CHALLENGING BIAS IN BIG DATA USER FOR AI AND MACHINE LEARNING

Policy Recommendations for Integrating the 'Ethical AI' Microcredential into Higher Education Admission Pathways

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Authors:		
	Adrian Solomon adrian.solomon@helix-connect.com	Helixconnect Europe
	Andreia Morgado andreia.morgado@impactsci.org	IMPACTsci
	Rúben Comas rubencomas@uib.es	Universitat de les Illes Balears
	M. Begoña Arenas begona.arenas@unir.net	Universidad Internacional de la Rioja
	Nidhi nidhi@btech.au.dk	Aarhus Universitet
	Maria Moreira maria.moreira@isqe.com	ISQ e-learning
	Elise Raittila elise.raittila@muova.fi	University of Applied Sciences

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Contents

1. Executive Summary

This policy recommendation presents a comprehensive plan for the formal recognition and integration of the Erasmus+ CHARLIE project's "Ethical AI" microcredential within higher education and lifelong learning systems across Spain, Portugal, Finland, Romania and Denmark. Aligning with the European Qualifications Framework (EQF Level 4) and existing EU strategies—such as the Digital Education Action Plan, European Skills Agenda and Council Recommendations on microcredentials—the proposal addresses pressing skills gaps in algorithmic ethics and bias mitigation.

The document synthesises the project's objectives, detailing the design of the "Ethical AI" microcredential: six competency units covering algorithmic bias, non-maleficence, accountability, transparency, human rights and practical ethical frameworks. It highlights the microcredential's value to diverse learners (upper secondary education students, VET trainees, adult professionals and higher-education students) by offering flexible, stackable pathways that enhance employability and support interdisciplinary curricula in fields ranging from computer science to law.

An analysis of national policy landscapes demonstrates varied stages of microcredential adoption: Spain and Finland boast structured frameworks, Portugal and Romania are developing formal recognition mechanisms, and Denmark shows emerging institutional initiatives. Drawing on these insights, the recommendations outline targeted advocacy strategies—engaging ministries, accreditation bodies, universities and industry partners—alongside practical steps for pilot integration, accreditation and inclusion in national catalogues.

Finally, the policy recommendation provides actionable guidance on embedding the microcredential into national qualifications frameworks, standardising credit transfer, securing dedicated funding streams, and establishing governance and quality-assurance bodies. Adopting these measures allows policymakers and educational leaders ensure that the "Ethical AI" microcredential gains sustainable recognition, thereby fostering a human-centred, equitable AI ecosystem across Europe.

2. Introduction

Artificial Intelligence (AI) has become deeply embedded in everyday life, from facial-recognition systems deployed in public security to personalised advertising algorithms on social media platforms. Although AI and its subset, Machine Learning (ML), rely on mathematical models, they are susceptible to reproducing and amplifying human biases present in their training data. Social scientists have long studied implicit bias—unconscious associations that can yield discriminatory outcomes. AI systems, however, are not inherently designed to make ethical judgements; they predict outcomes based on existing patterns, thereby risking the reinforcement of systemic discrimination.

With the widespread deployment of AI technologies—often developed by large tech companies driven primarily by profit—there is an urgent need to adopt a human-centred approach that uses AI to address, rather than exacerbate, societal challenges. In its Communications of 25 April 2018 and 7 December 2018, the European Commission set out a vision for "ethical, secure and cutting-edge AI made in Europe," insisting that AI systems must be human-centric and serve the common good by improving human welfare and freedom while mitigating associated risks.

2.1 Purpose and Structure of the Document

In this context, the CHARLIE project was co-funded by the Erasmus+ programme, from 30 December 2022 to 29 June 2025. It was implemented by a consortium of six partners across five European countries—Spain, Portugal, Romania, Finland and Denmark—each bringing complementary expertise in higher education, adult education and youth engagement.

In the scope of the project, three main training products were developed:

- The Higher Education level (EQF 6) Course **"Algorithmic Bias"** and implementation toolkit – for Higher Education students enrolled in Big Data, AI, machine learning, deep learning related

- The "**Ethical AI microcredential"** (EQF 4) for secondary education students, VET trainees and adults, aiming to apply to higher qualification levels relevant for the labour market

- The serious game "**Charlie's house: An Adventure of Discovery**" (EQF 2) targeting Youth 12-18 years - mainly disadvantaged young women to foster representation in STEM from a young age with the objective of potentiate the interest of girls and other young people from disadvantaged groups of STEM in the field of ethics in AI.

This document is a comprehensive policy recommendation developed within the Erasmus+ CHARLIE project, designed to support policymakers, higher education administrators, accreditation bodies, and educational stakeholders in effectively

recognising and integrating the **"Ethical AI" microcredential into European higher education and vocational education systems**.

The primary aim is to advocate for the structured and consistent recognition of this microcredential, highlighting its strategic alignment with current and forthcoming EU policy frameworks, labour market demands, and the increasing need for lifelong learning. Specifically, this policy recommendation is intended for policymakers at both national and European levels, higher education institutions, vocational training providers, accreditation and quality assurance agencies, and other educational stakeholders who influence educational policy and practice.

The document is structured as follows: Section 1 provides an Executive Summary, offering an overview of the key recommendations and strategic value of the microcredential.

Section 2 presents the context, intended audience, and structure of the document.

Section 3 introduces the "Ethical AI" Microcredential, detailing its learning outcomes and competency units, including specific knowledge on algorithmic bias.

Section 4 outlines the broader Policy Context and EU Framework, addressing relevant EU strategies on lifelong learning, digital education, and Artificial Intelligence. It further discusses the European Qualifications Framework, existing policies on microcredential recognition, and practical implementation scenarios.

Section 5 examines the National Policy Landscape across partner countries, providing detailed analyses of Spain, Portugal, Finland, Denmark, Romania, comparing varying stages of microcredential integration and recognition.

Section 6 establishes the specific Case for Recognition of the "Ethical AI" Microcredential, focusing on its benefits for adult learners and alignment with current university curricula and institutional needs.

Section 7 offers concrete Recommendations for Policymakers, proposing actionable strategies to integrate the microcredential into national recognition systems, providing guidance for administrators and policymakers, and suggesting innovative approaches to funding, governance, and accreditation.

Section 8 outlines an Advocacy Strategy, detailing a clear timeline, identification of key stakeholders and communication channels, country-specific recommendations, and strategies for ongoing monitoring and adaptation.

Section 9 provides a brief Conclusion, summarising the critical points and recommendations highlighted throughout the document.

References are provided at the end of the document to support further exploration and validation of the concepts and frameworks presented.

2.2 List of Abbreviations and Acronyms

Acronym	Full Form
A3ES	Agência de Avaliação e Acreditação do Ensino Superior (PT)
AI	Artificial Intelligence
ANECA	National Agency for Quality Assessment and Accreditation (ES)
APDSI	Associação para a Promoção e Desenvolvimento da Sociedade da Informação (PT)
ARACIS	Romanian Agency for Quality Assurance in Higher Education
CCISP	Conselho Coordenador dos Institutos Superiores Politécnicos (PT)
CEDEFOP	European Centre for the Development of Vocational Training
CET	Cursos de Especialização Tecnológica (PT)
CIP	Confederação Empresarial de Portugal (PT)
CRUE	Conferencia de Rectores de las Universidades Españolas (ES)
CRUP	Conselho de Reitores das Universidades Portuguesas (PT)
CUs	Competency Units
DGES	Direção-Geral do Ensino Superior (PT)
EBAU	Evaluación del Bachillerato para el Acceso a la Universidad (ES)
ECTS	European Credit Transfer and Accumulation System
EDCI	European Digital Credentials Infrastructure
EDUFI	Finnish National Agency for Education
ENIC	European Network of Information Centres in the European Region
ENQA	European Association for Quality Assurance in Higher Education
EQAR	European Quality Assurance Register for Higher Education
EQF	European Qualifications Framework
FP	Formación Profesional (ES)
HTX	Higher Technical Examination Programme (DK)
LLP	Lifelong Learning Programme
NAQ	National Authority for Qualification (RO)
NARIC	National Academic Recognition Information Centres
NQFs	National Qualifications Frameworks
RNQ	Romanian National Qualifications Framework
STX	Studentereksamen (General Upper Secondary Education) (DK)
TICE.PT	Pólo das Tecnologias de Informação, Comunicação e Electrónica (PT)
VET	Vocational Education and Training

3. The "Ethical AI" Microcredential

The CHARLIE project's "Ethical AI" microcredential is positioned at EQF Level 4 and is designed to serve a broad spectrum of learners—regardless of age, background or prior qualification—who seek to advance towards higher qualification levels relevant to contemporary labour markets and active civic participation. With **14 hours of student work it correspond to 0.5 ECTS credits.** Grounded in an interdisciplinary approach, this e-learning microcredential emphasises critical reflection, ethical reasoning and practical engagement with algorithmic systems.

3.1 Learning Outcomes and Competency Units

The course is structured around six Competency Units (CUs), each targeting specific skills and knowledge areas essential to ethical AI practice. Upon successful completion, participants will have systematically developed:

Foundational Understanding of Algorithmic Bias
1.1. Knowledge of the definition, sources and manifestations of algorithmic bias.
1.2. Insight into the societal and individual implications of biased algorithms.

Ethical Principle of Non-maleficence in AI
2.1. Awareness of risks and potential harms associated with biased AI systems.
2.2. Strategies to minimise harm and embed non-maleficence in AI development.

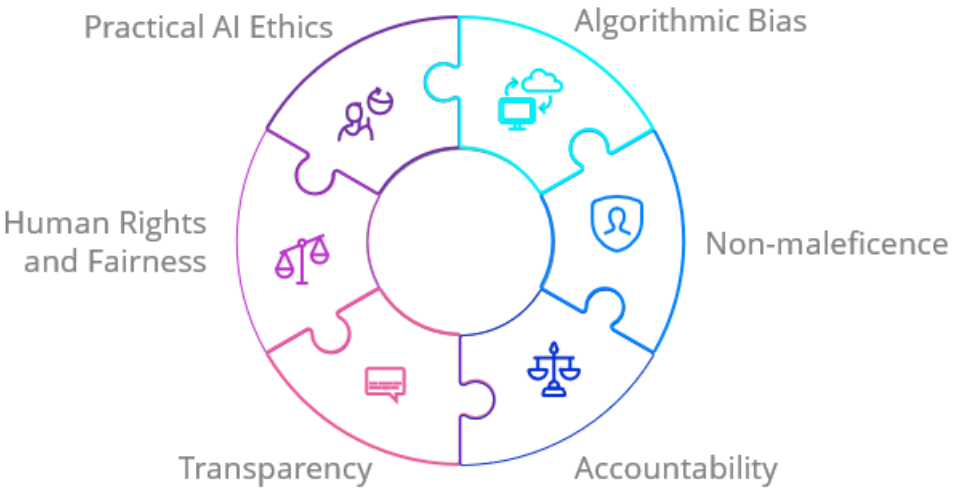
Accountability Frameworks
3.1. Examination of stakeholder roles and responsibilities in AI accountability.
3.2. Familiarity with legal and ethical frameworks governing AI systems.

Transparency in Algorithmic Decision-Making
4.1. Methods and tools to enhance explainability and openness in AI.
4.2. Understanding of the challenges and limitations inherent in transparent design.

Intersection of AI, Human Rights and Fairness
5.1. Analysis of how biased algorithms can infringe on rights—non-discrimination, privacy and freedom of expression.
5.2. Strategies to ensure equity and fairness in AI deployment.

Practical Application of Ethical AI Principles
6.1. Application of leading ethical frameworks and guidelines to real-world scenarios.
6.2. Best practices for stakeholder engagement, interdisciplinary collaboration and ethical development processes.

The corresponding **Competency Units** are:



4. Policy Context and EU Framework

The European Union's strategic commitment to lifelong learning, digital education and artificial intelligence is articulated through a series of interlinked policy instruments designed to equip citizens with the skills and competencies required in a rapidly evolving digital economy

4.1 EU Strategies on Lifelong Learning, Digital Education, and AI

Key strategies are:

EU Artificial Intelligence Act (AI Act 2023): which represents the first comprehensive regulatory framework aimed at ensuring the ethical, transparent, and safe deployment of AI technologies across member states. Specifically, the following elements of the AI Act underscore the critical need for embedding ethical competencies within educational programmes, positioning the "Ethical AI" microcredential at the forefront of educational innovation and regulatory compliance:

- **Recital (56)** explicitly states that AI systems used in education and training must respect fundamental rights, including privacy, non-discrimination, equality, and fairness. The "Ethical AI" microcredential directly addresses these priorities by equipping learners, educators, students, and professionals alike, with the knowledge to identify, assess, and mitigate algorithmic bias, safeguarding the fundamental rights of all individuals impacted by educational AI.

- **Article 5, point 1(f)** explicitly prohibits AI practices that exploit the vulnerabilities of specific groups, including learners. The "Ethical AI" microcredential trains participants to proactively recognise and prevent such exploitative practices. Participants will develop critical competencies to ensure that AI-driven educational tools uphold ethical standards, reinforcing a culture of transparency, accountability, and respect for learner autonomy.
- **Annex III, point (3)** classifies educational or vocational training AI systems as "high-risk," necessitating stringent oversight, including detailed risk assessment, ongoing monitoring, and robust transparency mechanisms. The "Ethical AI" microcredential 's focus on ethical evaluation and critical understanding of AI technologies ensures institutions and individuals remain compliant with these regulatory requirements, positioning them strategically to respond effectively to emerging EU-wide regulations.

European Skills Agenda (2020): Launched to bolster sustainable competitiveness and social fairness, the Skills Agenda aims to offer “a pathway to success” by improving the quality and relevance of skills development. It emphasises microcredentials as scalable solutions to bridge skill gaps, facilitating targeted upskilling and reskilling for both individuals and organisations (European Commission, 2020a).

Digital Education Action Plan (2021–2027): This Action Plan sets out two strategic priorities: fostering a high-performing digital education ecosystem and enhancing digital skills and competencies for the digital era. Under Strategic Priority 2, the Plan explicitly highlights microcredentials and modular learning as essential tools to provide flexible, accessible learning pathways, particularly for adult learners and professionals seeking rapid response to labour-market changes (European Commission, 2020b).

Council Recommendation on Building Bridges for Effective European Higher Education Area (2022): Recognising the role of flexible learning and microcredentials in widening participation, this Recommendation encourages higher-education institutions to establish credit recognition and accumulation mechanisms that support the incorporation of microcredentials into formal degree programmes, thereby promoting permeability between education sectors.

White Paper on Artificial Intelligence – A European Approach to Excellence and Trust (2020) and Coordinated Plan on AI (2021): These documents outline the EU’s vision for an ethical and human-centric AI ecosystem. They advocate for dedicated training pathways in AI ethics and trust, recommending partnerships between academia, industry and policymakers to develop microcredentials that address emerging ethical challenges in AI (European Commission, 2020c; 2021).

Lifelong Learning Programme (LLP) and Erasmus+ (2014–2027): Through Erasmus+ actions, the EU has funded pilot projects and partnerships to design, test and scale microcredentials in various domains, including digital skills and AI ethics. The LLP’s

commitment to inclusive, lifelong learning has fostered best-practice exchanges and mutual learning among member states.

Council Recommendation on Microcredentials for Lifelong Learning and Employability (2022): the European Union has committed to establishing a coherent policy framework to support the development, recognition and portability of microcredentials across member states (Council of the European Union, 2022). The Recommendation urges national authorities to:

- **Develop National Microcredential Catalogues**, creating publicly accessible catalogues that classify microcredentials according to learning outcomes, credit systems (e.g., ECTS) and EQF levels, thereby facilitating transparency and mutual recognition across borders.
- **Establish Quality Assurance Mechanisms** by setting standardized criteria and processes—aligned with existing quality-assurance agencies (e.g., ENQA, EQAR)—to validate the design, delivery and assessment of microcredentials, ensuring academic rigour and professional relevance.
- **Integrate Microcredentials into Formal Qualifications Pathways** enabling the accumulation of microcredentials into larger credentials (e.g., undergraduate degrees or professional certifications), promoting flexible learning pathways and credit recognition within higher education institutions.
- **Foster Stakeholder Collaboration** including ministries of education, accreditation bodies, employers and social partners to co-design microcredential standards that respond to labour-market needs and support skills development.

4.2 European Qualifications Framework and Microcredentials

The **European Qualifications Framework** serves as a pan-European reference framework designed to enhance the transparency, comparability and portability of qualifications across diverse national systems (European Commission, 2017). It includes all formal qualifications—from entry-level certificates to doctoral degrees—and spans the full spectrum of education and training subsystems in the 41 European countries currently engaged in its implementation. The EQF shifts emphasis from input measures (such as length of study) to demonstrable competencies attained at the end of a learning process by framing qualifications in terms of learning outcomes—specifically **knowledge, skills and autonomy-responsibility**. Central to the EQF are its eight reference levels, which describe progressively complex **learning outcomes**, thereby enabling stakeholders—learners, employers, and institutions—to interpret and compare qualifications unambiguously.

National Qualifications Frameworks (NQFs) have been developed by each participating country to map local qualifications to the EQF, thereby ensuring mutual recognition and facilitating learner and labour mobility. As of January 2024, 36 countries have formally 'referenced' their NQFs to the EQF—including Austria, Belgium (Flanders and Wallonia), Denmark, Finland, France, Germany, Italy, the Netherlands, Poland,

Portugal, Romania, Sweden, Switzerland, and Turkey—with the remaining nations expected to complete referencing during 2024–2025.

Microcredentials represent a significant innovation within this qualifications landscape. They are short, focused educational credentials that verify specific sets of skills or competencies acquired through flexible, modular learning experiences, typically ranging from approximately 1 to 15 ECTS credits. Microcredentials are particularly designed to support lifelong learning, enabling learners to upskill or reskill quickly in response to changing labour market demands or emerging fields, such as artificial intelligence and digital technologies. Due to their modular nature, microcredentials offer learners and institutions flexibility and adaptability, making them increasingly valuable within higher education and vocational training contexts.

The EQF has catalysed the development of comprehensive NQFs rooted in learning outcomes, supporting national reforms that make qualifications comparable across sectors and borders. This alignment is particularly significant for microcredentials, which, by mapping explicitly to specific EQF levels, gain enhanced clarity, recognition, and portability beyond their issuing institutions.

The **"Ethical AI" microcredential**, for example, corresponds to EQF Level 4, articulating its complexity and facilitating integration into national frameworks and higher-education access routes. Its workload corresponds to 14 hours of student work, approximately 0.5 ECTS credits. This integration supports wider recognition and transferability of learning achievements, promoting learner mobility and employability across the European Union.

5. National Policy Landscape in Partner Countries

The integration of microcredentials into higher-education systems across Europe represents a deliberate response to shifting educational requirements, emergent labour-market needs and the imperative of lifelong learning. This chapter examines the national policy landscapes of Spain, Portugal, Finland, Romania (including the broader Western Balkans) and Denmark, with particular emphasis on the formal recognition of microcredentials in the context of access to higher-education programmes.

5.1 Spain: Institutionalised Framework for Microcredentials

Spain has proactively embedded microcredentials within its higher-education architecture, positioning itself at the forefront of European policy developments. In 2022, the National Agency for Quality Assessment and Accreditation of Spain (ANECA) published a comprehensive framework to assure the quality of microcredentials in the Spanish university system (ANECA, 2022). These credentials—termed "micro-training"—provide partial accreditation of discrete competencies that may be accumulated into full modules or vocational education and training (VET) qualifications. ANECA's guidelines place micro-training on an equal footing with traditional qualifications and explicitly align them with

EQF Level 4, thereby ensuring compatibility with both national and EU recognition and mobility schemes (González Gago, 2023).

5.2 Portugal: Transitioning Towards a Structured National Approach

Portugal is actively developing a structured approach to microcredentials, even though its higher-education legislation does not yet explicitly address them. Under the 2021 Recovery and Resilience Plan, initiatives such as Impulso Jovens STEAM and Impulso Adultos have facilitated short, targeted learning opportunities, typically ranging from 1 to 10 ECTS, in response to contemporary labour-market demands (Government of Portugal, 2021). While these microcredentials remain institutionally regulated rather than formally recognised, Resolution No 207/2024 of the Council of Ministers mandates the establishment of a National Microcredentials Catalogue. This catalogue will integrate short-duration training into the National Qualifications Catalogue, assign official EQF levels and ensure transparent recognition (A3ES, 2024). Portugal's National Qualifications Framework (QNQ), established in 2010, is already fully aligned with the EQF across Levels 1–8, providing a robust foundation for this formalisation. Institutions such as the Polytechnic of Santarém have begun informally aligning their microcredentials with EQF Levels 4–7, contingent on complexity and credit weight (Government of Portugal, 2021; A3ES, 2024).

5.3 Finland: Strategic Integration with Digital Education Reform

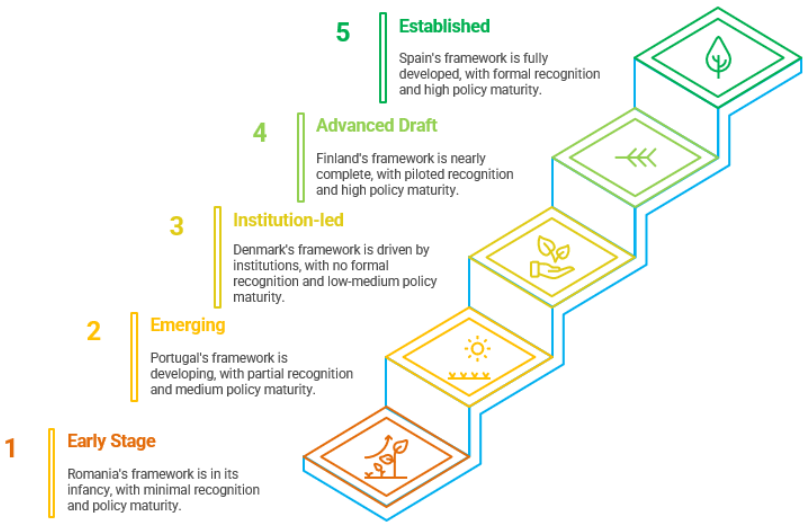
In Finland, microcredentials are integral to the Digivisio 2030 strategy for digital education reform. The draft national framework proposes standardised criteria for quality assurance, transparent credit allocations (1–59 ECTS) and integration into lifelong-learning pathways (Finnish Ministry of Education and Culture, 2024). The Opin.fi platform centralises access to these credentials, fostering learner mobility and ensuring alignment with labour-market needs (Digivisio 2030, 2024). Although Finland's National Qualifications Framework (FiNQF) already mirrors the EQF—where FiNQF Level 4 corresponds to EQF Level 4—explicit legislative recognition of microcredentials is forthcoming, which, for its part, supports the Digivisio 2030 initiative (Finnish Ministry of Education and Culture, 2024; Digivisio 2030, 2024).

5.4 Denmark: Emerging Interest and Institutional Initiatives

Denmark's engagement with microcredentials currently remains largely institution-driven, with an absence of formalized national-level policies. Institutions like Aalborg University have begun developing microcredentials as supplementary educational units, reflecting an increasing institutional awareness of their potential (Danish Accreditation Institution, 2024). Policy discussions initiated by entities such as the Danish Accreditation Institution highlight growing recognition of the value microcredentials offer in flexible, continuous education aligned with labor market shifts (Danish Accreditation Institution, 2024). This emerging discourse suggests Denmark may soon move towards formalizing microcredentials within its national educational framework.

5.5 Romania and the Western Balkans: Established Validation of Non-Formal Learning, Emerging Microcredential Framework

Romania has long emphasised the validation of competences acquired through non-formal and informal learning. Legislation such as Law 253/2003 and Governmental Law 76/2004 established accredited validation centres under the National Authority for Qualification (NAQ), which assess vocational competencies against national occupational standards (Government of Romania, 2003, 2004). Although the Romanian National Qualifications Framework (RNQ) is fully aligned with the EQF across Levels 1–8, it does not yet explicitly include microcredentials—a notable policy gap (Cedefop, 2024). The RNQ's Levels 4–6, however, offer an ideal platform for integrating short-term, competency-based credentials such as the "Ethical AI" microcredential. In the broader Western Balkans, Croatia's 2021 Law on Adult Education formally recognised microcredentials as short learning units tied to a voucher-based upskilling scheme, thereby advancing the objectives of the European Skills Agenda (Cedefop, 2022). Slovenia, Bosnia and Herzegovina, Serbia and Montenegro are also actively defining and implementing microcredential frameworks aligned with European vocational standards (EfVET, 2025).



The national policy landscapes regarding microcredentials in Spain, Portugal, Finland, Romania, and Denmark reveal a spectrum of approaches, from established frameworks to emerging interest. Spain and Finland have developed structured frameworks integrating microcredentials into their higher education systems, while Portugal is transitioning towards a more structured national approach. Romania's existing validation systems for non-formal learning provide a foundation for developing a microcredential framework, and Denmark's institutional initiatives indicate growing engagement with the concept. These developments underscore the importance of aligning national policies with European strategies to promote lifelong learning and employability, supporting the recognition of microcredentials like the "Ethical AI" microcredential in accessing higher education programmes.

6. The Case for Recognition of the "Ethical AI" Microcredential

Recent analyses highlight a surging demand for professionals equipped with ethical AI competencies. The World Economic Forum (2023) identified ethics and compliance as one of the top ten emerging roles in the Fourth Industrial Revolution, reflecting industry recognition that algorithmic fairness and transparency are critical for trust and adoption. Sectors such as finance, healthcare, public administration and criminal justice are particularly sensitive to the reputational and legal risks associated with biased algorithms (European Commission, 2018; González Gago, 2023). Employers now routinely include ethical AI and data governance as core requirements in job descriptions for data scientists, AI engineers and compliance officers, signalling a shift from purely technical capacities to integrated socio-technical skill sets.

6.1 Benefits of Microcredentials for Adult Learners in Higher Education

Microcredentials offer distinct advantages for adult learners seeking to upskill or reskill in a fast-moving labour market. Their flexible, modular design allows learners to engage in bite-sized, stackable learning units without committing to lengthy degree programmes (Council of the European Union, 2022).

One of the primary benefits is their flexible and modular design, which allows individuals to engage in bite-sized learning units without the need to enrol in lengthy degree programs, as highlighted by the Council of the European Union in 2022. This flexibility means that learners can access online modules at their own pace and convenience, fitting their educational pursuits around work and personal commitments.

Microcredentials are also specifically designed to target high-demand competencies, such as algorithmic fairness and accountability. This focus enables learners to apply their newly acquired skills in professional contexts almost immediately, thereby enhancing their effectiveness in the workplace. According to the European Skills Agenda of 2020, such targeted upskilling is essential in today's competitive environment.

In addition to improving skill sets, microcredentials significantly bolster employability and career advancement opportunities by obtaining verifiable, specialized skills, positioning learners for roles that require multidisciplinary perspectives on artificial intelligence, as noted by QQI in 2023.

Moreover, these credentials support the concept of stackability, meaning that they can be accumulated toward formal qualifications. This creates clear learning pathways, allowing learners to progress from short courses to diplomas or even degree programs, thereby facilitating continuous learning and development throughout their careers. This structure not only empowers adult learners but also aligns with the overarching goal of creating a more skilled workforce ready to meet the demands of the future.

6.2 Illustrative Use Cases

Una Europa Micro-credential in Sustainability: Co-developed by the University of Helsinki, University of Bologna and Jagiellonian University, this 10 ECTS programme comprises five MOOCs and integrates as an optional module in Helsinki's Master's in Atmospheric Sciences, exemplifying how microcredentials supplement traditional degrees (Una Europa, 2024).

AMKmicro Project: Coordinated by Haaga-Helia University of Applied Sciences, AMKmicro strengthens universities of applied sciences to design workforce-focused microcredentials, reinforcing continuous learning for working-age adults (AMKmicro, 2023).

Finnish Pilot Initiatives: Seven pilot microcredential modules—ranging from AI Act training at the University of Helsinki to carbon footprint reporting at Seinäjoki UAS—demonstrate institutional agility in offering small competence units ahead of formal national frameworks (Jotpa.fi, 2024).

DISCO SMS project: Coordinated by the Technical Budapest University of Technology, this initiative aims to set up and test a free platform for issuing stackable badges and microcredentials and a short course for teaching staff that will be available in 2026.

Collectively, these factors make a compelling case for the **formal recognition of the CHARLIE project's "Ethical AI" microcredential" when students are trying to access higher education pathways**: it addresses acute skills shortages, offers flexible pathways for diverse learner cohorts and aligns seamlessly with evolving higher-education curricula and institutional objectives.

7. General Recommendations

To consolidate and sustain the recognition of the "Ethical AI" microcredential and to maximise its value for learners, VET providers, higher education institutions, employers, and policymakers across national and European contexts are advised to undertake several strategic actions. A crucial first step is the explicit referencing of the microcredential within National Qualifications Frameworks by policy-makers, mapping it to the European Qualifications Framework at Level 4. Such mapping will ensure transparency, comparability, and consistency of recognition across different educational sectors and national borders, thereby facilitating learner mobility and employability. To ensure smooth integration within existing credit transfer mechanisms, accreditation bodies could also guide education providers to formally articulate the workload and credit value of the microcredential, aligning the standardised European Credit Transfer and Accumulation System (ECTS), and advocating for the use of widely recognised digital credential frameworks such as Europass Digital Credentials, enabling learners to present, validate, and transfer their achievements transparently and securely.

Additionally, incorporating proven credential recognition frameworks developed under Erasmus+ initiatives, such as the European Digital Credentials Infrastructure (EDCI), can significantly enhance the cross-border acceptance of the microcredential.

Institutions adopting the microcredential are recommended to set certification procedures with transparent validation protocols and digital issuance guidelines recommended to maintain credibility and standardisation across institutions and countries.

They are advised also to explicitly include microcredentials in their official programme offerings, indicating their applicability and value within admission criteria, curriculum structures, and progression pathways. Such institutional inclusion will elevate the status of microcredentials, reinforcing their legitimacy as equivalent supplements to traditional qualifications.

With the microcredential being officially recognised at country level, an effort can be made towards a structured roadmap to facilitate cross-border credential recognition. This roadmap should define key milestones, such as harmonising validation practices, training institutional staff on credential verification, and implementing compatible digital platforms for credential recognition and sharing across Europe.

Policymakers should support this roadmap with capacity-building initiatives to ensure effective implementation and are also encouraged to: a) allocate national and EU funds (e.g., Erasmus+, Recovery and Resilience Facility) to support microcredential development, pilot projects and QA capacity building; b) introduce matching-grant schemes that incentivise HEIs and industry partners to co-develop and co-finance microcredential offerings; c) establish a national microcredential coordination body, comprising representatives from ministries, QA agencies, HEIs and industry, to oversee policy implementation and regularly update frameworks; d) implement periodic impact evaluations to assess outcomes and adjust policy accordingly.

The integration of microcredentials into access pathways into higher education systems across Europe reflects a strategic response to evolving educational needs, labour market demands, and the imperative for lifelong learning.

In the following section, we present illustrative country-specific examples of how the "Ethical AI" microcredential could be recognised and implemented in Spain, Portugal, Finland, Romania, and Denmark. These hypothetical scenarios specifically illustrate integration at two critical educational junctures:

- Admission processes into Higher Education pathways.
- Inclusion within Vocational Education and Training programmes aligned with EQF Level 4, serving as effective bridges toward higher education and employment pathways.

SPAIN - Bachelor's Admission

Spanish University, Bachelor's in Informatics Engineering

Scenario:

1. In Spain, admission to Bachelor's programmes relies heavily on the Selectividad (EBAU) national exams. Universities have limited autonomy but can establish complementary merit criteria.
2. The Spanish University integrates the "Ethical AI" microcredential as a recognised extracurricular achievement (méritos adicionales), similar to language certificates or international competitions.
3. Applicants who complete the microcredential receive an additional point, clearly specified in the admission regulations.
4. Information is widely disseminated via official university channels, including detailed instructions for applicants about uploading Europass Digital Credentials for verification.

Added Value:

- Enhances applicant profiles beyond Selectividad results, offering distinct value in highly competitive STEM admissions.
- Aligns the university's admissions process with Spain's National Microcredential Framework (ANECA, 2022), thus boosting institutional prestige.

SPAIN - Integration into Vocational Training

VET provider, FP Técnico Superior en Desarrollo de Aplicaciones Multiplataforma (DAM)

Scenario:

1. Spain's Vocational Training system - Formación Profesional (FP) - clearly aligns qualifications with specific EQF levels, with Técnico Superior mapped to EQF Level 5. However, institutions frequently introduce supplementary learning modules at EQF Level 4 to prepare students transitioning to higher VET or university studies.
2. The "Ethical AI" microcredential is introduced as a complementary module in the final year of DAM, officially recognised as additional training (Formación complementaria).
3. Learners undertake this microcredential digitally through institutional platforms, receiving certification validated through Europass Digital Credentials.
4. The institution explicitly promotes this additional qualification, highlighting its relevance for progression into higher VET or Bachelor's degrees.

Added Value:

- Enhances student readiness and employability, aligning directly with Spain's policy emphasis on digital and ethical competences within vocational education.

PORTUGAL - Bachelor's Admission

Portuguese University, Bachelor's Degree in Data Science

Scenario:

1. In Portugal, the annual admissions to public higher education are centrally organised through the Concurso Nacional de Acesso managed by the Direção-Geral do Ensino Superior (DGES). under the supervision of the Comissão Nacional de Acesso ao Ensino Superior, which defines selection and ranking criteria for candidates.
2. For private institutions admissions occur through their own institutional admission processes. These access paths provide institutions with the autonomy to establish additional selection criteria, making them suitable contexts to integrate microcredentials.
3. The private university explicitly integrates the "Ethical AI" microcredential as a recognised additional qualification within its institutional admission regulations.
4. The microcredential is listed on the university's admission webpage and in institutional guidelines, clearly indicating how it contributes to a candidate's final ranking.
5. Applicants submit their Europass Digital Credential electronically via the institutional admission portal, facilitating verification and transparency.
6. Admissions committees receive clear guidance from the university's Academic Council to consistently evaluate and score the microcredential in combination with secondary school qualifications and other evaluation metrics.
7. The university promotes the inclusion and value of this microcredential through informational sessions, online webinars, and secondary education outreach initiatives.

Added Value:

- Provides additional pathways for applicants, enhancing the attractiveness of Bachelor's programmes by emphasising forward-thinking competencies directly aligned with Portugal's national priorities of digital transformation and lifelong learning.
- Demonstrates responsiveness to emerging EU-level policies (e.g., the AI Act), positioning the institution as a leader in ethical AI education within the Portuguese private higher education sector.

PORTUGAL - Integration into Vocational Training

VET provider, Cursos de Especialização Tecnológica (CET)

Scenario:

1. In Portugal, CETs are Level 5 qualifications under EQF, accessible after EQF Level 4 secondary education. However, complementary modules at EQF Level 4 often serve as bridging courses, preparing students for CET programmes.
2. The microcredential is embedded as a preparatory, optional module at EQF Level 4, offered to secondary education students considering enrolling in CET programmes.
3. Students complete the microcredential digitally, receiving Europass credentials clearly outlining achieved competences.
4. The institution formally recognises this microcredential within its admission guidelines for CET enrolment, awarding extra ranking points to candidates holding this certification.

Added Value

- Clearly aligns with national digital transformation initiatives (Impulso Jovens STEAM), facilitating smoother transitions into specialised technological education pathways (CET).

DENMARK - Bachelor's Admission

Danish University, Bachelor's Degree in Cognitive Science

Scenario:

1. Danish Bachelor's admissions use two main quotas: Quota 1 (based on grades) and Quota 2 (based on holistic assessment).
2. The Danish University explicitly acknowledges the "Ethical AI" microcredential as a valuable factor in Quota 2 admissions, which considers personal motivation, prior relevant experience, and extracurricular competencies.
3. Applicants present their microcredential digitally via Europass, explicitly recognised by Aarhus University's admissions portal.
4. Admissions committees use clearly defined scoring guidelines to weight the microcredential appropriately, reinforcing its value in applicant assessment.

Added Value:

- Supports Denmark's focus on holistic admissions and individual motivation assessment (Quota 2), aligning with Danish educational values on personal development.
- Responds directly to institutional initiatives exploring microcredentials, enhancing Aarhus University's competitive advantage within national higher education.

DENMARK - Integration into Vocational Training

Integration into Upper Secondary (Gymnasium STX or HTX)

Scenario:

1. Danish upper secondary education (STX/HTX) aligns explicitly with EQF Level 4 outcomes, preparing students for higher education.
2. The institution incorporates the microcredential into its HTX curriculum as an elective digital competency module.
3. Students complete this module digitally within the Gymnasium's existing e-learning platform, receiving certification digitally via Europass credentials.
4. Successful completion earns students additional recognition in their upper secondary diploma (Studentereksamen), formally recorded in their study portfolio, and enhancing their candidacy for higher education admission through Quota 2.

Added Value:

- Strengthens HTX's digital literacy and ethical education profile, explicitly aligning with Denmark's national strategy for enhancing digital competencies in upper secondary education.

ROMANIA - Bachelor's Admission

Romanian University, Bachelor's Degree in Automation and Computer Science

Scenario:

1. In Romania, admissions to Bachelor's programmes traditionally rely on the high-school Baccalaureate (Bacalaureat) exam and university entrance tests. However, universities can formally recognise non-formal learning achievements.
2. The Romanian University formally includes the microcredential within its "Recognition of Prior Learning" policy (under Romania's National Authority for Qualification framework).
3. Applicants submit their microcredential electronically through validation centres recognised by Romania's National Qualifications Authority.
4. The university admissions committee integrates these validated credentials as complementary merits, clearly outlining their equivalence in terms of admissions points.

Added Value:

- Reflects Romania's established practice of validating non-formal competencies, thus seamlessly integrating the microcredential within existing frameworks.
- Promotes inclusivity and innovation in higher education admissions, strengthening university alignment with national lifelong learning objectives. education.

ROMANIA - Integration into Vocational Training

Integration into Technological high school

Scenario:

1. Romania's secondary technical education (Liceu Tehnologic) aligns with EQF Level 4, preparing students for entry into VET pathways or higher education.
2. The microcredential is introduced as an additional optional module ("modul de pregătire opțională") in the ICT specialisation's final year curriculum.
3. Students complete the module via blended learning formats, leveraging national validation centres accredited by the Romanian National Authority for Qualifications.
4. Successful students receive formal recognition digitally through Europass, clearly enhancing their portfolio for university or higher vocational education applications.

Added Value: Directly aligns with Romania's policy priority on digital skills enhancement in secondary and technical education, leveraging established national validation frameworks for non-formal learning.

FINLAND - Bachelor's Admission

Finnish University, Bachelor's in Information and Communications Technology.

Scenario:

1. The microcredential is embedded into Finland's national digital education strategy (Digivisio 2030) via Opin.fi, Finland's unified digital education platform.
2. Explicitly referenced in national higher education application systems (Studyinfo.fi), clearly granting applicants additional recognition points.
3. Clear institutional guidelines on credential equivalence ensure applicants easily validate their credentials digitally.

Added Value:

Directly aligns with Finland's strategic national initiative in digital learning and modular education.

FINLAND - Integration into Vocational Training

Integration into ICT vocational qualification programme

Scenario:

- Finnish vocational upper secondary education (ammatillinen koulutus) explicitly aligns with EQF Level 4, preparing students for employment and further education.
- The Vocational College incorporates the microcredential into the curriculum as a digitally delivered optional module within Finland's national education platform (Opin.fi).
- Students receive certification upon completion, digitally validated via Europass Digital Credentials and recorded in national education records.
- Clearly communicates the added value of the microcredential for students transitioning to universities of applied sciences or employment, in line with Digivisio 2030 and PINKO project initiatives.

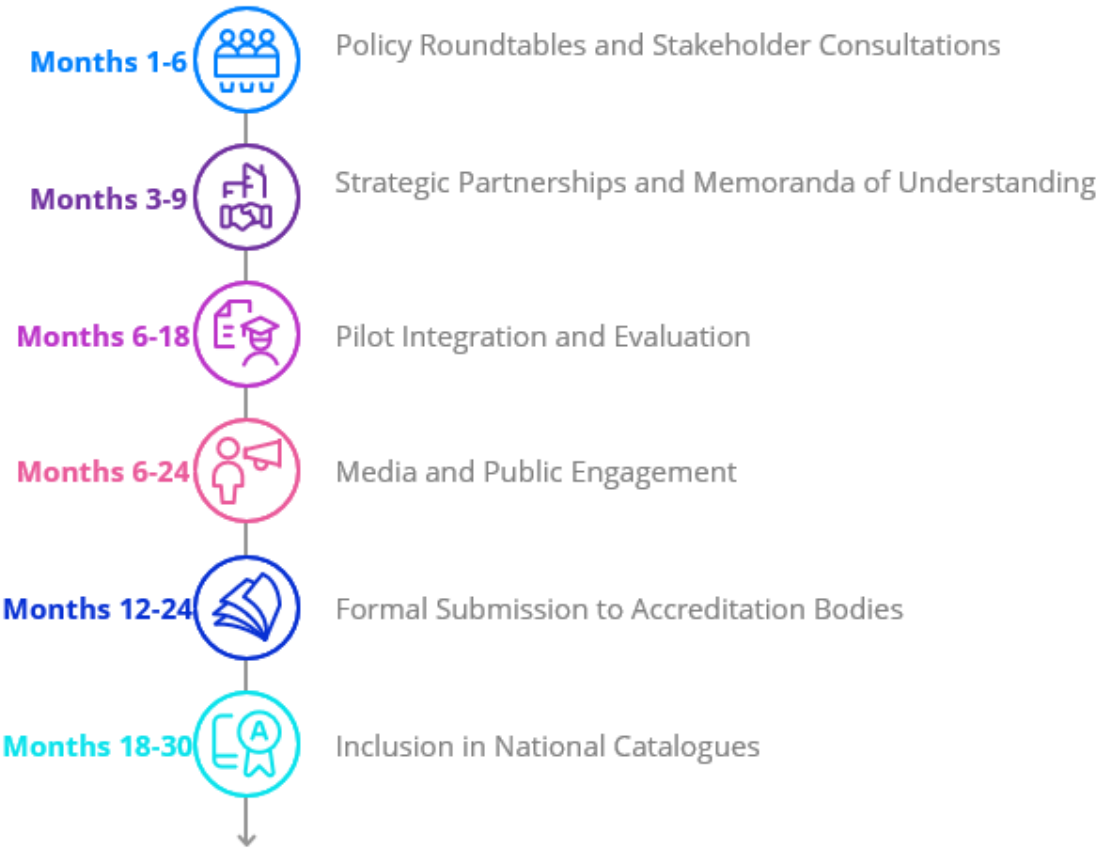
Added Value:

- Explicit alignment with Finland's national policy goals in digital education, fostering clear educational pathways towards higher education and employment, strengthening vocational institutions' strategic positioning within national education reforms.

8. Advocacy Strategy

To ensure the formal recognition of the CHARLIE project's "Ethical AI" microcredential, a coordinated, multi-country advocacy strategy is recommended. This plan sets out practical steps, identifies key stakeholders and channels, proposes timelines, and offers country-specific recommendations.

8.1 Timeline



Policy Roundtables and Stakeholder Consultations (Months 1–6)

- Organise national roundtables with ministries, accreditation agencies, HEI leadership and industry partners in each country.
- Present evidence dossiers (policy papers, pilot data) demonstrating the microcredential's benefits and alignment with national strategies.

Strategic Partnerships and Memoranda of Understanding (Months 3–9)

- Secure MOUs with leading universities, vocational bodies and industry associations
- Establish working groups within existing networks to champion integration.

Pilot Integration and Evaluation (Months 6–18)

- Embed the microcredential in one degree programme per partner HEI as a module or elective.
- Collect learner, faculty and employer feedback; compile impact metrics on upskilling and employability.

Media and Public Engagement (Months 6–24)

- Launch targeted media campaigns (press releases, op-eds in national outlets) timed with pilot milestones.
- Utilise social media channels (LinkedIn, X) and sector events (World Leaders Convention 2025 in Madrid) to disseminate success stories.

Formal Submission to Accreditation Bodies (Months 12–24)

- Prepare and submit accreditation dossiers to national QA agencies (ANECA, A3ES, ARACIS, EDUFI).
- Engage in technical hearings, addressing policy barriers with reference to EU Recommendations and national reforms.

Inclusion in National Catalogues (Months 18–30)

- Work with ministries to reference the microcredential in National Qualifications Frameworks and catalogues (e.g., Spain's Lifelong Learning Framework, Portugal's National Microcredentials Catalogue).
- Align final submissions with upcoming legal reforms (Portugal's RJIES revision, Finland's framework adoption, Romania's RNQ updates).

8.2 Key Stakeholders and Channels

We recommend the following stakeholders to be engaged in the previously described steps:

Government Ministries: Education, Digitalisation and Economic Affairs (e.g., Spain's Ministry of Education; Finland's Ministry of Education and Culture; Portugal's MCTES; Romania's Ministry of Education).

Accreditation and QA Agencies: ANECA (ES), A3ES (PT), ARACIS (RO), EDUFI (FI), Danish Accreditation Institution (DK).

Higher-Education Associations: CRUE (ES), CRUP/CCISP (PT), university consortia in RO and DK.

Industry Partners: Chambers of commerce, tech associations (CIP, APDSI, TICE.PT), AI companies (UiPath, Bitdefender, Microsoft RO).

EU Networks: ENIC-NARIC, CEDEFOP, Erasmus+ project forums.

Media & Public: National newspapers, specialist tech and education publications, professional social networks.

8.3 Country-Specific Recommendations

The following can be integrated into countries activities:

Spain: Leverage Spain's National AI Strategy and Digital Agenda 2025. Target ANECA and CRUE; schedule a policy workshop during the World Leaders Convention 2025 in Madrid. Use high-profile op-eds to build public momentum.

Finland: Align advocacy with Digivisio 2030 pilots. Coordinate with EDUFI to include microcredentials in the forthcoming framework; highlight outcomes from AMKmicro and other pilot initiatives to secure formal adoption.

Portugal: Engage DGES and A3ES under Resolution 207/2024. Form a coalition of CRUP, CCISP and INA to propose the microcredential in the National Microcredentials Catalogue. Showcase UAb's Impulso Adultos success metrics in ministerial briefs.

Romania: Coordinate with ANC and ARACIS to embed the microcredential within RNQ Levels 4–6. Use roundtables with the National Council for Digital Transformation to align with the AI Act. Present EU-funded pilot data to the Ministry of Education.

Denmark: Capitalise on institutional autonomy; partner with Aalborg University for pilot modules. Engage the Danish Accreditation Institution's ongoing discussions to advocate formal policy inclusion; use sector-specific events to demonstrate employer demand.

8.4 Monitoring and Adaptation

It is recommended that a central coordination unit (led by the CHARLIE consortium) would monitor progress through quarterly reports, and include a built-in revision mechanism every 2 years, updating strategies to address emerging barriers (e.g., legislative delays) and capitalising on new opportunities (e.g., EU AI Act adoption). Regular liaison with EU networks will ensure alignment with transnational policies and funding streams.

9. Conclusion

The CHARLIE project's "Ethical AI" microcredential represents a strategic innovation in addressing the urgent need for ethical, human-centred AI competencies across Europe's higher education and lifelong-learning ecosystems. By aligning with EQF Level 4, embedding critical topics—bias mitigation, non-maleficence, accountability, transparency, human rights and practical ethics—and employing flexible, modular pedagogy, the microcredential meets the evolving demands of learners, employers and policymakers.

A comprehensive analysis of national landscapes in Spain, Portugal, Finland, Romania and Denmark reveals diverse policy environments—from mature frameworks to emerging institutional initiatives—underscoring the necessity of tailored advocacy and integration strategies. The proposed multi-phase Advocacy Strategy and Action Plan provides actionable steps, from stakeholder roundtables and pilot integration to accreditation submissions and catalogue inclusion, ensuring coordinated progress towards formal recognition.

Policymakers and accreditation bodies are advised to embed the microcredential in national qualification frameworks, standardise credit transfer mechanisms, secure dedicated funding and establish robust governance and QA structures. University administrators should integrate competency units into curricula, leverage industry partnerships and adopt digital credentialing platforms to enhance accessibility and credibility.

European stakeholders can institutionalise the "Ethical AI" microcredential, equipping current and future cohorts with the knowledge and skills to develop AI systems that uphold fairness, accountability and transparency by adopting this microcredential. Such recognition will not only advance individual careers and institutional missions but also contribute to a more equitable, trustworthy AI ecosystem that aligns with the EU's vision for ethical, secure and people-centred digital transformation.

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