educational associations could support this effort by offering practical models for

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incorporating such insights into course review processes (e.g., structured reflection meetings, redesign checkpoints, shared templates for interpreting course-level indicators). Over time, teaching teams could integrate course-design recommendations into internal quality assurance cycles, ensuring that AI-supported analytics contribute to pedagogical refinement and curriculum enhancement, rather than serving primarily as mechanisms for learner monitoring.

## Align AI insights with authentic pedagogy and 4Cs development

**Policy brief:** For AI-supported recommendations to contribute meaningfully to teaching and learning, it is important that they extend beyond surface-level quantitative indicators, such as clicks, time spent, or page views, and align more closely with authentic educational aims, including skills development. Experiences from the implementation of augMENTOR indicate that while quantitative data can provide useful insights, it may not sufficiently capture the qualitative dimensions of learning processes and, if presented without appropriate context, may lead to ambiguity or misinterpretation. Within this perspective, grounding AI generated recommendations to a sound pedagogical framework and clearly defined learning competencies can help ensure that they support pedagogical intentions and reflect the depth and quality of learner engagement rather than only observable activity patterns.

**Implementation strategy:** Educational organisations could consider adopting a pedagogy-first approach, whereby the design and use of AI tools are guided primarily by curricular goals and pedagogical frameworks. This may involve mapping learning activities to specific competencies, such as creativity in design tasks or collaboration in group-based activities and integrating rubric-based assessment into analytic processes. Professional development initiatives could support educators in designing and assessing competence-oriented tasks whose outcomes can be meaningfully interpreted by AI systems. At institutional level, expectations could be articulated for AI-enabled platforms to present recommendations that synthesise qualitative and quantitative indicators in transparent and interpretable ways, and that are explicitly linked to intended learning outcomes and pedagogical frameworks. Periodic internal review processes could further help ensure that AI generated recommendations contribute to deeper learning and reflective practice, rather than focusing predominantly on task completion or platform interaction.

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# 6 Conclusion

This final policy brief brings together the key lessons of the augMENTOR project and outlines the conditions under which AI can be integrated into education in a responsible, pedagogically meaningful, and sustainable manner. Evidence from the project's pilots, technical development, and multi-level policy engagement confirms that AI can enhance personalised learning, formative assessment, and reflective instructional design when it is embedded within transparent architectures, aligned with validated pedagogical frameworks, and governed through clear human oversight. At the same time, the findings underline that AI does not generate educational value on its own; its impact depends on educators' interpretive capacity, the quality of course design, and the institutional contexts in which it is deployed.

The policy briefs and implementation strategies presented across international, national, and institutional levels converge around a set of shared priorities: strengthening AI literacy and interpretive competence among educators and learners; ensuring accessibility, inclusion, and language equity; safeguarding professional judgement and pedagogical integrity; aligning AI insights with sound pedagogical framework, competency-based curricula and transversal skills; and promoting open, interoperable, and sustainable digital infrastructures. Together, these priorities point towards a model of AI adoption that supports educational quality and equity, rather than efficiency alone.

As augMENTOR concludes, its outcomes provide a practical and evidence-based reference for future European initiatives in AI-enabled education. Sustained progress will require continued investment in teacher education, the institutionalisation of governance mechanisms for trustworthy AI, the refinement of explainability and accessibility standards, and long-term support for resilient digital ecosystems. By grounding innovation in human-centred, ethically robust, and pedagogically grounded principles, the augMENTOR project demonstrates that the responsible integration of AI in education is both achievable and necessary, offering a foundation upon which European education systems can continue to build inclusive, transparent, and high-quality AI-enhanced learning environments.

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# Annex I

## General feedback

In summary, the analysis of the augMENTOR profiles reveals distinct strengths and weaknesses across cognitive and 21st-century skills. The analysis of the performance data reveals distinct strengths and weaknesses across the IASIS profiles in relation to the course's cognitive and 21st-century skill demands. IASIS_A learners show solid collaboration and communication skills but require support in cognitive and creative domains. IASIS_B learners demonstrate strong cognitive and critical thinking abilities but need targeted development in communication. IASIS_C learners excel in autonomy, collaboration, and critical thinking but have room for growth in communication and creativity. These patterns align with their characteristic profiles and highlight specific educational needs within the course context.

The proposed policies, grounded in the TESA framework, address these needs by recommending tailored course designs and educator strategies that scaffold cognitive development, enhance creativity, and foster communication and collaboration. By integrating technology-augmented activities, formative assessments, and reflective practices, the policies aim to improve learner engagement and skill acquisition. The anticipated outcome is a more inclusive and effective learning environment that supports the diverse profiles of mental health professionals, ultimately enhancing their professional competencies and readiness for real-world challenges.

## Discussion about learners' profiles

**augMENTOR profile: IASIS_A**

**Characteristics:** Solid interpersonal and problem-solving skills, grounded self-awareness, and steady but improvable academic performance.

**Description:** The IASIS_A profile reflects learners who demonstrate notable strengths in communication and problem-solving, with a reliable sense of autonomy and relatedness. Their communication skills and time management are considered solid, and are confident that they perform 'quite well' in these areas. A strong awareness and inclusion of minority groups in daily interactions is also a characteristic, suggesting a thoughtful and socially conscious disposition. Problem-solving skills are a clear asset, consistently rated positively. Autonomy and competence are present at medium to high levels, and relatedness-how connected they feel to others-is particularly strong, with most learners in this group scoring in the high category. However, academic indicators show moderate outcomes. Creativity and cognitive performance fall into the average range while collaboration is somewhat

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stronger, suggesting that learners with this profile work well in group contexts. Critical thinking scores are modest, and communication grades,

**augMENTOR profile: IASIS_B**

**Characteristics:** Well-rounded, confident learners who not only excel academically but also exhibit social awareness and a strong sense of belonging.

**Description:** The IASIS_B profile represents learners with a more robust and consistent performance across most domains. Self-assessments are generally confident, mostly considering communication and time management skills at the highest levels. Deep commitment to inclusivity is portrayed, leading in ratings for the inclusion of minority groups, and demonstrating excellent problem-solving capabilities. These learners also perceive the thematic content of their courses as highly helpful, suggesting they are both engaged and benefiting from the structure. Autonomy and competence levels are high, and demonstrate strong connections to their peers. Academically, learners that fall under this profile perform well, with creativity and cognitive skills both well above average. Their collaboration skills are solid, critical thinking is well-developed, and their communication grades align with their self-perception, also averaging well above average.

**augMENTOR profile: IASIS_C**

**Characteristics:** High autonomy, intellectually capable individuals who thrive in collaborative and higher-order thinking tasks, positioning them as leaders in both academic and social-emotional domains.

**Description:** The IASIS_C profile corresponds to learners with high performance across several key indicators. Learners in this profile showcase strong creativity, with the high median scores, also excelling in critical thinking and communication-both in self-assessment and in graded performance. Autonomy is the most developed, with the greatest number reporting 'very high' levels, and their sense of competence and relatedness is equally strong. Cognitive performance is solid, averaging quite above average, and collaboration is particularly impressive. While time management and communication self-assessments are good, and problem-solving abilities are reliable, their inclusion of minority groups is moderate. Learners under this profile tend to find the thematic content helpful.

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## Insights about performance

**#1 Learners with solid interpersonal and problem-solving skills, grounded self-awareness, and steady but improvable academic performance.**

**(augMENTOR profile: IASIS_A)**

**Analysis:** The IASIS_A profile demonstrates moderate cognitive skills with scores ranging from 58.3 to 73.0, showing steady but improvable academic performance. Their creativity scores are relatively balanced but slightly lower in some areas compared to other profiles. Collaboration and communication skills are strong, with scores mostly above 70, reflecting solid interpersonal skills. Critical thinking is also well developed but shows room for growth.

**Key Observations:**

- Strengths: Collaboration, Communication, Critical Thinking
- Weaknesses: Cognitive skills in some areas, Creativity in certain dimensions

**#2 Learners with well-rounded, confident learners who not only excel academically but also exhibit social awareness and a strong sense of belonging.**

**(augMENTOR profile: IASIS_B)**

**Analysis:** IASIS_B learners show the highest cognitive and critical thinking scores among the profiles, indicating strong academic and analytical capabilities. Creativity and collaboration scores are also high, supporting their well-rounded and confident learner characteristics. Communication skills are solid but slightly lower than collaboration and critical thinking.

**Key Observations:**

- Strengths: Cognitive skills, Critical Thinking, Collaboration, Creativity
- Weaknesses: Communication slightly less strong compared to other skills

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**#3 Learners with high autonomy, intellectually capable individuals who thrive in collaborative and higher-order thinking tasks, positioning them as leaders in both academic and social-emotional domains.**

**(augMENTOR profile: IASIS_C)**

**Analysis:** IASIS_C learners exhibit high autonomy and excel in collaboration and critical thinking, with some of the highest scores in these areas. However, their cognitive skill scores are slightly lower compared to IASIS_B and IASIS_A, and creativity scores show variability. Communication skills are adequate but not as strong as collaboration.

**Key Observations:**

- Strengths: Collaboration, Critical Thinking, Autonomy
- Weaknesses: Cognitive skills, Communication, Creativity in some dimensions

## Policy recommendations for supporting learners

**#1 Supporting learners with solid interpersonal and problem-solving skills, grounded self-awareness, and steady but improvable academic performance.**

🟢 **Policy recommendation:** Future courses should be designed to leverage the strong interpersonal and collaboration skills of IASIS_A learners while providing targeted support to enhance their cognitive and creative abilities. Emphasis should be placed on scaffolded problem-solving activities and creative thinking exercises integrated with collaborative tasks to build confidence and academic performance.

**Guidelines on the recommendation:**

- Scaffolded Cognitive Development: Activities should be structured progressively to build cognitive skills, incorporating real-life problem-solving scenarios relevant to mental health professionals (TESA Phase E: Activities for Implementation in the Classroom).
- Creativity Enhancement Workshops: Creative tasks should be embedded within collaborative projects to stimulate divergent thinking and innovation, supporting the development of creativity alongside communication (TESA Phase E).
- Collaborative Reflection Sessions: Regular peer discussion and reflection activities should be included to strengthen self-awareness and critical thinking, fostering deeper understanding and metacognitive skills (TESA Phase E and Phase F: Metacognitive Activities).

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- Integrated Communication Practice: Communication exercises should be contextualized within professional scenarios to improve clarity and effectiveness, addressing slight weaknesses in expressive skills (TESA Phase E).
- Use of Technology for Interactive Learning: Digital tools facilitating scenario-based learning and peer feedback should be incorporated to engage learners actively and support diverse learning styles (TESA Phase D: Teaching Material and Technology-Augmented e-Activities).

**#2 Supporting learners with well-rounded, confident learners who not only excel academically but also exhibit social awareness and a strong sense of belonging.**

🟢 **Policy recommendation:** Future courses should capitalize on the well-rounded and confident nature of IASIS_B learners by offering advanced challenges that promote leadership in collaborative settings and enhance communication skills. The course design should integrate complex problem-solving tasks and inclusive group activities to maintain engagement and foster social awareness.

**Guidelines on the recommendation:**

- Advanced Problem-Solving Modules: Complex case studies and decision-making scenarios should be included to further develop cognitive and critical thinking skills at a higher level (TESA Phase E).
- Communication Skill Intensives: Targeted modules focusing on professional communication nuances, including active listening and empathetic dialogue, should be implemented to address communication gaps (TESA Phase E).
- Leadership in Collaboration: Group activities should be designed to encourage leadership roles, promoting social awareness and a sense of belonging (TESA Phase E).
- Diversity and Inclusion Simulations: Interactive exercises emphasizing diversity and inclusion should be integrated to deepen understanding and application of these concepts in professional practice (TESA Phase E).
- Formative Assessments with Feedback Loops: Frequent formative assessments with detailed feedback should be used to monitor progress and adapt learning paths (TESA Phase F: Evaluation).

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**#3 Supporting learners with high autonomy, intellectually capable individuals who thrive in collaborative and higher-order thinking tasks, positioning them as leaders in both academic and social-emotional domains.**

🟢 **Policy recommendation:** Future courses should be tailored to support the high autonomy and leadership potential of IASIS_C learners by providing opportunities for self-directed learning and advanced collaborative problem-solving. Emphasis should be placed on enhancing communication skills and creativity through innovative and flexible learning activities.

**Guidelines on the recommendation:**

- Self-Directed Learning Projects: Learners should be encouraged to design and lead projects that integrate course themes, fostering autonomy and higher-order thinking (TESA Phase E).
- Creative Collaboration Tasks: Activities should promote creative problem-solving within teams, leveraging their strength in collaboration and critical thinking (TESA Phase E).
- Communication Skill Development: Structured communication workshops focusing on clarity, persuasion, and professional dialogue should be incorporated to strengthen weaker communication skills (TESA Phase E).
- Peer Mentoring Programs: Opportunities for IASIS_C learners to mentor peers should be created to enhance leadership and social-emotional skills (TESA Phase E).
- Technology-Enhanced Reflective Practices: Use of digital portfolios and reflective journals should be encouraged to support metacognitive development and continuous improvement (TESA Phase F).

## Policy recommendations for supporting educators and course providers

**#1 Supporting learners with solid interpersonal and problem-solving skills, grounded self-awareness, and steady but improvable academic performance.**

🟢 **Policy recommendation:** Educators should be equipped to support IASIS_A learners by implementing structured scaffolding, fostering collaborative learning environments, and integrating creativity-enhancing strategies. Emphasis should be placed on continuous formative assessment and personalized feedback to build confidence and academic skills.

**Guidelines on the recommendation:**

- Structured Scaffolding Implementation: Educators should break down complex cognitive tasks into manageable steps, providing clear guidance weekly (TESA Phase E).
- Facilitation of Collaborative Learning: Group activities should be organized to maximize peer interaction and support, with roles assigned to encourage participation (TESA Phase E).
- Creativity Stimulation Techniques: Educators should introduce brainstorming sessions and creative problem-solving exercises regularly (TESA Phase E).
- Formative Micro-Assessments: Frequent low-stakes assessments should be conducted to monitor progress and inform instruction (TESA Phase F).
- Personalized Feedback Delivery: Timely and specific feedback should be provided to address individual learner needs (TESA Phase F).
- Use of Digital Interactive Tools: Educators should integrate technology that supports scenario-based learning and peer feedback (TESA Phase D and E).
- Encouragement of Reflective Practice: Reflection prompts and discussion forums should be facilitated to enhance metacognitive skills (TESA Phase F).

**#2 Supporting learners with well-rounded, confident learners who not only excel academically but also exhibit social awareness and a strong sense of belonging.**

🟢 **Policy recommendation:** Educators should focus on challenging IASIS_B learners with advanced content and leadership opportunities while supporting communication skill refinement. Strategies should include differentiated instruction, leadership role assignments, and inclusive group dynamics management.

**Guidelines on the recommendation:**

- Differentiated Instruction Design: Educators should tailor tasks to challenge learners appropriately, providing extension activities weekly (TESA Phase E).
- Leadership Role Facilitation: Assign leadership roles in group work to foster responsibility and social awareness (TESA Phase E).
- Communication Skills Coaching: Targeted workshops and role-playing exercises should be scheduled to enhance communication (TESA Phase E).
- Inclusive Group Dynamics Management: Educators should monitor and guide group interactions to ensure inclusivity and respect (TESA Phase E).
- Regular Formative Feedback: Implement ongoing assessments with constructive feedback to guide learner development (TESA Phase F).
- Integration of Diversity Simulations: Use scenario-based activities to deepen understanding of inclusion (TESA Phase E).
- Encouragement of Peer Feedback: Facilitate peer review sessions to build critical evaluation skills (TESA Phase F).

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**#3 Supporting learners with high autonomy, intellectually capable individuals who thrive in collaborative and higher-order thinking tasks, positioning them as leaders in both academic and social-emotional domains.**

🟢 **Policy recommendation:** Educators should support IASIS_C learners by promoting autonomy through self-directed projects, enhancing communication skills, and providing leadership opportunities. Strategies should include flexible learning paths, mentorship facilitation, and technology integration for reflective practice.

**Guidelines on the recommendation:**

- Promotion of Self-Directed Learning: Educators should provide frameworks for independent projects with periodic check-ins (TESA Phase E).
- Communication Skills Workshops: Regular sessions focusing on professional communication should be integrated (TESA Phase E).
- Mentorship Program Coordination: Facilitate peer mentoring roles to leverage leadership strengths (TESA Phase E).
- Flexible Learning Pathways: Allow learners to choose topics or methods within the course framework (TESA Phase E).
- Use of Digital Portfolios: Encourage maintenance of e-portfolios for reflection and assessment (TESA Phase F).
- Collaborative Problem-Solving Facilitation: Organize complex group tasks that require creative solutions (TESA Phase E).
- Frequent Reflective Activities: Implement journaling and discussion prompts to support metacognition (TESA Phase F).

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# Annex II

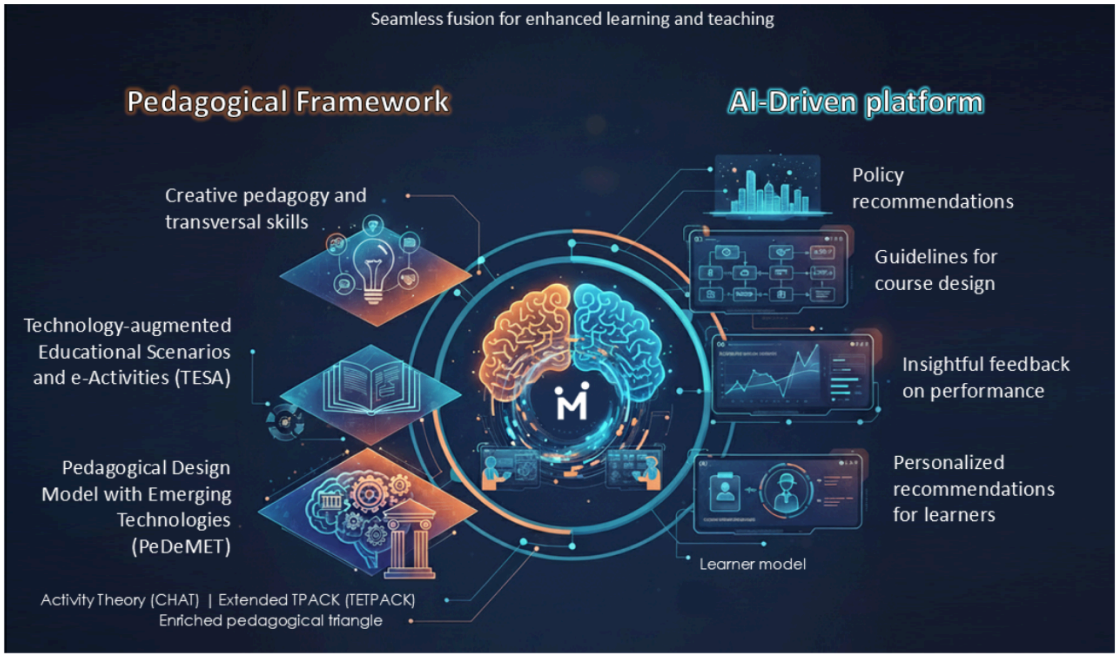
augMENTOR

## Augmented Intelligence for Pedagogically Sustained Training and Education

**Policy Brief 3 - December 2025**

This third and final **augMENTOR** policy brief builds on the project's technical development, pilot implementation, and policy dialogue across Europe. It translates the principles of trustworthy and pedagogically grounded Artificial Intelligence (AI) into concrete guidance drawn from real educational settings, highlighting how AI can meaningfully support teaching, learning, and institutional decision-making.

## THE AUGMENTOR SOLUTION




The augMENTOR solution aims to bring transformative change to education by seamlessly weaving modern technology into the way we teach and learn. It does so by offering a coherent model comprised of a state-of-the-art pedagogical framework and an AI-boosted platform that supports educators and learners throughout the learning process. By mixing new teaching methods with advanced artificial intelligence, augMENTOR helps educators design advanced courses and helps students maximize their potential.

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# THE AUGMENTOR PLATFORM

**augMENTOR** transforms heterogeneous learning data into meaningful, explainable, and pedagogically grounded insights by interweaving learner profiles, information from a dynamic knowledge graph and the Technology-augmented Educational Scenarios and e-Activities pedagogical framework (TESA). It supports the learning process on three different levels:

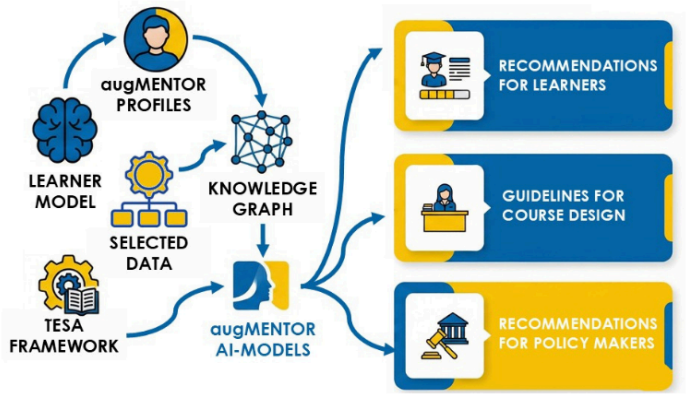
**a. Recommendations for learners** to improve their performance and skills

**b. Course design guidelines for educators** to support them in creating inclusive courses for diverse classes

**c. Recommendations for policy makers** and education stakeholders to inform decision making for curriculum design and future courses.

**Recommendations** are designed by aggregating performance data, the augMENTOR profiles, and course descriptions, while all insights are evidence-based and aligned with the TESA (Technology Enhanced Student Assessment) framework produced by the project. Using all these dimensions, augMENTOR ensures that policies range across diverse educational contexts while being pedagogically sound, transparent and directly linked to real data.

augMENTOR creates detailed **learner profiles** by looking at more than just academic performance. It considers a learner's engagement and in-course activities. It gathers a wide range of information from surveys, grades, and in-course behavioral metrics to create these profiles. This process uses advanced machine learning to group learners with similar characteristics, forming the basis for the predefined augMENTOR profiles.




*augMENTOR core elements and their interconnected structure*

# AUGMENTOR ACTIVITIES

**PILOT IMPLEMENTATION**

**4 Pilot sites**

**~700 Learners and educators involved**

**POLICY MAKING WORKSHOPS**

**8 workshops**

**~ 120 Participants involved**

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# POLICY BRIEFS

## INTERNATIONAL STAKEHOLDERS & EDUCATIONAL POLICY MAKERS

**Promote explainable, pedagogically meaningful learning analytics**
Meaningful AI integration requires interpretable, pedagogically relevant analytics. augMENTOR pilots demonstrateD that opaque data hinders instructional decisions. Consequently, explainable, pedagogically grounded systems are essential to support professional judgement and reflective teaching.

**Safeguard human oversight to prevent deskilling and protect pedagogical integrity**
To preserve professional agency and prevent deskilling, AI must be positioned to augment rather than replace human judgement. Stakeholder insights confirm that maintaining this oversight is essential to ensure AI reinforces ethical, contextual, and emotionally informed pedagogy.

**Promote accessible, multimodal AI systems to ensure equity in AI supported learning across Europe**
Learners with literacy challenges or disabilities often struggle to utilise AI recommendations without human mediation. Consequently, framing accessibility-by-design and multimodal features as core conditions is essential for ensuring equitable, inclusive AI adoption.

**Advancing future-oriented STEM Education through 21st century skills and explainable AI**
Strengthening STEM education requires enhancing quality and inclusivity by integrating 21st century skills within flexible pedagogical frameworks. augMENTOR findings confirm that explainable, ethically grounded AI supports this transformation through personalised learning and formative assessment, suggesting international policy could leverage such platforms to align advanced digital skills with educator empowerment and robust governance.

**Promote sustainability and digital sovereignty in AI-Enabled education**
To align AI adoption with long-term sustainability and autonomy, the environmental impact and reliance on non-European infrastructure needs to be addressed. Stakeholders warn that ignoring these factors strains resources and compromises strategic control, necessitating that sustainability and digital sovereignty be framed as complementary dimensions of responsible, resilient AI education.

## NATIONAL STAKEHOLDERS & EDUCATIONAL POLICY MAKERS

**Strengthen national teacher training frameworks to build AI literacy and competence among educators**
Although educators increasingly use AI, augMENTOR findings indicate that uncertainty in interpreting insights persists, stemming from a skills gap rather than resistance. To prevent the pedagogical value of AI from remaining under-realised, national policies need to systematically embed AI literacy into teacher training, enabling educators to critically interpret and contextualise automated insights.

**Promote tools that increase trust in AI generated recommendations through explainability features**
While learners valued recommendations, concerns regarding standardisation and opaque criteria highlight a critical need for visible assessment logic. Consequently, national AI strategies need to prioritise transparency to ensure that automated assessments reinforce trust and pedagogical legitimacy.

**Strengthen usability, and technical reliability as conditions for pedagogical benefit**
Learners praised the platform's usability, yet technical barriers at the early stages of the pilot like system freezing or navigation difficulties highlighted that pedagogical benefit is inextricably linked to reliability. Consequently, inconsistent performance or complex access can drive disengagement, rendering even valuable recommendations ineffective.

**Align regulatory frameworks with classroom realities through practical implementation guidance**
To ensure AI regulations are practically relevant, policy intentions could be effectively translated into everyday pedagogical practice. Stakeholders indicate that educators often struggle to interpret regulatory requirements, viewing frameworks as abstract reference points rather than supportive instruments. Consequently, national policies could prioritise bridging regulatory objectives with classroom realities through clear, practice-oriented guidance.

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## EDUCATIONAL ORGANISATIONS, ASSOCIATIONS & EDUCATORS

**Position AI as a pedagogical companion that supports, rather than replaces, human judgment**
Evidence from augMENTOR pilots suggests AI recommendations are most valuable as starting points for dialogue rather than definitive judgements. Since educators used these outputs to facilitate reflection and scaffolding, AI's primary value lies in informing human reasoning rather than automation. Therefore, organisations could frame AI as a pedagogical companion, ensuring human judgement and relational pedagogy remain central.

**Use AI recommendations to strengthen continuous, iterative learning cycles**
augMENTOR pilots indicate that AI tools are most effective when integrated into the regular teaching rhythm rather than applied retrospectively. Educators valued timely insights for formative assessment and early intervention, enabling adjustments to pacing and workload. Consequently, AI can support continuous learning by structuring activities into shorter cycles that promote positive habits and reduce cognitive overload.

**Expand recommendations beyond learners to include course design recommendations for educators**
Educators suggest that recommendations should extend beyond learner performance to address course structure and pedagogical design. As learner progress is shaped by task quality and scaffolding, course-level insights can support reflective practice and prevent the misattribution of instructional design issues to learner deficits .

**Align AI insights with authentic pedagogy and 4Cs development**
To ensure meaningful contribution, AI recommendations must transcend surface metrics and align with authentic skills development. As augMENTOR pilots indicate, reliance on quantitative data alone risks ambiguity. . Consequently, grounding AI in pedagogical frameworks is essential to capture the true depth of learner engagement rather than merely observable activity patterns.

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**www.augmentor-project.eu/**

**WANT MORE?**

Visit the extended version of this policy brief to find more information about:

- Dedicated strategies about implementing the presented briefs
- The introduction of AI in educational settings
- Current EU policies and trends.

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