

Teaching Responsible AI Entrepreneurship: Experiences From the Erasmus+ Pathfinder Project

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Abstract: The rapid integration of artificial intelligence in society presents both profound opportunities and urgent challenges for higher education. As future professionals and entrepreneurs will increasingly rely on AI-driven tools, it is essential that universities cultivate AI literacy, critical thinking, and ethical reasoning. In response, this paper presents the design of a new course: AI in Business: Ethics, Applications, and Entrepreneurship, developed under the Erasmus+ Pathfinder project and launched in September 2025. The course is grounded in the UNESCO AI Competency Frameworks, Design Thinking and ENTRECOMP Framework and supports the European Union's Digital Education Action Plan by promoting responsible, human-centered AI integration. Structured around ten thematic modules, the course introduces students to AI ethics, human-centered design, technical applications, and innovation strategies. Delivered online, it leverages group projects, case studies, and real-world problem-solving. A distinctive feature is the use of large language models as learning partners framing AI not merely as a tool, but as a co-creative agent in cognitive and entrepreneurial development. Students work in teams to develop and pitch AI-based business ideas, supported by coaching and expert feedback. The course is informed by a constructivist and sociocultural pedagogical foundation, where knowledge is co-constructed through active engagement and mediated by cultural tools, here, generative AI. It also draws on human-centered design thinking and transformative learning theory, encouraging students to reframe assumptions and design solutions with ethical and societal impact in mind. Though the course is set to end in December 2025, this paper outlines the instructional model, theoretical foundation, and implementation strategy. It offers a scalable, interdisciplinary framework for embedding ethical, inclusive, and innovation-driven AI education within higher education, while empowering educators and students to engage critically and constructively with the evolving digital landscape.

Keywords: AI literacy, Erasmus+, Ethical AI, Entrepreneurship, UNESCO AI framework

1. Introduction

Artificial intelligence is transforming the landscape of higher education, business, and entrepreneurship, emerging as a central driver of innovation and decision-making across all sectors of society (Zouhaier, 2023). Accelerating digitalization, the rise of Industry 5.0, and growing emphasis on sustainability and human-centered innovation are reshaping how knowledge is created, shared, and applied. As future professionals increasingly engage with AI systems to analyze data, generate insights, and design novel solutions, universities are tasked with preparing graduates not only to use these technologies but also to collaborate with them critically and ethically.

This educational transformation is supported by key international policy frameworks. UNESCO's AI Competency Framework for Students (2023) outlines the knowledge, skills, and attitudes needed to engage with AI systems ethically and effectively, emphasising human rights, inclusion, and societal well-being. Similarly, the European Union's Digital Education Action Plan (European Commission, 2020) prioritises the development of digital and AI competences as part of a lifelong learning agenda. Together, these frameworks underscore the urgency of equipping higher education learners with AI literacy, ethical awareness, and innovation capabilities to navigate an increasingly complex and technologically mediated world.

Despite growing interest in AI education, most initiatives remain concentrated within technical disciplines such as computer science and engineering. For non-technical students, particularly those in business, entrepreneurship, and management, AI is often introduced only at a conceptual or strategic level, with limited connection to practical or ethical contexts (Chun and Elkins, 2023). This creates a pedagogical gap: although students increasingly encounter AI-driven decision systems in professional settings, they often lack opportunities to engage with these technologies in ways that foster critical evaluation and ethical application. The challenge lies in teaching AI without requiring coding expertise, while supporting a deeper understanding of how AI systems function, influence decision-making, and shape societal outcomes.

This study addresses that gap by examining the design and implementation of a pilot course, *AI for Business and Entrepreneurship*, delivered at LAB University of Applied Sciences in Finland as part of the Erasmus+ Pathfinder Project (2024–2026). The Pathfinder initiative seeks to enhance AI competences among students

and educators in European higher education through interdisciplinary and ethically grounded teaching methods.

The pilot course was structured as a 5 ECTS online module offered from September to December 2025. It primarily targeted international business students but was also open to participants from technology, healthcare, and design disciplines. The course design integrated three pedagogical frameworks: Design Thinking to guide creative, human-centered problem-solving; the EntreComp Framework to support entrepreneurial skill development; and the UNESCO AI Competency and Ethics Framework to embed ethical reflection and responsible AI literacy.

Methodologically, the study employs a conceptual case study and participatory observation approach, analysing the course's design, structure, and implementation as part of a broader pedagogical experiment in responsible AI education.

The article is structured as follows: Section 2 presents a literature review on AI in higher education, Design Thinking as a pedagogical model, entrepreneurship education through the EntreComp framework, and ethical AI literacy informed by UNESCO's guidelines. Section 3 outlines the methodological approach, explaining how the course was designed and examined as a conceptual case. Section 4 presents findings from the pilot implementation. Section 5 provides discussion and conclusions, relating the findings to ongoing debates in responsible AI education and entrepreneurship pedagogy.

This study contributes to emerging discourse on interdisciplinary AI education by offering a replicable model for embedding AI literacy, ethical awareness, and entrepreneurial competence into applied business curricula. It demonstrates how higher education institutions can respond to the demands of global digital transformation through human-centered, competence-based, and ethically informed AI pedagogy.

2. Literature Review

2.1 AI in Higher Education and Pedagogical Frameworks

Artificial intelligence has become a transformative force in higher education, influencing how institutions teach, assess, and prepare students for an increasingly digital and automated world. Early applications of AI in education focused largely on automation—for example, adaptive testing, grading algorithms, and recommender systems for personalized learning (Zawacki-Richter et al., 2020). More recent developments have shifted toward augmentation, where AI acts as a cognitive partner enhancing creativity, problem-solving, and ethical reasoning. This move from automation to augmentation reflects a paradigm shift: AI is not only a tool to optimize efficiency but also a mediating technology that shapes human thinking, collaboration, and learning itself (Holmes et al., 2024).

The pedagogical implications of this transformation are profound. Integrating AI tools into learning environments requires educators to address new forms of literacy, including understanding how AI systems generate, interpret, and bias information. This has led to a growing recognition of AI literacy as a key educational goal (Tuomi, 2024). AI literacy encompasses not just technical understanding, but also ethical reflection and critical digital citizenship - the ability to interrogate how algorithms affect knowledge production, fairness, and inclusion. Despite the growing adoption of AI in education, challenges persist in developing responsible AI pedagogies that combine technical, ethical, and creative dimensions. Educators still struggle to balance conceptual understanding with practical, interdisciplinary engagement.

2.2 Design Thinking as a Pedagogical Approach

Design Thinking has emerged as a powerful pedagogical methodology for preparing students to navigate complex, uncertain, and innovation-driven contexts. Originally developed within design and engineering fields (IDEO; Brown, 2008), design thinking has evolved into an educational framework for creative problem-solving, emphasizing empathy, iteration, and human-centered innovation. It aligns with constructivist and experiential learning theories, positioning students as active participants who co-create knowledge through exploration, experimentation, and reflection (Liedtka, 2015).

As a pedagogical process, design thinking consists of iterative stages—empathize, define, ideate, prototype, and test—that encourage learners to understand user perspectives, frame problems, generate ideas, and iteratively refine solutions. This cycle supports higher-order cognitive processes such as divergent thinking, metacognition, and reflection (Rauth et al., 2010). In educational contexts, design thinking transforms classrooms into laboratories of inquiry, where failure is reframed as an opportunity for learning.

In recent years, design thinking has been applied in AI and entrepreneurship education, offering a framework for integrating technology with creativity and ethics. For instance, Meinel and Leifer (2021) highlight how design thinking encourages learners to approach emerging technologies with empathy and ethical consideration, enabling “human-centered innovation.” This makes it particularly suited to teaching AI ethics, as it foregrounds human needs, societal values, and responsible design principles.

2.3 Entrepreneurship Education and the EntreComp Framework

Entrepreneurship education has undergone a major evolution over the past two decades, shifting from business plan-oriented training toward competence-based, experiential learning. The EntreComp Framework (Bacigalupo et al., 2016), developed by the European Commission, represents a cornerstone of this shift. It defines entrepreneurship as a transversal competence applicable across professional and social contexts, not limited to the creation of new ventures. EntreComp identifies three main competence areas: Ideas and Opportunities, Resources, and Into Action. These competences support learners in developing a mindset of agency, creativity, and responsibility—qualities essential for navigating the ethical and social dimensions of technological innovation.

Pedagogically, EntreComp aligns closely with project-based and experiential learning models, where students learn by developing and testing real ideas. Lackéus (2020) emphasizes the role of value creation - learning through generating value for others as the central mechanism of entrepreneurial education. This aligns with constructivist principles, as learners develop understanding through authentic problem-solving and reflection.

2.4 The UNESCO AI Competency Framework: Ethics, Literacy, and Values

The UNESCO AI Competency Framework for Students (2023) represents one of the first comprehensive global efforts to define what learners should know, do, and value in relation to AI. The framework emphasizes that AI education is not merely technical but ethical, civic, and reflective. It calls for cultivating critical digital citizenship, the capacity to question algorithmic systems, recognize bias, and make responsible choices in human-AI interaction.

Integrating UNESCO’s framework into higher education supports curricula that bridge technology, ethics, and social values. Recent scholarship suggests that embedding UNESCO’s competencies fosters ethical reasoning and empathy among students (Holmes, 2024).

3. Methodology

3.1 Research Design and Approach

This study adopts a conceptual case study design (Merriam, 1998; Yin, 2018) focusing on the design and implementation of an innovative course rather than its evaluation outcomes. The case represents a pedagogical innovation in AI education developed within the Erasmus+ Pathfinder Project (2024–2026), a European initiative supporting ethically grounded, competence-based AI curricula.

The research is descriptive and interpretive, examining how three frameworks: Design Thinking, EntreComp, and UNESCO AI Competency were translated into pedagogical practice. It follows design-based research (DBR) principles (Reeves, 2006; Wang & Hannafin, 2005), emphasizing iterative development, contextualization, and reflective practice. In this approach, the learning environment itself becomes an object of inquiry, bridging theory and practice in real-world settings.

The study is grounded in constructivist and sociocultural learning theories, viewing learning as an active, collaborative, and tool-mediated process (Vygotsky, 1978). Knowledge is co-constructed through interaction with peers and cultural artifacts, including generative AI systems, which function as mediating tools for exploration and reflection. From this perspective, AI acts not as a teacher replacement but as a co-participant in the learning process (Holmes et al., 2022), scaffolding higher-order thinking and ethical reasoning when embedded in collaborative learning activities.

The design is also informed by transformative learning theory (Mezirow, 1997), which emphasizes critical reflection and perspective change. Combined with human-centered design thinking, this orientation supports ethical imagination—the capacity to envision socially responsible applications of AI (Cranton & Taylor, 2012). Accordingly, the course aimed not only to build competence but to foster critical awareness, empathy, and ethical agency, aligning with UNESCO’s call for human-centered and values-driven AI education.

3.2 Data Sources and Materials

The study draws on document-based qualitative data that captures the pedagogical logic, design process, and instructional implementation of the course. The course plan outlines learning objectives, weekly topics, and alignment with the Design Thinking, EntreComp, and UNESCO AI frameworks. The lesson materials (PowerPoint presentations) detail the content progression, group activities, and embedded competence goals.

No student assignments, reflections, or identifiable data were analyzed. The materials were restricted to instructor-generated and publicly accessible sources to comply with ethical standards for educational research at LAB University of Applied Sciences. This focus allowed for a detailed reconstruction of how the course operationalized theoretical frameworks and implemented interdisciplinary AI education in practice.

3.3 Data Analysis

The data analysis was designed to reconstruct and interpret the pedagogical logic of the course. Rather than seeking to measure outcomes, the analysis aimed to understand how the course design embodied theoretical frameworks and operationalized its ethical and entrepreneurial goals within a real educational context. Consistent with the conceptual case study and design-based research orientation of this project, the analysis adopted a qualitative, interpretive, and framework-driven approach.

4. Results: Course Design and Implementation

4.1 Course Context and Rationale

The course AI in Business: Ethics, Applications, and Entrepreneurship was developed and implemented at LAB University of Applied Sciences in Finland as part of the Erasmus+ Pathfinder Project (2024–2026). The Pathfinder project aims to strengthen AI literacy and entrepreneurial competence across European higher education institutions by developing innovative, ethically grounded pedagogical models. Within this initiative, the course represented a pilot implementation exploring how interdisciplinary students could engage with artificial intelligence through a human-centered, ethically responsible, and entrepreneurial lens.

The course was offered within LAB’s Department of Business and Hospitality Management, yet intentionally structured to attract participation from other faculties, including Technology, Design, and Healthcare. The target learners were primarily bachelor’s-level students in International Business, though several participants came from other degree programs, contributing diverse perspectives on how AI can be applied in different sectors.

Delivered fully online, the course carries 5 ECTS credits and runs from September to December 2025. The digital format was chosen to support accessibility for students from multiple campuses and to reflect the realities of remote, AI-enhanced work environments. The course includes 10 online 3h sessions in Zoom and online learning environment in Moodle.

4.2 Course Structure and Framework Alignment

The course is designed as a 10-session learning journey. Each phase is explicitly aligned with the Design Thinking phases, UNESCO AI Competency Framework’s and EntreComp Framework’s competence areas.

This triple-framework alignment provides both pedagogical coherence and developmental progression. It guides students from initial awareness of AI’s societal roles to active, ethical engagement with AI-based business innovation. The structure ensures that technical understanding, ethical reasoning, and entrepreneurial application are integrated rather than treated as separate subjects.

The course unfolds progressively: beginning with conceptual understanding and empathy, moving toward creative ideation and prototyping, and concluding with testing, reflection, and ethical evaluation.

Table 1: Integration of Design Thinking, EntreComp, and UNESCO AI Competences Across the Course

Week	Session Title	UNESCO Dimension	Design Thinking	EntreComp
1	Course Kickoff	Overview of all	Empathize	Spotting opportunities, working with others
2	Human Agency and Accountability	Human-centered mindset	Empathize	Ethical and sustainable thinking

Week	Session Title	UNESCO Dimension	Design Thinking	EntreComp
3	Citizenship in the Era of AI	Human-centered mindset	Define	Valuing ideas, mobilizing resources
4	Embodied Ethics and Responsible Use	Ethics of AI	Define	Coping with ambiguity, uncertainty & risk
5	Ethics by Design	Ethics of AI	Ideate	Creativity
6	AI Techniques and Applications	AI techniques & applications	Ideate / Prototype	Planning and management
7	Problem Scoping	AI techniques & applications	Ideate / Prototype	Vision
8	Architecture Design	AI system design	Prototype	Taking initiative
9	Iteration and Feedback Loops	AI system design + Ethics	Test	Learning through experience
10	Seminar: Final Presentations and Reflection	All dimensions		Learning through experiences

This alignment creates a structured yet flexible learning flow, ensuring that each phase built upon the previous one both conceptually and practically.

4.3 Learning Activities and Group Work

Group-based learning forms the core pedagogical approach of the course. During the first session, students were introduced to the overall aims of the course and engaged in an exploratory brainstorming exercise to identify areas where AI could generate social or business value. From this activity, students self-organized into thematic groups according to interest areas such as healthcare, cybersecurity, sustainability, education, and creative industries.

Each group remains intact throughout the semester, collaborating synchronously in breakout sessions and asynchronously via Moodle forums and shared digital workspaces. The instructor’s role evolved from lecturer to facilitator and coach, providing guidance, ethical framing, and formative feedback rather than prescriptive answers. Short input segments introduced conceptual material: AI applications in business, ethical frameworks, and innovation models, followed by extended periods of team-based exploration and dialogue.

4.4 Integration of Generative AI Tools

A distinctive feature of the course is the intentional integration of generative AI tools as reflective co-creators, rather than as sources of ready-made answers. The pedagogical aim is to cultivate AI literacy and ethical awareness by positioning large language models as dialogical partners in the learning process.

From the first session, students were introduced to the ethical and epistemic limitations of generative AI. The instructors facilitated a discussion on algorithmic bias, hallucination, and amplification of stereotypes, emphasizing the importance of critical thinking and bias awareness in AI-supported work. Students were encouraged to treat AI-generated content as provisional material for reflection and improvement, not as final output.

To support structured application of AI tools, two custom chatbots were implemented within the Moodle environment. Value Proposition Canvas Chatbot is designed to help students articulate customer segments, value propositions, and problem-solution fit for their AI-based business ideas. Business Model Canvas Chatbot is guiding teams through elements such as key partners, activities, and revenue models, helping them conceptualize how AI could generate and deliver value ethically and sustainably.

Students were asked to use the chatbots and critically assess the relevance and accuracy of chatbot outputs, identify and discuss biases or unrealistic assumptions embedded in AI responses, and propose human-centred improvements to ensure inclusivity, fairness, and contextual fit. This reflective engagement was deepened through guided group discussions following each AI-supported task. Students compared AI-generated ideas with their own analyses, debated ethical implications, and evaluated how human judgment complements algorithmic output.

4.5 Digital Learning Infrastructure (Moodle)

The course is delivered entirely online, supported by Moodle as the central digital learning hub. Each week, instructors upload session recordings, presentation slides, readings, and links to external tools, including the generative AI chatbots. This ensures that students could revisit materials, engage at their own pace, and build continuity between live sessions and independent study.

Moodle also hosts asynchronous assignments designed to scaffold learning between synchronous meetings. These include uploads of intermediary outputs created during group work and discussions in the break out rooms. While these submissions are not graded, they serve as formative checkpoints, encouraging students to iterate and maintain steady progress rather than deferring work until the end of the course.

5. Discussion and Conclusion

5.1 Reinterpreting the Course Design Through Theory

The course was grounded in constructivist, sociocultural, and transformative learning theories. Learning was conceptualized as an active, social, and reflective process, where knowledge was co-constructed through dialogue, collaboration, and mediated interaction with AI tools. In practice, students engaged in cycles of exploration and reflection that reflected Vygotsky's (1978) concept of mediated learning, where tools, in this case generative AI systems, served as cognitive scaffolds that extended learners' reasoning and creative capacities beyond individual levels.

The constructivist principle of learning by doing was embedded in the design thinking process, where students actively applied knowledge through iterative group work and project-based inquiry. This approach enabled them to negotiate meaning, refine ideas, and build shared understanding. From a transformative learning perspective (Mezirow, 1997), the course encouraged students to question common assumptions about AI, particularly the idea of AI as a neutral or purely technical system. This fostered ethical awareness and supported shifts in perspective.

5.2 Integration of Frameworks: Lessons Learned

The integration of Design Thinking, the EntreComp Framework, and the UNESCO AI Competency Framework provided a coherent, multi-dimensional foundation for learning. Design Thinking offered a flexible structure for progressing from problem identification to solution development. EntreComp provided a shared language for entrepreneurial competences, framing creativity and ethical awareness as core skills. The UNESCO framework anchored these pedagogical elements in a broader ethical and societal context, ensuring that innovation was aligned with principles of sustainability and human dignity.

Although the integration required deliberate curricular alignment, it proved pedagogically valuable. Students experienced learning as a continuous progression from conceptual understanding to practical application and ethical reflection. This illustrates the potential of multi-framework approaches to support responsible AI education within business and entrepreneurship contexts.

5.3 Generative AI as a Learning Mediator

The course reconceptualized generative AI as a learning mediator that facilitated interaction between human reasoning and computational suggestion. In line with sociocultural and constructivist pedagogical approaches, AI tools were positioned as mediating artifacts that shaped thinking and collaboration, rather than merely automating tasks.

Through guided reflection, students learned to identify bias, overgeneralization, and contextual limitations in AI outputs, fostering meta-awareness of how algorithms structure information and meaning. The course demonstrated that, when integrated through pedagogical design, generative AI can support and expand learners' cognitive and creative capacities.

5.4 Limitations and Future Directions

This study centers on the design and implementation phase of the course, with a comprehensive evaluation of student learning outcomes scheduled to take place following the course's conclusion in December 2025. Consequently, the findings presented are conceptual and formative in nature, intended to illustrate the pedagogical processes rather than to assess their impact.

Planned future research will involve multiple components. First, a detailed analysis of student reflections and project outputs will be conducted in 2026 to examine learning experiences and knowledge application. Second, comparative studies across Pathfinder partner institutions will explore the scalability and contextual adaptability of the course design.

Collectively, these future research activities aim to extend the project's contribution from an initial pilot toward a theoretically grounded and empirically validated model for ethical AI and entrepreneurship education within higher education.

5.5 Conclusions

The course contributes to three intersecting domains of educational innovation. First, within the domain of AI in education, it offers a model for the responsible and reflective integration of artificial intelligence into learning environments. Second, in the field of entrepreneurship education, it embeds ethical and sustainable thinking as core components of innovation learning. Third, in terms of pedagogical design, it demonstrates how multiple educational frameworks can be effectively aligned within a scalable, competence-based course structure.

The course exemplifies a human-centered AI learning ecosystem that enables students to engage with technology critically and creatively, while maintaining a strong ethical orientation. It underscores the potential of AI literacy, when grounded in constructivist and transformative pedagogies, to bridge the gap between technological advancement and social responsibility.

Ethics declaration: The research did not involve human subjects in the form of interviews, surveys, or identifiable student data. Instead, it drew exclusively on document-based materials, including course plans, teaching artefacts, and instructor observations, produced during the development and delivery of the course.

AI declaration: The AI was employed to assist the author in structuring sections and refining academic language for clarity and coherence and proofreading. Final editorial responsibility and intellectual authorship remain fully with the human author.

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