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UNIVERSITY LIFELONG LEARNING IN THE AGE OF AI

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Universities, Digital Transformation and Lifelong Learning

Universities are well aware of the ever-changing learning landscape to recognise the changes in the learning landscape; in fact, the sector is saturated with strategy documents, position papers and pilot projects that articulate the correct principles of lifelong learning, digital transformation and artificial intelligence (AI). Despite their ongoing awareness, however, universities are still struggling to modify the institutional structures that would help realise these good intentions for adult learners. Digital transformation and AI are certainly significant to this narrative, and act, as we argue, more as a magnifying glass that reveals and exacerbates the pre-existing institutional

From Peripheral Activity to Institutional Mission: The Most Urgent Shift

The most significant shift universities must make is to treat lifelong learning as a core institutional mission rather than a sole extension as continuing professional education. Although universities offer lifelong learning, they rarely integrate it into their institutional design. This gap is evident in a recent contribution to University World News, which describes lifelong learning as occupying the margins of political ambition despite European policy discourse increasingly placing it at the centre. Our experience across several European systems confirms this disconnect between rhetoric and structural reality.

This is not merely a matter of resourcing. The deeper problem is conceptual: lifelong learning is often reduced to a response to labour market volatility. As Bélanger (2016) reminds us, learning across the life course is not only lifelong but also life-wide and life-deep. It concerns the entire life course, multiple spheres of life and the meanings through which individuals make sense of change. Reframing lifelong learning in these terms has direct institutional consequences. It requires universities to redesign their relationship with learners

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across time, creating more flexible and recurrent forms of engagement that allow individuals to enter, leave and re-enter higher education at different life stages. This can be achieved through modular provision, recognition of prior learning, flexible admission pathways and enhanced guidance services.

This argument also has a widening-participation dimension that contributors converge on from different perspectives. One frames it in terms of the parallel crises confronting European societies such as ecological breakdown, war and democratic backsliding, and argues that universities cannot claim social relevance while remaining structurally closed to those who are distant from higher education by nationality, gender, family background or prior educational trajectory. Another frames the same concern through the lens of intersectional equity, arguing that flexible entry pathways, recognition of prior learning and learner-centred support are not merely administrative conveniences but instruments of educational justice for individuals whose trajectories have been interrupted by disability, migration, caring responsibilities or gender inequality. In this reading, lifelong learning is not principally a mechanism for up-skilling, but a mechanism for expanding who is able to belong to the university.

This is precisely why the most urgent priority, in our shared view, is to resist the narrowing of lifelong learning to short-term employability and skills adaptation. Upskilling and reskilling are important and should not be dismissed. However, Biesta's (2006) long-standing warning remains highly relevant: lifelong learning has increasingly been framed as human capital formation and economic investment at the expense of the personal and democratic purposes that originally motivated the concept. A university lifelong learning agenda that speaks only the language of competitiveness and human capital will, over time, undermine precisely what makes universities distinctive: their capacity to cultivate critical thought, ethical judgement and democratic participation. Holding these dimensions together rather than choosing between them is the most urgent and challenging task ahead.

Digital Transformation and AI: Reshaping, not Replacing, the Relationship with Adult Learners

Only once this institutional and societal argument is established does it make sense to discuss digital tools. We believe that digital transformation and generative AI in particular are reshaping the relationship between universities and adult learners in ways that extend beyond convenience or efficiency. Learning has become ubiquitous and multifaceted through digitalisation; information is readily accessible via a smartphone and often difficult to verify. Generative AI has already been integrated into universities through texts and papers co-written with AI, literature reviews shaped by AI suggestions, and research questions developed in dialogue with AI systems. This is not some hypothetical future scenario – it is already the current operating environment of both students and staff.

For lifelong learners, this reality is particularly pertinent. Adults enrolled in university lifelong learning programmes typically work in environments where artificial intelligence is already embedded in everyday professional practice. The university's codified knowledge is now already available to these learners; its distinctive value, therefore, cannot be primarily disseminating knowledge, but instead needs to shift towards coaching learners in how to apply, judge and value knowledge critically. This has direct implications for assessment: universities have tended to respond to generative AI by tightening testing routines, breaking exams into smaller components and attempting to exclude AI as though the objective were to preserve a particular mode of testing rather than to determine what learning actually is and how it might be evidenced differently in an AI-saturated environment.

We believe there are two risks that higher education institutions are systematically underestimating. The first is the temptation to treat digital transformation primarily as a question of technology adoption rather than educational redesign. Recent postdigital scholarship has warned that much of the current discourse frames AI as a straightforward solution for enhancing personalisation and scale while paying insufficient attention to the pedagogical assumptions, social contexts, and commercial interests embedded in these technologies (Palenski et al., 2024). Universities need to become AI-literate not only as users of tools but as institutions capable of interrogating the assumptions built into them and rethinking how they educate and assess learning.

The second underestimated risk concerns the erosion of the human dimensions of learning. If universities rely on AI primarily to optimise content delivery or automate administrative and educational processes, they risk weakening precisely the forms of dialogue, critical reflection, collaborative inquiry, and relational support that adult learners value most and that most clearly distinguish university learning from the transactional consumption of information. The question, in other words, is not whether universities will adopt digital transformation - they inevitably will - but whether they can do so in ways that reinforce human agency and preserve learning as a fundamentally social and critical process rather than producing more technologically sophisticated universities that are paradoxically less human-centred than before.

Taken together, these considerations suggest a shift that is both urgent and easily stated, but difficult to implement: digital transformation and artificial intelligence should not be treated as a separate technological agenda imposed upon lifelong learning provision but as forces that require universities to fundamentally rethink the nature of learning, its support and its recognition. Adult and professionally embedded learners present a particularly instructive test case for the entire institution.

Obstacles are Cultural before they are Technical: Governance for a Post-Traditional University

If digital transformation is not the central problem, then what is? We believe the issue is organisational and cultural rather than technological. Universities are governed by senior staff whose formative professional experience often dates to the 1980s and 1990s, operating under procedures and rules that in some cases originated decades earlier. More fundamentally, universities retain a near-monopoly on the awarding of degrees. This monopoly, alongside deeply conservative institutional routines, makes lifelong learning a service universities offer rather than a structural priority.

The clearest articulation of this structural mismatch concerns the figure of the ‘traditional student’ around whom most university structures such as governance, resource allocation, quality assurance and academic incentive systems remain organised. This model is characterised by an entry into higher education immediately after secondary school, full-time study, a linear pathway and graduation. Adult lifelong learners depart from this model at every point. They enter at different life stages, combine study with employment and caring responsibilities, and bring highly diverse prior experiences and aspirations. Responding to this reality requires more than simply expanding the educational offerings available to such learners; it demands a reorganisation of how universities function. This involves integrating recognition of prior learning, modular pathways and stronger collaboration across academic departments, professional services, and external partners into the basic institutional architecture rather than leaving them as isolated pilot projects dependent on individual commitment.

We believe there are two governance directions. The first concerns external accountability and incentives. Making lifelong learning and widening participation a mandatory component of university rankings and target and performance agreements between universities and ministries would provide institutions with a structural incentive to treat lifelong learning as seriously as they do research excellence. This would extend the logic to individual incentives by rewarding staff, both academic and administrative, for engagement with lifelong learning. This would correct a system in which lifelong learning work is often invisible in career progression.

The second direction concerns the competencies of those who govern. Just as many of the world's leading companies have already made AI literacy a part of senior performance reviews, universities should make AI literacy a mandatory competency for staff working in university governance, particularly for senior and top management. This is because governance decisions about assessment, curriculum and quality assurance in an AI-saturated environment cannot be entirely delegated to technical staff. Equally, cultural change of this kind requires leadership that actively engages with societal partners, public and private organisations, employers, and civil society to develop a shared understanding of how knowledge circulates and is used outside the university. This understanding should be incorporated into recognition and reward structures rather than treating external engagement as a marginal activity. Digital transformation, artificial intelligence and learning analytics can undoubtedly support more flexible and accessible learning opportunities, but only if they are embedded within governance models that prioritise educational purpose over technological adoption. This returns us to the initial argument: universities themselves need to become lifelong learning organisations capable of continuously learning and adapting in response to the evolving needs of learners and the societies they serve.

Redefining Success: From Counting Credentials to Cultivating Agency

Our reflections transform how universities should define 'success' in lifelong learning. We explicitly reject a definition of success primarily framed in labour market terms such as improving one's position in the job market or contributing to a competitive economy. This is not because these outcomes are not important, but because they capture only a fraction of what lifelong learning intends to achieve. Therefore, treating them as the primary metric risks reducing universities to training providers among many with no distinctive claim on adult learners' trust.

The proposed alternative is a shift towards learner agency, understood in overlapping, but distinct registers. This involves empowering learners to exercise active citizenship and contributing to their professional and personal agency, helping them become reflective practitioners with a broadened professional repertoire. Another perspective frames success as the university's capacity to support long-term learner agency across increasingly complex and uncertain lives. This involves helping individuals develop the knowledge, critical judgement, confidence, and learning capabilities necessary to navigate multiple personal, professional and civic transitions over time. This is evaluated not only in terms of economic returns but also in relation to social inclusion, democratic participation, personal fulfilment and wellbeing (Palenski et al., 2024).

This reframing has direct implications for the indicators universities should track. We propose the following non-exhaustive set of indicators, organised across four dimensions in conjunction with existing European and international frameworks (European Commission, 2019).

The first dimension concerns access and flexibility: multiple entry and exit points across the life course, modular provision and diverse study modes, AI-supported enrolment and accreditation processes, and the institutional recognition of prior learning rather than case-by-case negotiation. The second involves digital and AI literacy: digital and AI literacy offered as foundational modules for all learners, evidence that learners develop the confidence to use AI critically rather than rely on it and AI literacy established as a mandatory competency for governance and senior staff, not only for teaching staff. The third concerns institutional mainstreaming: lifelong learning integrated into target and performance agreements between universities and ministries, university lifelong learning and widening participation included as criteria in university rankings, and rewards for staff both academic and administrative for engagement with lifelong learning. The fourth addresses learner agency and societal outcomes: evidence of learners' active citizenship, reflective practice and broadened professional repertoire, social inclusion and reduced barriers for underrepresented groups, democratic participation, personal fulfilment and well-being, and a sense of belonging and meaningful interaction within digital environments.

These four dimensions are deliberately heterogeneous, combining structural features such as entry and exit points, and modular provision with process measures like the impact of digital environments on barriers and a sense of belonging, and outcome measures including democratic participation, well-being, and sustained engagement over time. This heterogeneity is intentional: a single number, however sophisticated, cannot capture the comprehensive nature of a university's service to learners across their entire life course. Ultimately, and this is perhaps the most compelling formulation to emerge from our contributions, the true success of digital transformation in university lifelong learning should not be judged by the sophistication of the technologies adopted but by the extent to which they expand learners' opportunities, capabilities and freedom to continue learning throughout their lives. Furthermore, universities themselves should demonstrate the capacity to learn, adapt and change in response.

Five Commitments for University Lifelong Learning

We conclude with five commitments that we believe should guide universities, funders and researchers working on lifelong learning over the next decade.

- First, institutionalise lifelong learning as a core mission embedded in strategy funding models and academic recognition rather than a project-based activity dependent on individual commitment.
- Second, treat digital transformation and generative AI as an opportunity for pedagogical redesign, not merely as a technology adoption; protect and reinforce the human relational and critical dimensions of learning that adult learners value most.
- Third, reform governance to align incentives with lifelong learning by integrating it into quality assurance, resource allocation, and rankings, and make AI literacy a mandatory competency for university leadership and governance staff.
- Fourth, redefine success around learner agency, capability and civic and personal flourishing using broader indicators than participation, completion and short-term employment outcomes alone.
- Fifth, build durable partnerships with employers, public institutions and civil society, recognising that lifelong learning ecosystems cannot be created by universities acting alone.

None of these commitments is novel in isolation; readers of this journal will recognise elements of each in the wider literature on lifelong learning and digital transformation in higher education. What this editorial aims to do is to contribute to the argument that they

must be pursued together as a single institutional project rather than as parallel initiatives that can proceed independently. Universities that treat AI adoption as separable from governance reform, or governance reform as separable from a genuine redefinition of success, are likely to accumulate pilot projects without ever becoming, in any structural sense, lifelong learning institutions. The learners deserve more than that.

Perspectives on University Lifelong Learning, Agency and AI

The four papers of this small but rich edition highlight several of our raised issues and try to address them in a comprehensive and future-oriented way. While the lenses and the perspectives vary, they all share a commitment to different forms, levels and dimensions of agency.

In their conceptual paper, *Sarah Frodsham* and *Julie Bourguignon* explore how GenAI shapes learner agency in higher education, drawing on Alice's Adventures in Wonderland. Using a collaborative autoethnographic approach, they compare human and GenAI interpretations of Halfway Down through different perspectives. The study highlights the continuing importance of human interaction and collaborative reflection in sustaining learner agency.

In his innovative practice article, *Martin Mayr* shifts our focus to AI as augmentation rather than replacement of human educators. He presents an AI Tutor designed to support adult learners in specialised university training, outlining key design principles, implementation steps, and early practitioner observations through an iterative, design-based approach. The paper argues that the educational value of AI tutors in ULLL depends less on technical sophistication than on careful pedagogical curation, transparent design boundaries, and alignment with lifelong learning principles.

Jean Françoise Bodart, *Sandrine Bonnet* and *Giuseppina Lumia* widen our perspective to an institutional approach of dealing with AI. With the University of Lille's Charter of Good Pedagogical Practices for AI, they show how a higher education institution can respond to the disruptive effects of generative AI by embracing its lifelong learning mission. Framing AI as both a challenge and an opportunity for lifelong learning, they position their university as a hub for reskilling and critical digital literacy for diverse publics.

Iiris Kangasniemi and *Sanna Soppela* examine escape game pedagogy as an innovative practice for promoting inclusive learning in lifelong learning based on the pedagogical implementation developed at the University of Eastern Finland. They argue that from an inclusive learning perspective, educational escape games foster diverse modes of participation and knowledge construction and offer a flexible framework for designing collaborative and inclusive learning environments in lifelong learning contexts.

Finally, our Three Questions are posed by *Ester Cois* and answered by *Heather Haseley*, the inaugural Chief Lifelong Learning Officer at Imperial College London. Under the perspective of Building the Future of Learning in the Age of AI, Heather talks about personalisation and human relationships, about the responsible use of AI and conscious educational decisions, and about the issue of scaling, contextualisation and meaningful learning.

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HALFWAY DOWN THE RABBIT HOLE: A COLLABORATIVE AUTOETHNOGRAPHIC CRITIQUE OF AI IN LIFELONG LEARNING

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Research Paper

Keywords: *GenAI; higher education; collaborative autoethnography; ontology; epistemic insights*

ABSTRACT

This paper responds to UNESCO's call for the ethical and pedagogical validation of generative artificial intelligence (GenAI). Situated within the University of Oxford's free provision of ChatGPT-5.2, the study examines how GenAI can, within a bounded educational setting, shape agency. We draw on *Alice's Adventures in Wonderland* to frame engagement with GenAI as the first author initially explores an unfamiliar learning landscape. The analysis of this digital exploration is structured around four dimensions of agency: independent, social interaction, demonstrable action, and complex. It also centres on a reflective collaborative autoethnographic review of the first author's interpretation of A. A. Milne's poem *Halfway Down* across multiple lenses (child, scientist, social scientist, and artist), which is also juxtaposed alongside GenAI-generated interpretations on the same poem, through the same lenses. This research was designed to answer the question 'How does social context shape the adoption of generative AI in higher education, particularly within the agentive learning process?' Findings indicate that while GenAI produces extensive and coherent text, it lacks personalisation, referencing, and socially mediated dialogue. The absence of a human "more able other" highlights the limitations of AI in replicating the social and cultural dimensions central to education. Reflexive dialogue between the authors further reveals the importance of structured, collaborative engagement in sustaining learner agency. Ultimately, the paper argues that GenAI should be an augmentation rather than replacement for human-centred teaching and that its effective integration into Higher Education requires careful pedagogical design grounded in reflexivity, social interaction, structured tasks and the tenets of learner agency.

INTRODUCTION: SETTING THE SCENE

Generative AI (GenAI) is a Large Language Model, pre-trained on even larger amounts of data. It espouses answers to any questions and generates text that mimics the nuances of written discourse. The United Nations Educational, Scientific and Cultural Organization (UNESCO) guidance "stresses the need for educational institutions to validate GenAI systems on their ethical and pedagogical appropriateness for education" (UNESCO, 2023). With this in mind, Oxford University (2025) have openly welcomed the transformative potential of this cutting-edge technology by being the first United Kingdom university to provide free ChatGPT-5.2 model licences to both staff and students.

MacDonald (2025) discussed this free offering at the **eucen** Autumn Seminar at the University of Barcelona, Spain, and described the work of the Department of Oxford Lifelong Learning in trialling new AI tools to enhance adult education. At the same conference, Heintz (2025) suggested that the future of education could be 'on-demand education creation' and even proposed that, ultimately, skills could be instantly implanted by streaming pre-programmed data into the brain through a neural jack, akin to the Hollywood movie 'The Matrix'. This imagery, however, reduces knowledge to a one-way data exchange and fails to address how it meets aspiring academics' independent learning needs. That is, Jarvis (2014) argues, it would overlook the opportunity for critical reflection, what the lifelong learner contributes to the social context, and omit the importance of developing learning relationship between student and teacher. To consider this further, the first author, who is also a lifelong learner and lecturer at Oxford Lifelong Learning, reflected on her lived experience of adopting GenAI. She did this while positioning this alongside the fictional narrative 'Alice in Wonderland'. This approach is not without precedent. Spiro (2014), for example, demonstrates how both fictional and non-fictional accounts can shape the future practices of those who facilitate learning. The paper initially adopts an autoethnographic approach, followed by a collaborative autoethnographic perspective. By engaging with this established methodological tradition on her own first, the fiction becomes a reflective mirror, illuminating the intersections between personal experience and imagined worlds. However, in the spirit of recognising multiple and complex perspectives, both authors will bring their collective thoughts to the foreground while reflecting on the first author's interactions with GenAI. Julie's additional perspective of Sarah's storied account will ensure that the research remains socially and culturally grounded and creates the potential opportunity for collaborative change beyond a singular narrative (Ellis *et al.*, 2011). Although the aforementioned film is not directly based on Alice in Wonderland, it draws inspiration from Lewis Carroll's classic story. It is through this fictional tale that this reflective inquiry will begin to unfold.

Sarah was offered the opportunity through the University of Oxford to either download the free AI application (app) or remain ignorant of the affordances it could offer. She opted to install the software and thus this new tool became the focus of new learning opportunities (Milne, 2011). Initially, her interactions stimulated awe-inspiring wonder as she played with the app, but she also recognised that further understanding would require deeper level cognitive engagement. Therefore, she acknowledged that she had to do more than simply idly ask general knowledge questions and look on in wonder as text seemingly appeared. This is contrasted to the fictional character Alice, in her adventures in Wonderland, because she had neither an app nor a conversational companion to support her during the initial stages of her journey, but she interacted with the characters she met along the way to help her learn about her surroundings. For example, upon seeing the Cheshire cat, she asked for directions

> *"Cheshire Puss," she began, rather timidly, as she did not at all know whether it would like the name: however, it only grinned a little wider. "Come, it's pleased so far," thought Alice, and she went on. "Would you tell me, please, which way I ought to go from here?"*
> *"That depends a good deal on where you want to get to," said the Cat.*
> *"I don't much care where—" said Alice.*
> *"Then it doesn't matter which way you go," said the Cat.*
> *"—so long as I get somewhere," Alice added as an explanation.*
> *"Oh, you're sure to do that," said the Cat, "if you only walk long enough."*
> *(Carroll, 1869).*

Placed into an educational context, it could be argued that prior to this social interaction between cat and protagonist, Alice was a 'lone scientist,' or a constructivist learner (Piaget and Inhelder, 1969). This is similar to Sarah's initial exploration of adopting AI. More

specifically, she was discovering Wonderland for herself, but the conversation and the cat questioning her destination, or objective, reinforces Bruner and Haste's (1987) summation that it is through social interactions with a more experienced other that students can 'become' more knowledgeable about their world in which they are situated. This space between what a learner can accomplish independently and what they can achieve with guidance from others was defined by Vygotsky (1978, p.: 86) as the Zone of Proximal Development (ZPD). McGregor (2008) would also argue that it is how tasks are structured by the other that is key to fruitful outcomes. She found that in an educational environment, an 'open task' generated ideas, but with little application, while partially structured ones produced more collaborative and evaluated strategies. Clay (2025, p. 2) argued that teachers, or Vygotsky's other, should support learners in adopting the helpful uses of AI as a tool, while avoiding the harmful pitfalls, with the ultimate aim of strengthening learner agency. Yet Clay also acknowledges that '*our problem is that we don't know how to do that*' (ibid). Nevertheless, UNESCO (2023) is still calling for GenAI to be adopted for educational purposes to facilitate 'agency' or independent learning**.**

To scrutinise Sarah's agentive AI learning journey further in this paper we are adopting Manyukhina and Wyse's (2019, p. 223) definition of *agency*, that is, '*the capacity to act independently and to make one's choices.*' However, Biesta and Tedder (2007) stated that agency cannot be possessed and should be augmented through participatory engagement. This is *learner agency,* whereby students are provided with opportunities by another to make decisions and act upon them (Bruner, 1996). In turn, the student *demonstrates agency* and actively engages in ways in which they show initiative (Mercer, 2012). There is a fourth dimension to consider here too, namely *complex agency,* which emerges differently across contexts, through various interactions with others, and over time (Mercer, 2012).

In this paper, therefore, we will consider Sarah's initial explorations of AI in her personal Wonderland through these four dimensions of agency. By adopting this framework, the study seeks to deepen pedagogical understanding and address the following research question: How does social context shape the adoption of generative AI in higher education, particularly within the agentive learning process?

In responding to this question, the paper presents a collaborative autoethnographic account that explores how generative AI may or may not facilitate learner agency, particularly through social context. It offers both reflective and conceptual insights, providing perspectives relevant to practitioners, digital pedagogy professionals, and researchers interested in AI in education.

To consider this further let's turn back to the Cheshire cat, in the excerpt above, who exemplifies learner agency by situating themselves as the social other when asking about Alice's destination. This actively engages Alice's demonstrable agency and she asks her next question of the cat, which is not found in the excerpt above. She asks "*What sort of people live about here?*" (Carroll, 1869). She is informed "*In **that** direction… lives a Hatter: and in **that** direction… lives a March Hare. Visit either if you like: they're both mad*." After further conversation, Alice makes her own agentive choice about which way to go because "*I've seen hatters before… the March Hare will be the most interesting*." Metaphorically, she is continuing to discover and experience something anew. What this reified interaction between cat and protagonist does not exemplify is the emergence of complex agency, for it is a singular conversation, situated in an atomised context. For the fourth dimension to emerge during Sarah's GenAI journey it would need to be longitudinal, historical and reflective in nature. It is also interesting to note that at this juncture in the story Alice was interacting with the Cheshire cat whilst Sarah continued to opt for the adoption of a constructivist approach, namely, the discovery of GenAI by herself, before inviting conversation with another.

METHODOLOGICAL STANCE: INTO COLLABORATIVE AUTOETHNOGRAPHY

Sarah began her journey down the metaphorical rabbit hole with her phone in hand and the app at her fingertips, whereas Alice, in Lewis Carroll's book, is introduced to the reader as sitting by the riverbank next to her sister, contemplating whether or not to make a daisy chain. While this initial scene is brief, it is required to understand context. Namely, Alice is a young girl situated in her own ontological reality. This is the environment in which she sees the white rabbit who is the initial foil for future epistemic insights. Sarah's background context is different; she was a former biochemist of 10 years and then traversed the social science paradigm to obtain her doctorate in education and more recently obtained a Master's in Art practice; thus, she can claim to view her interactions with AI not from a singular paradigm, but through multiple perspectives. She is also the co-convener of the AI Steering Group at Oxford Lifelong Learning, University of Oxford, alongside Julie (a Senior Manager of Digital Pedagogy at the same institution). Both authors are therefore active, visible, members of a special interest group and committed, through their own curious nature, to develop understandings of AI in broader social settings. This methodological approach is apt because, as Ellis *et al.* (2011) state, it uses tenets of autobiography and ethnography in an attempt to intertwine Sarah's artist and scientific selves. This historical context aligns with Liamputtong's (202, p. :391) account of autoethnography, in which researchers situate themselves within their social world, often beginning with a personal story that weaves together individual and cultural elements throughout their lifetime. Similarly, Ellis and Bochner (2003, p. 206) emphasise starting from personal experience, attending to physical sensations, thoughts, and emotions through introspection and emotional recall, and writing these lived experiences as narrative. Indeed, Adams (2012, p. 192) adds to this argument by stating *'good autoethnography shows how and why the individual and the cultural… the personal and the political intertwine*.' Murphy *et al.* (2021) state that this approach is even more imperative now that the global landscape is becoming more digital, especially when AI and its future functionality is still uncertain (Bochner and Ellis, 2022, p. 9).

While Jeremiah (2023) captured his own interactions and subsequent reflections with ChatGTP4 over several months, using an autoethnographic narrative, Sarah and Julie decided to collaborate and discuss their perspectives on the first author's AI exploration, enabling reflective learning beyond the initial exploration (Ellis *et al.*, 2011). They are not the first to work as a pair using a collaborative ethnographic approach; more recently, Al-Fattal and Singh (2025) reviewed their personal reflections of their manual approach to thematically analyse data and then they invited GenAI to do the same. Although they worked closely together throughout the research project, this paper is different in that Sarah initially explored her interactions with GenAI on her own. With this in mind, Elliot (1964) described how Sarah would need a period of gestation, three months post expedition, prior to forming any reflexive discussion with Julie. Moustakas (2011, p 3), however, reminded both narrators that this research is still the first author's self-reflection and will continue to be heuristic in nature as it draws on her direct experience. This approach is similar to Turns and Flores (2025), who met eight times to debrief on what the first author was trailing with GenAI to promote thinking and deeper reflection. Therefore, Julie became the collaborator and facilitator of thinking (Wolfe *et al.*, 2018) for Sarah. Grushka (2007, p; 355) states that, '*...this reflected connectedness bridges the individual life, family, society and the world.... A process where the self and others are parallel and vital agencies of mind [can] inform each other...*', thus possibly bringing Mercer's (2012) description of complex agency to the foreground.

RESEARCH DESIGN: INTO THE AI WONDERLAND

This research was three-fold. First, Sarah adopted a "hermeneutic circle" whereby she sought '*to understand an object of interpretation, through a poem*' (Van Ness, 2011, p. 302), hence the adoption of A. A. Milne's classic prose Halfway Down. According to Anggara and Yusup (2026), this type of reflection through poetry facilitates emotional connections and depth of interpretation which aligns with the initial autoethnographic approach adopted by Sarah. Indeed, this poem was read to Sarah by her late father, Stephen Frodsham, when she was young. It was one of his favourites. Hoult (2020) states that poetry can be used in research to open up multiple meanings and express complex identity rather than a singular perspective. This approach, therefore, seemed apt for Sarah to have reflected on this poem through the autoethnographic lens of her childhood and then through the paradigms which she has traversed as an adult, namely, as a scientist, social science and arts practitioner. The second phase involved asking GenAI to do the same task. Sarah specifically asked GenAI the following questions: 'How would a child interpret this poem' and then, 'How would a scientist/positivist interpret it?' The same question was asked about the social scientist and artist practitioner sequentially. For this paper, Sarah used GenAI only once, during a single, time-bound session. She deliberately chose not to continue to prompt further engagement within the digital space, because she wanted to focus on her immediate experience - her emotions, thoughts, and physical responses as they occurred in that moment. Through this, she aimed to reflect on her own independence and decision-making, examining how this might be understood through different theoretical perspectives when GenAI is positioned as a facilitative "other." She was essentially creating critical incidents to question whether and how she could demonstrate her own agency through this interaction. Although she was initially worried that this approach might overlook more complex forms of agency, she was interested in how creating a space, with this poem, in this constrained setting, could shape her engagement with digital interaction. Finally, the third stage was for Julie and Sarah to collectively contrast these sets of outputs and evaluate how AI could be adopted to support learning. With these objectives in hand, Sarah traversed the AI landscape through the poem reified below.

Halfway down

Halfway down the stairs is a stair where I sit.
There isn't any other stair quite like it.
I'm not at the bottom, I'm not at the top;
So this is the stair where I always stop.

Halfway up the stairs isn't up
And it isn't down.
It isn't in the nursery,
It isn't in town.
And all sorts of funny thoughts
Run round my head.
It isn't really Anywhere!
It's somewhere else instead!

by A. A. Milne (1924).

RESULTS OF PHASES 1 AND 2: EXPLORING THE STAIRWAY PERSONALLY AND DIGITALLY

The childhood perspective of being neither in the town or the nursery

As Bullough and Pinnegar (2001, p. 16) stated, self-explorations like this one invite connections and create spaces to recognise experiences associated with the poem. This poem's narrative enabled Sarah to reflect on the social and cultural experiences that she had been afforded during her lifetime. That is, Sarah was viewing the poem through the historical lens of her child-self. She recollects the warmth she felt when her father read the poem by her bedside and even GenAI described how 'it's the kind of poem that feels cozy, like a bedtime story.' Personally, for Sarah, it also evoked feelings of the entire family in the household because their shoes usually festooned each step of the stairway. Additionally, thanks to her father's love of this poem, she also recalled how she was ontologically convinced that if she walked down the stairs backwards, all the way to the bottom, she could be transported anywhere from these stairs if she just believed hard enough. She recalls demonstrating her learner agency by putting this imaginative theory into practice but was thwarted by her mother who, two steps from the bottom, picked her up to sweep her away to the family dining table in time for tea. These stories were accessed from Sarah's memory but, in contrast, GenAI listed descriptions of how a child would find the poem relatable, noting how 'many children have a favourite spot – under a table or behind a sofa.' It also suggested that they would find it 'imaginative' 'a bit quirky' and 'funny or silly'.

By examining this poem through the lens of her childhood Sarah may have sat alone with the GenAI app on her phone, but she did not situate herself as a lone scientist (Dewey, 1934). This, she reflected, was actually a false fallacy, and she subsequently rejected the notion of sensemaking being segregated from her past social and everyday experiences. That is, Sarah recognised how this emotive poem spoke to her, historically, on both inter- and intrapersonal levels and over time. This was complex agency in action and the unobservable connectedness between her and her late father.

The Biochemist's view of the stair where *they* always sat

As we traverse from Sarah's childhood to her lived experience of being a scientist there is a change in tone. She begins to ask objective questions about the poem, including enquiring about the number of steps – after all, if there are an even number of steps, then there would be no step to sit on half-way down. If there is indeed a stair, why does the child always stop on that particular step? What is observably different about it? There would also be the question regarding whether they do stop there 100% of the time, and for how long. Finally, like Schrodinger's cat, the child is in the in-between state where reality is not fixed. While the theoretical cat is simultaneously dead or alive the child is neither up nor down. In fact, from a positivist's ontological perspective there is only one reality and, therefore, having observed neither the cat or child, as a scientist we are unable to state that either exists (Denzin *et al.*, 2023). This adds an additional layer of tension between Sarah's agentive imaginative experience as a child and the scientist-self's desire for verifiable knowledge. While Sarah as a scientist may not be exercising agency in the same imaginative sense as the child, she nonetheless demonstrates a form of agency through her persistent questioning of the observable world. By contrast, GenAI's interpretation of a scientist/positivist perspective extends beyond a narrow focus on empirical verification. It introduces additional considerations, such as 'environmental factors influencing behaviour.' Yet, it ultimately concludes, much like Sarah the scientist, that a 'strict positivist' would regard the scenario as merely a poetic expression, rather than as a claim amenable to empirical investigation.

It is interesting to note that the GenAI script, post scientific analysis, generated multiple ideas that resonated with Sarah's own positivistic mindset, but it also provided a broader explanation of how a scientist might think. Rather than facilitating deeper thought about her stance, Sarah's immediate response was to feel somewhat stripped of her own independent thought. She was initially unsure whether she would have time to seek out literature to support GenAI's unreferenced claims. Interestingly, she felt that her adventure in this AI Wonderland moved from an autoethnographic exploration to a need to validate her own academic competence. This was arguably akin to Alice's deliberations as to whether or not to visit the March Hare.

The interpretivist was placed somewhere else instead.

From a social science perspective, Sarah recognised that the person in the poem had no direct access to the world beyond 'the step where they always sit' but could recognise other realities (e.g., the nursery or town). Consequently, whether the town or nursery was up or down the stairs became irrelevant, because meanings were generated from their immediate positioning, namely, what they could explore on their own as a 'lone scientist' at that atomised moment in time, like the reified interaction between Cat and the protagonist Alice. GenAI also identified four key themes: subjective experience, social and cultural context, liminality, and narrative meaning-making. Under each heading, it generated further provocations, asking, for example, "what does this space mean to a child?" and "how does the child construct this meaning through language and imagination?" It suggested that the child's decision to sit in this "in-between" space could be read as an expression of agency. In addition and similarly to the previous two lenses, childhood and scientist, GenAI's response offered no references for Sarah to trace and situate in context. In summary, the limitation of the generated interpretations omitted the transparency and reflexivity that underpin interpretivist research practices, and therefore, complex agency was wanting.

The liminal possibilities of the singular stair

Sarah, as artist, recognised the creative tension described by Perry (2008, cited in Hall 2010), who argued that contemporary artists often engage the part of us that is deeply uncomfortable with uncertainty. That is this person, sitting on a middle step is considering where they are positioned and what their reality is. They know what lies beyond this middle step but, as readers, we are unsure whether the nursery is up or down the stairs. Perhaps they are on the cusp of embracing uncertainty, or are about to experience an epistemic insight as they decide to move either up or down the steps. After all, they are having 'all sorts of funny thoughts' running round their head. As an artist, Hannahan (2006, p. 152) similarly emphasises that the challenge is not to eliminate this discomfort, but to *own* it, embracing the continual making and remaking of meaning. In reading Milne's poem, Sarah, the artist, found herself doing exactly this: asking "What if…?" and moving, from a focus on *what is* being created to an exploration of *what might be* (Chappell and Cremin, 2014). The position of being "halfway down" became an imaginative threshold for Sarah and opened up a learning proposition of possibilities. As done previously, following reflection of the poem through the artist's lens, GenAI was invited to review the poem through the same lens. This pretrained algorithm generated the idea that an artist would say "*Halfway Down* is a poetic invitation to inhabit the in-between. It challenges linear movement and adult logic, offering instead a space of imaginative autonomy. As an artist, [GenAI espoused] I see the halfway stair as a site of inquiry – where stillness, embodiment, and poetic language converge to reveal new ways of knowing." A further five categories with descriptors emerged. These are: the stair as a site of inquiry, embodied experience, imaginative space making, poetic language as material and childhood as epistemology. Underneath each was text far longer than Sarah's own musings. Due to the volume of unreferenced text GenAI espoused, Sarah was beginning to feel more like the person at the end of the poem because she was having all sorts of funny questions running around her head about her own understanding of the

world. This rabbit hole had become a vast maze in front of her and her adventure in the AI wonderland had begun to spiral out of control. However, Pulk and Koris (2025, p. 9) recognised that GenAI produces a '*superficial mode of thinking [and] average work*' and UNESCO (2023) stated that '*While GenAI can produce new content, it cannot generate new ideas or solutions to real-world challenges, as it does not understand real-world objects or social relations that underpin language*.' Grushka's (2007, p. 355) bridge of 'connectedness' between 'life, family, society and the world' had ceased to exist for Sarah and her sensemaking had become segregated from her past and present social and everyday experiences. Indeed, what GenAI had omitted was not just the historical aspect of Sarah's meaning making but the more able other's social discourse (the equivalent to Alice's Cheshire cat). That is, Sarah felt as if she was not being offered opportunities to make her own decisions about this vast information being proffered. Feeling stripped of her capacity to act independently and not having the opportunity to make decisions through a mediator she was left feeling disorientated and 'somewhere else instead.'

PHASE 3: JULIE'S AND SARAH'S REFLEXIVE DISCUSSION

The importance of drawing on pre-understanding when considering one's own ontological and epistemological assumptions is highlighted by Denzin *et al.* (2023), and, as such, a qualitative researcher recognises and welcomes other realities and perspectives. In this case, Julie represented "the other" perspective. Her first comment to Sarah was that her curiosity had got the better of her. She recognised that, in her excitement, Sarah had rushed ahead without considering her own ZPD. Together, Julie and Sarah first explored what Sarah had consciously and unconsciously brought to her engagement with the app. In other words, they examined her underlying ontological assumptions and considered the extent to which these had, or, in this case, had not, been mediated in ways to stimulate further learning. It became apparent that the GenAI activity Sarah undertook had not been intentionally designed to safeguard her developing agency as a learner. As a result, she eventually disengaged from the learning process because the volume and pace of information overwhelmed her, and her ability to act independently as a learner (agentively) was effectively interrupted. In successful AI research, such as that conducted by Al-Fattal and Singh (2025), both researchers worked collaboratively throughout the process, supporting and challenging each other's interpretations. By contrast, Jeremiah's (2023) solitary exploration of their AI landscape resulted in a similar outcome to Sarah's experience. After engaging in dialogue with the AI, Jeremiah's response was to withdraw, perceiving the interaction as unproductive. Indeed, Jeremiah (2023) would suggest that Sarah experienced cognitive inflexibility and this would have contributed to her decision to withdraw rather than engage more deeply after her initial AI interactions. To counter this, Clay (2025, p. 2) argues that teachers, or another like Julie, must support learners in adopting the helpful uses of AI while persuading them to avoid the harmful ones, with the ultimate aim of strengthening learner agency. But, how to do this is still being questioned. Armed with this socially constructed knowing, both Julie and Sarah felt they could begin to answer their research question: "How does social context shape the adoption of generative AI in higher education, particularly within the agentive learning process?" That is, what this adventure in AI Wonderland and subsequent conversation with Julie has made evident is that facilitating agentive learning requires a social dialogue with another person. In Sarah's case, working with someone like Julie afforded her the opportunity to externalise her otherwise internal and solitary interaction with the digital other (Vine *et al.*, 2018).

Of course, an alternative consideration would be to think about how the structure of the task shaped Sarah's learning. After all, Sarah may have sat alone with the GenAI app on her phone, but she did not situate herself as a lone scientist (Dewey, 1934). In fact, in viewing the poem through the lens of a child she had rejected such divisions, realising the poem echoed with her history, revealing complex agency and unspoken bonds with her late father.

Therefore, if Sarah had structured her further interactions, as McGregor (2008) had proposed, with historical reflexivity in mind, rather than diving into the AI landscape without planning, her constructivist approach may well have been more targeted and fruitful. Mustafa Suleyman (2025), CEO of Microsoft AI, recently argued that consciousness can exist only in biological beings. From this perspective, the exchange between Sarah and AI could only ever have been superficial because it is a non-sentient algorithm generating text without any awareness of Sarah's historical, social, and cultural experiences and how these shape her learning as an individual independent thinker. Vine *et al*. (2018) noted that the constructivist approach used in this initial autoethnographic research also has the potential to generate anxiety for participants. Indeed, with Holman Jones's (2005, p. 764) assertion that "autoethnographers view research and writing as socially just acts; rather than a preoccupation with accuracy," Sarah also reflected on her earlier scientific training with Julie. She recalled how she once believed in a singular ontological truth. During that period of her academic life, she had assumed the existence of an authoritative other whose truth she would either accept or reject (Wegerif, 2011). Yet, as an interpretivist researcher she acknowledges that "scientists and social scientists throughout history have been recognised for their ability to critique their philosophies from within and beyond their encultured bounded communities" (Frodsham, 2024, p. 58). With this understanding, Julie and Sarah viewed the writing of this paper as an opportunity to think through the established cultural and disciplinary boundaries of a singular perspective and discipline (Bochner & Ellis, 2022, p. 9) and consider how the digital can be designed to support all students' agentive learning. Therefore, rather than asking how GenAI can influence the role of the social context in higher education, we should be arguing about how students are provided with opportunities, prior to AI engagement and/or during, to make informed decisions and act upon them accordingly and constructively (Bruner, 1996).

FINAL THOUGHTS

In the spirit of reciprocal critical debate, both authors recognise that a single article is insufficient to capture the full complexity of learning processes, for example, the illumination of *Complex agency*, which appeared wanting through the lens of scientist, social scientist, and artist. This would require longitudinal, social interactions rather than the short-term, individual engagement presented. Looking forward, the paper invites research that adopts collaborative, longitudinal, and multi-participant designs to better capture the evolving nature of learner agency. Such work could examine how sustained interactions between learners, educators, and AI systems support the development of complex agency over time, while also integrating structured pedagogical frameworks to enhance meaningful engagement. In summary, it is through the iterative and reciprocal interactions among those involved in lifelong learning, including teachers, students, and administrative staff, and AI systems that a more comprehensive understanding will emerge. Ultimately, if GenAI is to be made widely accessible, stakeholders in lifelong learning must adopt collaborative, reflexive, and human-centred practices that extend across roles, disciplines, and temporal scales, while honouring the historical and pedagogical foundations that came before. After all, uncritical curiosity risks killing the curious 'Cheshire' cat, and neither Julie or Sarah want to undermine the role of the facilitative other.

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BUILDING AN AI TUTOR FOR UNIVERSITY LIFELONG LEARNING: DESIGN, IMPLEMENTATION, AND CRITICAL REFLECTION

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Innovative Practice

Keywords: *AI tutor; university lifelong learning; adult learners; personalised learning; innovative practice*

ABSTRACT

Artificial intelligence (AI) is increasingly promoted as a means to enhance flexibility, personalisation, and access in University Lifelong Learning (ULLL). This paper presents the development of an AI Tutor as an innovative practice designed to support adult learners in specialised university training, using Smart Farming modules as an illustrative context. Rather than positioning AI as a replacement for existing educational practices, the AI tutor was conceived as a pedagogically-bounded support layer embedded in established courses. Its design builds on curated course materials, lecture transcripts, and structured exercises, enabling context-aware, multilingual explanations and just-in-time learner support through a conversational interface. The paper outlines key design principles, implementation steps, and early practitioner observations through an iterative, design-based approach, highlighting perceived benefits such as increased accessibility, adaptability to heterogeneous prior knowledge, and integration of tacit instructional knowledge. At the same time, the contribution critically reflects on limitations and ethical considerations, including risks of over-reliance, authority attribution, data governance, and uneven learner readiness. The paper argues that the educational value of AI tutors in ULLL depends less on technical sophistication than on careful pedagogical curation, transparent design boundaries, and alignment with lifelong learning principles.

INTRODUCTION: AI AND UNIVERSITY LIFELONG LEARNING

Artificial intelligence (AI), specifically Large Language Models (LLMs), is increasingly positioned as a driver of change in University Lifelong Learning (ULLL). Technological transformation, labour market volatility, and demographic change have intensified demands for continuous upskilling across the lifespan. Universities are expected to provide flexible, scalable, and inclusive learning opportunities for diverse adult populations, and AI-enabled tools are often framed as a means to personalise pathways and extend institutional reach. However, effectiveness depends strongly on pedagogical design, implementation context, and ethical governance rather than on technology alone. From the perspective of adult learning theory, effective support must account for self-direction, experiential relevance, and heterogeneous prior knowledge, principles that any AI-based tool must actively accommodate (Reiss, 2021; Gupta and MacLellan, 2025).

Traditional digital formats in lifelong learning, notably Massive Open Online Courses (MOOCs) and static learning management systems, have achieved scale but frequently

struggle to sustain engagement or address heterogeneous learner needs. Adult learners in ULLL often combine study with work and family commitments, requiring support that is available on demand and responsive to prior knowledge. Empirical evidence suggests that AI-driven tutoring systems can accelerate learning and provide timely feedback in both distance and adult education contexts, yet adoption remains uneven and often self-selective (Gupta and MacLellan, 2025; Möller et al., 2024). This raises a critical tension: while AI tutors show measurable benefits for motivated learners, they do not automatically resolve issues of access, inclusion, or persistence central to ULLL.

Recent research increasingly points toward hybrid and human-centred models of AI deployment rather than fully automated solutions. Studies on human–AI tutoring and co-pilot systems demonstrate that AI is most effective when it augments, rather than replaces, educators and trainers, supporting pedagogical quality while preserving human judgement and contextual sensitivity (Thomas et al., 2024; Wang et al., 2024). At the same time, systematic reviews highlight persistent risks related to algorithmic bias, transparency, and data governance, alongside a tendency for AI tools to focus narrowly on task performance rather than holistic self-regulated learning (Lan and Zhou, 2025). These findings underscore the need for critical, practice-oriented experimentation that aligns AI innovation with the values and goals of ULLL.

This paper presents the development of an AI Tutor as an innovative practice in specialised ULLL, offering a practice-oriented account aimed at instructional designers, ULLL programme managers, and university teachers seeking to integrate AI into existing course provision. Rather than presenting AI as a universal solution, it situates the AI Tutor within a specific educational context, examining its design rationale, practical implementation, and perceived added value for adult learners. By explicitly linking technological choices to ULLL principles, flexibility, inclusion, and learner-centeredness, the paper responds to current debates on how AI can meaningfully support lifelong learning without reproducing existing inequalities or pedagogical limitations. Its contribution is threefold: it applies AI tutoring to the under-explored context of adult university learners, proposes a reproducible workflow for repurposing existing course materials, and frames the AI Tutor as didactic middleware rather than a replacement for instruction.

CONTEXT AND PRACTICE SETTING

The practice described in this paper is situated within the Lifelong Learning unit of BOKU University Vienna, a university with a strong applied orientation towards sustainability, agriculture, and environmental sciences. The initiative was developed with partners from Technical University of Munich and Free University of Bozen-Bolzano in the context of the ERASMUS+ KA220 cooperation project "USAGE-NG" (an EU-funded multinational educational partnership; project reference 2022-1-AT01-KA220-HED-000089504; European Commission, 2022), which focuses on modernising university lifelong learning provision for non-traditional and regionally dispersed learners. Within this institutional setting, the AI Tutor was conceived not as a stand-alone technological experiment, but as an embedded innovation aligned with the university's mission to extend academic knowledge into professional and rural contexts.

The primary target group consists of adult learners with a university-level background, notably farmers and rural professionals engaged in continuing education in the domain of Smart Farming, covering topics such as precision agriculture, sensor technology, and data-driven crop management. These learners typically combine study with demanding work schedules and operate in environments characterised by limited access to on-campus support. Prior research on intelligent tutoring systems for adult learners suggests that flexibility, asynchronous access, and relevance to real-world practice are decisive factors for

adoption and sustained use, particularly among older and professionally embedded learners (Gupta and MacLellan, 2025; Liu et al., 2025).

A key constraint shaping the design of the AI Tutor was the reliance on existing university courses and training materials. Rather than redesigning curricula from scratch, the innovation focused on restructuring and repurposing established Smart Farming modules into a conversational, context-aware format. This constraint reflects a common condition in ULLL, where scalability and sustainability depend on leveraging existing resources while enhancing personalisation and learner support through AI-driven tools (Möller et al., 2024).

DESIGN OF THE AI TUTOR

The design of the AI Tutor was guided by the dual requirement of pedagogical relevance for ULLL and practical feasibility within existing university course structures. Rather than conceiving the tutor as a generic conversational agent, the design process treated it as a form of didactic middleware: a dialogic interface layered onto established teaching materials that translates validated academic content into adaptive, context-sensitive explanations. This choice reflects a core assumption: in ULLL contexts, value lies less in novel content generation than in improving access, intelligibility, and adaptability of already validated academic resources.

Pedagogical design principles

Three pedagogical principles shaped the AI Tutor's design: learner-centredness, context sensitivity, and support for self-regulated learning. These principles draw on established adult learning theory, particularly the recognition that adult learners bring diverse prior knowledge, learn most effectively when content is relevant to their professional context, and benefit from opportunities for self-directed inquiry. First, learner-centredness was operationalised through adaptive explanations. The tutor was instructed to adjust the depth, terminology, and examples of its responses according to the learner's questions, thereby accommodating heterogeneous prior knowledge. This aligns with evidence that AI tutors can support personalisation and engagement in adult education settings, provided they are designed to respond flexibly rather than uniformly (Alfredo et al., 2024; Gupta and MacLellan, 2025).

The second design principle prioritised context sensitivity. The tutor does not operate on open web knowledge by default, but instead draws primarily on a curated, course-specific knowledge base derived from existing teaching materials. Technically, this is achieved through a Retrieval-Augmented Generation (RAG) architecture provided by the hosting platform (Academic AI, a GDPR-compliant cloud service for Austrian universities; ACOmarket, 2024), which retrieves relevant document passages before generating responses. This design decision significantly reduces, but does not eliminate, risks of hallucination and misalignment with course learning outcomes, while preserving coherence with institutional curricula. Importantly, the AI is positioned as a supplementary explainer rather than an authoritative instructor: a cautious stance consistent with evidence that AI-generated educational content requires human oversight and explicit quality controls (Pesovski et al., 2024).

Third, the AI Tutor was designed to support self-regulated learning by enabling iterative questioning, clarification, and reflection. Learners can revisit concepts at their own pace, request alternative explanations, or explore examples without the social cost sometimes associated with classroom questioning. While studies suggest that AI-supported self-regulation can enhance learning, they also warn against dependency risks if learners defer too much cognitive responsibility to the system (Lan and Zhou, 2025). This tension informed later design constraints.

Content preparation and structuring

Implementation began with a systematic collection of all available course materials. These included lecture slides, scripts, assignments, example exercises with solutions, past examination questions, and audio or video recordings of lectures. A key insight from this project is that AI tutoring quality is highly dependent on the coherence and organisation of source materials. Files were therefore renamed consistently and organised into a clear hierarchy by module and lecture unit, enabling traceability and future reuse.

To make the materials usable for an LLM, structured summaries were created for each lecture unit. Large Language Models were used to generate these summaries, with constraints to avoid excessive abstraction. Summaries focused on key concepts, definitions, and examples, often including references to the source material to preserve transparency and enable direct source attribution. This step reduces the context load for the AI system, allowing extended chats while maintaining response consistency and relevance.

Lecture recordings were transcribed using automated tools, followed by selective review. Transcripts served to capture what might be termed “tacit instructional knowledge,” consisting of explanations, contextual examples, analogies, and clarifications that lecturers communicate orally but that are not recorded in slides or written materials. By transcribing and curating these elements, otherwise ephemeral knowledge becomes explicit and retrievable. Transcript-derived content was integrated into the summaries and clearly marked to maintain accountability for added interpretations.

Exercises formed a further implementation layer. Tasks were rewritten into clean, structured text files, including problem statements, step-by-step solutions, and grading hints where applicable. This enabled the AI Tutor to provide guided explanations, hints, or feedback rather than simply reproducing answers. The intention was to support self-regulated learning without automating assessment, a balance that is particularly important in adult and professional education contexts.

Defining tutor behaviour through a system prompt

Once the content was prepared, it was embedded into the AI system's knowledge base. The central design mechanism at the next stage was the system prompt, which defines the tutor's role, tone, and behavioural boundaries. The system prompt functions as a pedagogical instrument rather than a merely technical parameter. It instructs the LLM to respond in a supportive and explanatory manner, to adapt to different learner levels, and to rely primarily on the provided documents. *Table 1* below illustrates key behavioural rules encoded in the prompt.

Rule	Pedagogical intent
Respond based on provided course documents; use external knowledge only when necessary and flag it explicitly	Ensures curriculum alignment; reduces hallucination risk
Adapt explanations for beginner or advanced learners as appropriate	Accommodates heterogeneous prior knowledge
If unsure, say so	Promotes transparency and epistemic honesty
Highlight additional information derived from transcripts	Makes tacit instructional knowledge visible
Encourage reflection through follow-up questions rather than providing direct answers	Supports self-regulated learning

Table 1: Selected system prompt rules defining AI Tutor behaviour

Crucially, the prompt also directs the LLM to acknowledge uncertainty and to distinguish between information derived from the knowledge base and additional insights drawn from other sources or the model's training data. This design choice addresses ethical concerns related to overconfidence and perceived authority in AI systems, which can undermine learner judgement if left unchecked. By making the tutor's knowledge boundaries explicit, the implementation supports transparency and trust. For example, when a learner asks how soil moisture sensors function in precision agriculture, the tutor draws on module summaries and a transcript-derived analogy used by the lecturer, rather than generating a generic explanation from its training data (Dieterle et al., 2022).

Testing, refinement, and early use

The development followed an iterative, design-based approach. Rather than a single deployment, the AI Tutor underwent repeated cycles of testing, evaluation, and refinement by the project team (three instructional designers and subject-matter experts across the partner institutions). Testing consisted of structured interactions simulating typical learner queries like asking clarification questions, probing conceptual understanding, and requesting alternative explanations. Responses were assessed against a simple evaluation rubric focusing on clarity, factual accuracy, adaptability to learner level, and conversational coherence. Identified weaknesses led either to prompt refinements or to adjustments in how materials were summarised and structured.

Early use within the project context indicates that the AI Tutor is particularly effective as a just-in-time support tool. Learners can revisit specific concepts without navigating entire course documents and can engage with content in a more exploratory manner. These observations are consistent with broader evidence that AI-driven tutoring systems can improve efficiency and engagement in adult and distance learning when embedded within structured educational settings. However, it should be noted that these insights are based on practitioner observation during initial deployment rather than on systematic learner evaluation (Möller et al., 2024).

Critical reflection on implementation choices

A major strength of the described approach is its transferability. Because the workflow builds on existing teaching materials and institutionally approved AI platforms, it can be applied beyond the Smart Farming domain to any discipline where structured course materials, recordings, and exercises are available. The key requirements are not domain-specific expertise in AI, but rather pedagogical curation and willingness to restructure existing content for conversational use. This makes the approach particularly relevant for ULLL contexts, where programmes span diverse fields and resources for bespoke technological development are limited. At the same time, the approach is constrained by the quality of source materials; fragmented or outdated courses require substantial preparatory effort. Moreover, summarisation and transcription introduce interpretative layers that demand careful oversight to avoid subtle distortions.

Legal and ethical considerations further shape implementation. Some teaching materials can only be used within closed institutional systems due to copyright restrictions, limiting broader dissemination. Data protection and transparency requirements must also be addressed, particularly if learner interactions are logged or analysed. These constraints reinforce the importance of positioning the AI Tutor as a bounded support tool rather than an autonomous instructor.

BENEFITS, CHALLENGES AND LIMITATIONS

The perceived benefits of the AI Tutor emerged from its capacity to address persistent constraints in ULLL: heterogeneity of learners, time scarcity, and limited individualised support. The conversational interface enabled users to access explanations on demand, revisit concepts at their own pace, and pose questions without social barriers present in synchronous settings. A further added value lies in integrating formal course materials with tacit instructional knowledge from lecture transcripts, especially relevant in specialised domains such as Smart Farming, where learners benefit from concrete examples beyond static slides. The multilingual capabilities also supported inclusivity by lowering linguistic barriers. Rather than replacing educators, the tutor functioned as a complementary support layer, reinforcing the hybrid human–AI model that recent research suggests yields stronger outcomes than fully automated systems (Reiss, 2021; Gupta and MacLellan, 2025; Möller et al., 2024; Thomas et al., 2024).

These benefits must be interpreted cautiously. Observations are based on early-stage practitioner feedback rather than controlled experimental evaluation. There is a risk of overstating pedagogical impact if perceived improvements in engagement are conflated with demonstrable learning gains. Efficiency gains may reflect surface-level optimisation rather than deeper conceptual understanding, an ambiguity also noted in the wider literature (Ward et al., 2025).

Several challenges accompany implementation. Data protection and privacy remain central concerns, particularly given the handling of learner interactions. Compliance with GDPR and institutional data governance was treated as a non-negotiable design constraint. Content accuracy poses ongoing risks: while the tutor is grounded in curated materials, generative models can still produce plausible but incorrect explanations if safeguards are insufficient (An et al., 2024; Dieterle et al., 2022). Beyond technical constraints, the implementation rests on implicit pedagogical assumptions. Learners may attribute authoritative status to AI-generated responses regardless of explicit design boundaries. Continuous on-demand support, while intended to foster self-regulated learning, may equally reduce productive struggle if not carefully scaffolded. Multilingual availability does not automatically ensure inclusivity where disparities in digital confidence and AI literacy persist (Bulut et al., 2024; Meylani, 2025; Lan and Zhou, 2025).

Recognising these assumptions does not undermine the value of the AI Tutor; rather, it highlights the need for ongoing pedagogical mediation, explicit learner orientation, and institutional governance to ensure that AI-supported tutoring strengthens, rather than simplifies, ULLL practices.

CONCLUSIONS

The development of the AI Tutor illustrates how AI can extend learner support in ULLL without displacing established pedagogical practices. Rather than framing AI as disruptive, this contribution has shown how an AI Tutor can function as a pedagogically-bounded support layer that enhances access to established academic content. The educational value of such tools depends less on technical sophistication than on careful pedagogical curation, contextual embedding, and ethical governance (Dieterle et al., 2022; Reiss, 2021; Wang et al., 2024).

For ULLL, the implications are twofold. First, AI tutors can meaningfully extend institutional capacity to provide just-in-time, personalised support for adult learners who combine study with professional responsibilities. Observed benefits, increased accessibility, multilingual support, and integration of tacit knowledge align with evidence from adult and distance

education contexts (Gupta and MacLellan, 2025; Möller et al., 2024). Second, these benefits are neither automatic nor universal. Without explicit pedagogical framing, learners may overestimate the authority of AI-generated explanations, and continuous support may unintentionally reduce productive struggle (Lan and Zhou, 2025). The implementation therefore supports a cautious, hybrid approach where AI tutors augment rather than replace human educators (Thomas et al., 2024; Wang et al., 2024).

Several research questions arise from this practice that warrant systematic investigation: How do adult learners perceive and navigate the knowledge boundaries of AI tutors in practice? What evaluation designs are appropriate for assessing AI tutor impact in ULLL settings where controlled experiments are difficult? Under what conditions does the described workflow transfer effectively to non-technical disciplines? Planned next steps include integrating guided exercises with scaffolded feedback, collecting structured learner feedback, and exploring more rigorous evaluation approaches. At this stage, the AI Tutor is best understood as infrastructure in the making: exhibiting properties such as persistence, scalability, and institutional embedding, but requiring further evaluation before it constitutes a mature component of lifelong learning ecosystems.

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INSTITUTIONAL PEDAGOGICAL CHARTER FOR GOOD PRACTICES AT THE UNIVERSITY OF LILLE IN THE EVOLVING CONTEXT OF GENERATIVE AI: PERSPECTIVES FOR LIFELONG LEARNING

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Innovative Practice

Keywords: *Artificial intelligence (AI); university lifelong learning; AI governance; ethical AI; pedagogical innovation; upskilling; reskilling; higher education*

ABSTRACT

Generative artificial intelligence (AI) is transforming higher education by reshaping student practices, professional expectations, and the nature of academic work. Universities must now support not only initial degree students but also adult learners and staff who need continuous upskilling to remain relevant in an AI-mediated labour market. This contribution presents the University of Lille's innovative initiative to integrate generative AI into pedagogy through a participatory Charter of Good Pedagogical Practices. The initiative combined a diagnosis of student AI uses and multi-level acculturation strategy for staff and learners. It explicitly framed AI as both a challenge and an opportunity for lifelong learning, positioning the university as a hub for ongoing reskilling and critical digital literacy for diverse publics.
Keywords: Artificial intelligence; academic integrity; lifelong learning; governance; higher education.

INTRODUCTION

Generative artificial intelligence (AI) has rapidly evolved and is profoundly affecting the labour market, reshaping work practices across professions and structuring how tasks, communication and knowledge production are organised (OECD, 2023). Labour market analyses show marked increases in AI-related job postings and transversal demands for 'AI literacy' in both technical and non-technical roles, underlining the need for continuous upskilling and reskilling (OECD, 2023). In the coming years, 61% of adult workers will need to handle skills relative to the impact of AI on their work, but only 15% thus far have already received training in using AI tools (CEDEFOP, 2025). Universities are therefore under pressure to prepare learners, not only traditional full-time students but also professionals and adult learners, for careers in which AI-related competences are increasingly requested (Lyndgaard et al., 2024).

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Simultaneously, the diffusion of large language models underlying generative AI has progressively and deeply altered student practices. Surveys reveal high rates of AI use for coursework, assignment preparation and assessment-related tasks, often in the absence of clear institutional guidance (Brown et al., 2025). This raises concerns about academic integrity, assessment validity, equity of access, and the preservation of critical and creative skills, all of which are central to a lifelong learning mission that seeks to empower learners throughout the life course. This contribution presents the University of Lille's response through an innovative, participatory initiative: the development and implementation of a Charter of Good Pedagogical Practices for AI, explicitly framed by a lifelong learning perspective aimed at acculturating students, academic staff, and other professionals to AI in ways that support employability, ethical awareness, and critical digital literacy (Lyndgaard et al., 2024).

CONVERGENT PRINCIPLES FOR AI GOVERNANCE IN HIGHER EDUCATION

Recent scholarship on AI governance converges on shared principles for responsible implementation in higher education. Papagiannidis et al. (2025) emphasised translating high-level ethical principles (accountability, transparency, fairness, privacy and human oversight) into concrete structural, procedural and relational practices across the AI lifecycle. Barus et al. (2025) grounded these recommendations in student perspectives, showing that learners strongly support AI integration but demand clear guidelines, ethics training and participatory governance to prevent plagiarism and preserve academic integrity. Together, these studies suggest that effective AI governance requires principle-based yet practice-oriented frameworks, multi-stakeholder participation, continuous adaptation, and a balance between innovation and the protection of human agency, equity and trust.

CONTEXT AT UNIVERSITY OF LILLE

The University of Lille, a large French institution with diverse disciplinary fields, observed an abrupt increase in student use of generative AI tools. An internal survey by the student association GALILLÉ surveyed 346 respondents from Bachelor and Master programmes across disciplines, including social sciences, humanities, health and STEM (Science, Technology, Engineering and Mathematics) fields. The survey estimated frequency and types of AI uses (information search, drafting, proofreading, idea generation), perceived usefulness and satisfaction, verification practices, and perceived risks. Results suggested that a majority used AI for information gathering, drafting, proofreading, idea generation and content review, with high levels of perceived usefulness and satisfaction (https://accueil.galille.org/accueil/nos-chiffres). However, only around half systematically checked the accuracy of AI-generated outputs, and trust remained ambivalent. This combination of intensive use, partial verification and uncertain trust created a fragile environment for learning and assessment, consistent with other surveys (Hillman et al., 2025; Brown et al., 2025).

Beyond initial education, the university provides continuing education and professional development. The same AI-driven transformations also reshape expectations for adult learners and employees requiring career-long skill updates (OECD, 2023; Lyndgaard et al., 2024). Lifelong learning therefore emerged as a unifying lens: AI is not only a topic within specific courses, but a cross-cutting challenge requiring an institutional strategy supporting continuous learning for all publics (Low et al., 2025). Throughout the process, a lifelong learning perspective was maintained: students, academic staff, and administrative staff were solicited not only as actors in developing rules and ethical guidelines, but as learners

needing to develop evolving competences to navigate AI-rich environments. Academic colleagues identified several tensions. First, academic integrity became harder to monitor as AI-generated texts challenged conventional plagiarism detection and blurred boundaries between assistance and delegation. Concerns also arose that reliance on AI might erode essential competences such as critical thinking, problem-solving and deep disciplinary understanding (Alshammari and Park, 2025). Finally, AI use raised privacy and data protection issues, particularly regarding input of personal or institutional data into external services, in a context where GDPR compliance is mandatory.

METHODOLOGICAL CHOICE: A PARTICIPATORY PROCESS

The University of Lille deliberately rejected an approach based on prohibition or purely technical control. Instead, the institution adopted a governance model grounded in three principles: awareness of both benefits and limitations of AI, engagement of students and staff in shaping recommendations, and flexible adaptation to a fast-evolving technological environment. Therefore, the political choice was driven to promote a charter being designed less as a static code of conduct and more as a shared learning tool that can be revisited, updated and appropriated across different life stages and across initial and continuing education programmes.

The methodological design followed a multiple-step participatory process: an initial diagnostic phase, a consultation phase with academic and support staff, and a co-construction phase organised around interdisciplinary working groups. This design combined empirical evidence on existing practices with deliberative spaces where different actors could articulate expectations, tensions and priorities regarding integrating generative AI in teaching and learning.

Two parallel processes were engaged. First, a process was initiated with elected student representatives, independently of teaching teams, in direct connection with the vice-presidency for education and pedagogical innovation. We chose to collect information on generative AI use from students and teachers separately in order to make it easier for students to speak freely, since many of them fear academic consequences or being suspected of dishonesty (Gonsalves, 2025). This interaction led to a student survey, spontaneously designed and headed by a student association. With 346 respondents across multiple programmes, the survey provided an empirical map of AI appropriation and highlighted ambivalences mentioned above. Second, consultations with teachers and educational support staff were performed, underlining uneven levels of AI familiarity and significant uncertainty about policies and pedagogical implications.

The university then launched a participatory process to co-construct a Charter of Good Pedagogical Practices for AI. Working groups involving teachers from different disciplines, educational designers, IT and data protection officers, and student representatives were established. This composition reflected the university community's diversity at disciplinary, technical and pedagogical levels. Each group gathered approximately 18 to 36 participants and met several times between November 2024 and March 2025. Three consultation meetings took the form of focus groups and extended discussions, during which participants described concrete classroom situations, perceived benefits and risks of AI, and possibilities of regulating its use. Discussions were documented and synthesised, subsequently constituting the Charter's framing.

The goal was not to produce recommendations that would quickly become obsolete, but to define stable principles, values and guidelines capable of guiding decisions despite technological change. This choice reflects a lifelong learning perspective: rather than

embedding rigid rules, the university sought to develop a shared culture and reflexive competences that can evolve over time and across learning pathways. The final Charter text was written collegially in working groups, then briefly circulated to gather feedback from the wider community before formal adoption.

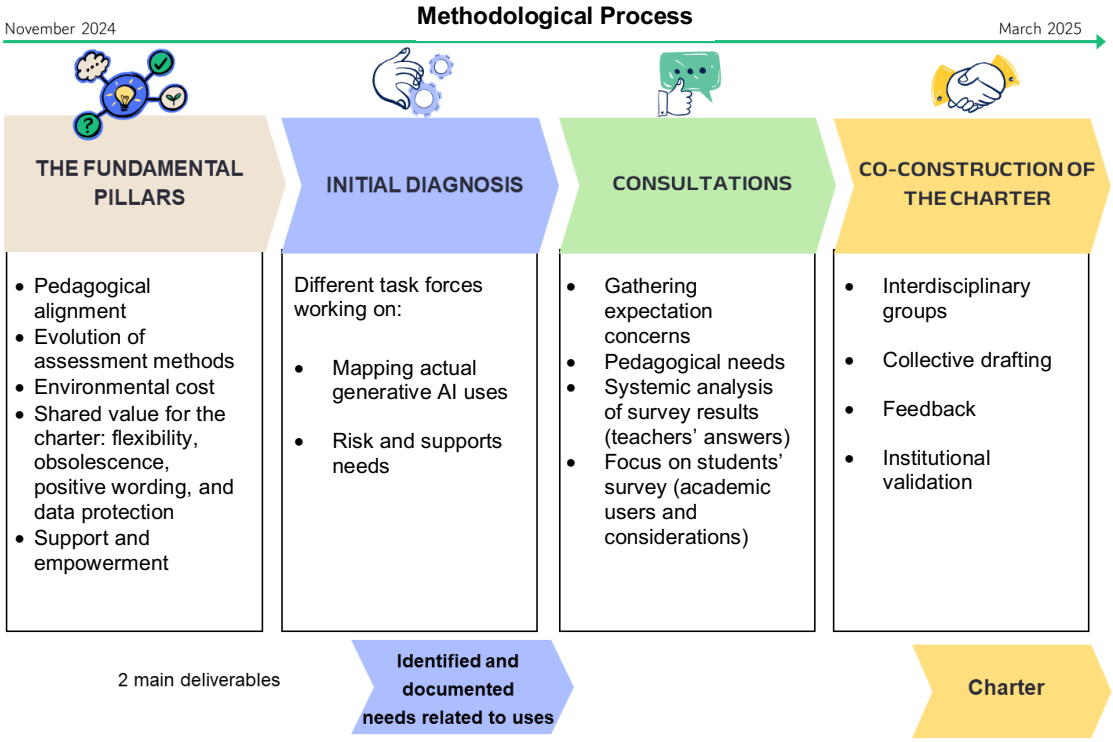

Figure 1. Participatory Methodological Process for the AI Charter

THE CHARTER: PRINCIPLES AND PEDAGOGICAL DIMENSIONS

The core principles of the Charter did not emerge *a priori*. The resulting charter was structured around five core principles: **transparency**, **critical thinking**, **academic integrity**, **data protection** and **responsibility**. Transparency requires both teachers and students to clearly indicate when and how AI tools are used, whether in course design, assessment preparation or student work. Critical thinking emphasises using AI outputs as objects of analysis rather than truths to be accepted, inviting students to question, verify and contextualise AI-generated content. Beside critical thinking, the ecological dimension and environmental cost of using generative AI were raised by many colleagues as a central concern, stressing that digital frugality should be actively encouraged as a guiding practice. Even though the Charter supports integration of generative AI, it does not encourage treating these tools as indispensable teaching components.

Maintenance of academic integrity remained central. The charter acknowledges that AI can support learning but insists that assessments must still validly certify individual competences, especially in high-stakes or professional programmes. Clear rules distinguish acceptable forms of AI assistance from misconduct, and teachers are encouraged to redesign assessment tasks towards more authentic, process-oriented and collaborative formats, so that learning outcomes remain meaningful. Data protection principles ensure compliance with European regulations and caution against exposing personal or sensitive information to external platforms. Responsibility is conceived as a shared duty of institutions, staff and

students to consider consequences of AI uses and to act in ways that preserve fairness, inclusion and trust.

These principles are linked to concrete pedagogical dimensions. The charter calls for alignment between AI-related practices and intended learning outcomes of each course and programme. Teachers are encouraged to identify which competences should be developed primarily, such as ethical reasoning, complex judgement, embodied skills, and which tasks can be supported by AI, promoting a more purposeful distribution of roles. The charter also insists on adapting assessment methods to potential AI uses, for instance, by integrating in-class activities, oral examinations, project-based learning and reflective components that make uncritical AI delegation less viable.

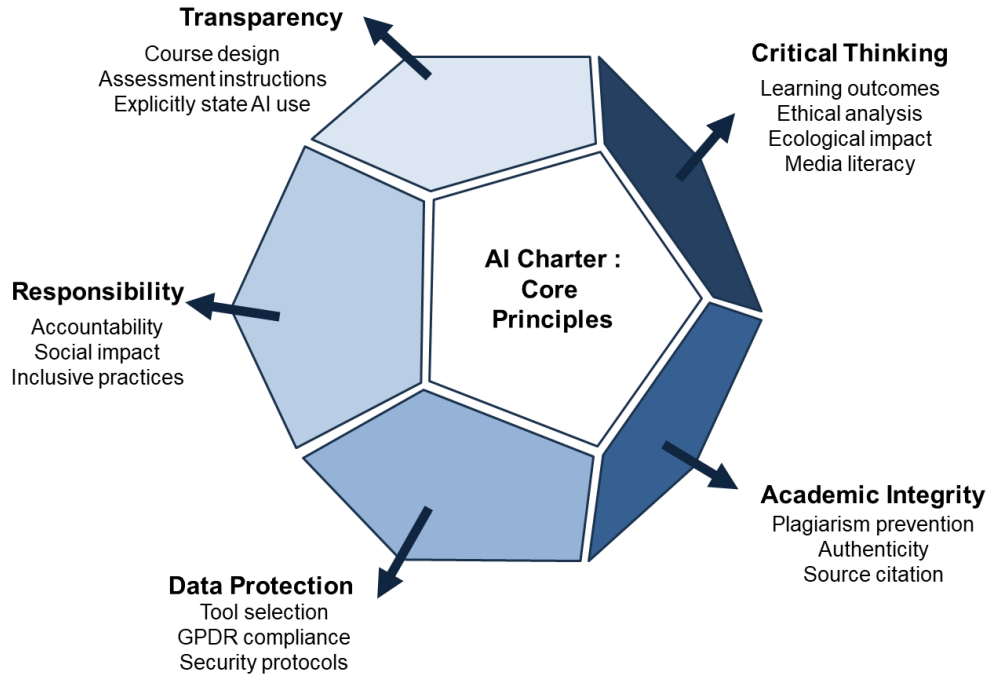

Figure 2. Core Principles of the Charter and Pedagogical Dimensions

A LIFELONG LEARNING LENS ON AI GOVERNANCE

From the outset, the initiative was framed as a contribution to the university's lifelong learning mission rather than a narrow response to immediate academic integrity concerns. AI is reshaping the skills expected of graduates, and international organisations underline that continuous learning will be essential for workers to remain employable. Simultaneously, teachers and staff are themselves learners who must acquire new competences to design, implement and evaluate AI-mediated pedagogies.

The charter therefore addresses multiple audiences along the life span. For initial degree students, it aims to develop critical AI literacy that can be mobilised in subsequent professional and personal contexts. For adult learners in continuing education, it offers a framework to understand and integrate AI's role with discernment in their jobs, whether in health, education, administration or industry.

The initiative also emphasises inclusivity and equity, central to contemporary lifelong learning agendas. AI can exacerbate digital divides if only some learners have access to powerful tools, adequate devices or sufficient literacy to use them effectively. By institutionalising principles and offering structured support, the University of Lille seeks to reduce disparities between programmes, disciplines and learner groups, ensuring that AI-related opportunities are not confined to already privileged publics.

The charter has also become a catalyst for additional working groups, including in university administrative services and research laboratories, where dedicated charters are now being drafted in conjunction with the professional training directorate and other stakeholders.

MULTI-LEVEL AI ACCULTURATION

To operationalise this lifelong learning orientation, the university supports AI acculturation at several levels, from brief introductory sessions for all community members to more sustained workshops and open-access training. These activities help students, teachers and administrative staff acquire a basic understanding of generative AI, explore concrete pedagogical and professional uses, and engage critically with issues such as bias and environmental impact. The consolidation of all initiatives will form part of an upcoming training plan covering both administrative and academic staff.

Across these different levels, AI-related skills are treated as dynamic and open-ended rather than as outcomes of a single course, encouraging repeated engagement over time and embedding lifelong learning within the institution's strategy.

EARLY OUTCOMES AND CRITICAL REFLECTIONS

Although the initiative is still in development, several early outcomes are visible. At the level of discourse, the charter has helped shift institutional narratives from prohibition and policing to a language of support, responsibility and critical engagement. Teachers report that having a shared framework reduces uncertainty and provides a basis for explaining expectations and rationales to students. In some courses, assessments have been redesigned to include explicit reflection on AI use, critical analysis of AI-generated content, or collaborative projects where AI is one tool among others.

The process has also revealed tensions and limitations. Not all teachers have the same level of digital confidence or time to engage in training and redesign, and some worry that integrating AI will normalise dependence on tools whose long-term effects on cognition and professional identity are unclear. Students appreciate clearer guidance but may perceive differences between disciplines or teachers as unequal treatment. For adult learners returning to education, there is a risk that the expectation to master new digital tools in addition to disciplinary content may be experienced as an additional barrier. Supporting lifelong learning around AI requires efforts in staff development, acculturation, infrastructure and coordination, which is challenging under limited resources. Finally, as the charter is not, by its nature, legally binding, the question arises as to how the charter is incorporated into the study regulations of faculties and departments, in accordance with a principle of subsidiarity.

The University of Lille's initiative is part of a national dynamic of developing sovereign generative AI, respecting GDPR and developing generative AI specialised for teaching, learning and research, in accordance with constraints of higher education and French universities (to reduce inequalities between learners) and hosted in situ in universities (data protection and privacy). The initiative is therefore consistent with national efforts to develop

sovereign generative AI solutions for education and research, hosted on university-controlled infrastructures. By encouraging use of GDPR-compliant and locally hosted tools, the university aims to mitigate geopolitical and data-sovereignty risks associated with commercial AI services while reducing inequalities in access between institutions and learner groups.

EUROPEAN POSITIONING AND TRANSFERABILITY

The University of Lille's approach is aligned with European values and principles for responsible AI, data protection and university lifelong learning, emphasising participatory governance, personal data protection and coherence with educational objectives (OECD, 2023; European Commission: Directorate-General for Education, Youth, Sport and Culture, 2026). It is embedded in international networks that support sharing of experiences, benchmarking of practices and joint development of resources, and offers several transferable elements for other institutions: principle-based rather than tool-based rules, a data-informed and participatory design process, and a multi-level acculturation model for students and staff (including adult learners).

From a lifelong learning perspective, it shows that AI governance in higher education should extend beyond internal academic debates to include partnerships with employers, regional authorities and civil society, so that AI-related curricula and guidelines follow labour market developments while keeping ethical and social issues at the core. This, in turn, positions university AI charters as tools for wider social dialogue about AI, work and citizenship (Portocarrero Ramos et al., 2025; Low et al., 2025).

Across European higher education, institutional responses to generative AI vary in scope and emphasis. For example, ETH Zurich's "Generative AI in Teaching and Learning – Guidelines" adopts a proactive but primarily assessment-centred approach: lecturers are encouraged to allow GenAI under conditions of responsibility, transparency and fairness, with legal aspects covered by existing performance assessment rules and declarations of originality (ETH Zurich, 2024). Similarly, the Open University in the UK defines three categories of AI use for assessments, ranging from prohibition to mandatory use, providing clear but largely assessment-specific guidance to students and tutors (The Open University, 2025). Recent analyses by international organisations indicate that many universities still focus their institutional documents on risks, integrity and exam regulations, with fewer initiatives explicitly linking AI governance to broader strategies for lifelong learning and university continuing education (UNESCO, 2023).

CONCLUSION

The University of Lille's Charter of Good Pedagogical Practices for AI shows how a higher education institution can respond to the disruptive effects of generative AI by embracing its lifelong learning mission. Instead of prohibiting tools that students and professionals will inevitably encounter, the initiative aims to build a shared culture of critical, ethical and purposeful AI use, positioning the university as a learning organisation that can adapt to technological change while preserving academic integrity and promoting equity. By framing AI as both a challenge and an opportunity for lifelong learning, it shifts the central question from whether to integrate AI into education to how to do so in ways that help learners of all ages develop the capacities needed to navigate an uncertain future. In doing so, the initiative offers other universities a context-sensitive, participatory model that can strengthen a European ecosystem in which AI supports the goals of university lifelong learning.

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ESCAPE GAME PEDAGOGY: A FRAMEWORK FOR INCLUSIVE LIFELONG LEARNING

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ABSTRACT

Accelerated transformation in working life and society has heightened the demand for flexible, inclusive, and purposeful pedagogical approaches in higher education and lifelong learning. The diversity of adult learners calls for learning environments that support participation, agency, and inclusion. This paper examines escape game pedagogy as an innovative practice for promoting inclusive learning in lifelong learning based on the pedagogical implementations developed at the University of Eastern Finland.

Therefore, escape game pedagogy is approached through three complementary perspectives, each supported by prior research: experiential and multisensory learning, collaborative learning and social inclusion, as well as active learner agency, psychological safety, and the acceptance of uncertainty. Escape game pedagogy is not just a motivating, gamified method, but a learner-centred and collaborative pedagogical approach. From an inclusive learning perspective, educational escape games foster diverse modes of participation and knowledge construction and offer a flexible framework for designing collaborative and inclusive learning environments in lifelong learning contexts.

INTRODUCTION

Continuous changes in working life and society have increased the need for adults to upscale their competencies, placing new demands on the pedagogy of lifelong learning. This highlights the need for learning solutions that recognise the diverse backgrounds, capabilities, and ways in which adult learners participate in learning (Arslan et al., 2024). Higher education institutions, as providers of continuing education, have faced a growing need to experiment with new pedagogical approaches to support adult learners' agency, inclusion, and meaningfulness of learning in more diverse ways. Within this transformation, universities function not only as providers of education but also as pedagogical development environments in which new forms of learning can be tested, evaluated, and embedded as part of lifelong learning.

At the University of Eastern Finland, escape game pedagogy has been developed and applied as a pedagogical approach to support learning since the early 2020s. This development has been supported by UEF's unique Sm4rt LOC escape game laboratory, which was designed specifically for the development of educational escape games. Originally, escape games were created as entertainment-oriented activities in which participants solve tasks within a limited time to achieve a shared goal (Nicholson, 2015). When applied in educational contexts, educational escape games are deliberately designed

to support predefined learning outcomes and competence development (Fotaris & Mastoras, 2019; Veldkamp et al., 2020).

Educational escape games offer a pedagogical approach that addresses key challenges in lifelong learning and adult education by integrating experiential, collaborative, and inclusive learning. The key characteristics of escape game pedagogy include narrative structure, immersion, problem-solving, and collaboration, which together create active and learner-centred learning situations. The gamified structure encourages practical application, collaborative learning, and reflection, supporting different ways of participation. Owing to these features, escape game pedagogy is adaptable to a wide range of educational contexts and can be implemented in various formats, including physical, digital, hybrid, and portable solutions. In this article, the term 'escape games' is used to refer to all these modalities.

At the University of Eastern Finland, escape game pedagogy has been applied across educational levels, illustrating its scalability from early education to adult and continuing education. Examples include a physical escape game supporting early literacy skills in primary education; work-life-oriented physical and virtual escape games in pharmacy degree programmes; and, within lifelong learning, a hybrid escape game supporting hybrid teaching practices, as well as digital escape games addressing Finnish language learning and sustainable circular economy. In addition, escape game pedagogy has been utilised in teacher professional development, where escape games function both as a pedagogical method and as a means for learning escape game pedagogy itself. The flexibility of the approach aligns well with the pedagogical needs of lifelong learning. Through deliberate choices in implementation format and game design, escape games can respond to diverse learning needs and offer opportunities to enhance accessibility and support inclusive learning environments.

Our practical observations indicate that escape game pedagogy is not merely a motivating or entertaining method; rather, it structures learning as an experimental, collaborative, and learner-centred process. This perspective aligns with research on adult education and lifelong learning, which emphasises the active role of learners, interaction, and meaningful, accessible learning environments (Gouthro & Holloway, 2023; Arslan et al., 2024). Driven by digitalisation, higher education institutions are increasingly developing flexible, learner-centred solutions that promote inclusion and collaborative learning (Håkansson Lindqvist et al., 2024). In this context, adult education requires pedagogical approaches that strengthen learner agency and enable experiential, collaborative, and flexible learning.

In higher education, educational escape games have become increasingly common as tools for developing communication, teamwork, and problem-solving skills, as well as for enhancing students' motivation and engagement (Clarke, 2017; Charlesworth, 2018). Escape game pedagogy has also been shown to promote experiential learning, learner agency, and lifelong learning competences in adult education (Mijal et al., 2020). Based on practical experience, escape game pedagogy has proven to be an approach that enriches both teaching and learning. Within the context of lifelong learning, escape games provide learners with opportunities to engage actively, leverage their existing knowledge, and collaborate in constructing new understanding. They lower the threshold for participation, support diverse ways of learning, and create space for shared problem-solving.

This paper examines how escape game pedagogy can support inclusive learning in the context of lifelong learning. The topic is approached from three key perspectives that characterise both pedagogical escape games and the particular needs of adult learning. The first perspective focuses on experiential and multisensory learning, the second on collaborative learning and social inclusion, and the third on active learner agency, psychological safety, and the acceptance of uncertainty in learning.

Example of Escape Game Pedagogy in Practice: The “Emergency Lighthouse”

The Emergency Lighthouse is a short, physical educational escape game designed to demonstrate to teachers how subject-specific learning content can be embedded in an immersive game narrative. The game is played in a physical room in small groups and lasts approximately ten minutes. The space is staged with lighting and sound effects to create an immersive atmosphere.

The session begins with a brief introduction to the game narrative and the collaborative nature of the task. At the start of the game, participants access an audio message via a QR code introducing the scenario: due to climate change, an ice floe has collapsed, creating a hazard for ships at sea. The players’ task is to activate an emergency lighthouse by following an activation manual and solving three interconnected tasks. In this example, the tasks focus on mathematical literacy, including logical reasoning, equation solving, identifying geometric figures, and reading coordinates. Each task solved reveals information needed to progress, ultimately leading to a numerical code.

After completing the game, a guided reflection is conducted in which participants discuss their experiences and the thoughts the game evoked. In a teacher professional development context, the discussion also examines how narrative, atmosphere, and subject content were integrated into the game and how similar design principles could be applied in participants’ own teaching.

EXPERIENTIAL AND MULTISENSORY LEARNING

In educational escape games, the principles of experiential and multisensory learning are realised. Escape games are grounded in experiential learning, as they integrate hands-on activity, problem-solving, and a narrative context in ways that engage learners through multiple sensory channels and support learning through experience (Fotaris & Mastoras, 2019; Veldkamp et al., 2020). Due to these structural features, escape games create learning situations where participation is not restricted to a single mode of engagement but instead enables learners to draw on diverse strengths and sensory modalities.

Inclusive learning requires learning environments that acknowledge learners’ diverse backgrounds, capabilities, and ways of engaging in the learning process. In adult education and lifelong learning contexts, learners differ in prior knowledge, motivation, learning histories, and life situations, which places demands on pedagogical solutions. Consequently, learning environments should offer multimodal and flexible opportunities for participation, rather than relying solely on linguistic or theoretical transmission of knowledge (Holloway & Gouthro, 2024).

Experiential learning provides a strong pedagogical foundation for inclusive approaches. According to Kolb (1984), learning is a continuous process in which knowledge is constructed through the interaction of concrete experience, reflection, conceptualisation, and active experimentation. This approach goes beyond passive reception of information, enabling multiple forms of participation while integrating cognitive, emotional, and practical dimensions.

Multisensory learning complements the experiential approach by offering learners multiple pathways for processing information and constructing meaning. Multisensory-enriched learning situations can be particularly beneficial in heterogeneous learner groups, where cognitive and practical strengths vary (Mathias & von Kriegstein, 2023). Learning environments that incorporate multisensory elements lower barriers to participation and

enhance accessibility, as learning extends beyond reading or listening to include doing, observing, and interacting. Such approaches also support strength-based learning, enabling different learners to draw on their preferred ways of participating and learning.

From the perspective of adult education, experiential and multisensory learning methods are especially significant, as adult learners benefit from authentic and practice-oriented learning experiences that connect with their prior experiences and personal goals (Sisselman-Borgia & Torino, 2017). These pedagogical approaches can strengthen motivation, engagement, and the perceived meaningfulness of learning in lifelong learning contexts.

Educational escape games have been used particularly in higher education and professional competence development. They have been shown to support learner engagement, motivation, and the experiential quality of learning (Fotaris & Mastoras, 2019; Veldkamp et al., 2020). However, educational escape games alone do not ensure a complete learning process, but require integration with other elements to support learning outcomes. Based on our observations from educational escape game implementations, escape games function especially well as part of a broader learning process in which experiential activity and reflection deepen theoretical understanding. In practice, learners first familiarise themselves with the relevant theoretical content, then apply their knowledge in the escape game through concrete and immersive activities, and finally deepen their learning through collective reflection after the game.

This structure appears particularly effective in adult education contexts, where the perceived meaningfulness of learning often emerges from the dialogue between theoretical knowledge and concrete action (Charlesworth, 2018; Mijal et al., 2020). For example, in teacher professional development, educational escape games have been used to deepen previously covered theoretical content, while post-game reflection supported the articulation of learning experiences, made competences visible, and reinforced theoretical understanding.

COLLABORATIVE LEARNING AND SOCIAL INCLUSION

Collaborative learning is grounded in the idea that learning is not an individual performance; instead, the entire group works together towards a shared goal, with learning occurring through active interaction. The importance of positive interdependence is emphasised, as group members recognise that their participation affects the success of others (Hellström et al., 2015). In educational escape games, collaborative learning is supported through deliberately structured tasks requiring equal participation from all group members. Because progress depends on collective effort, educational escape games strengthen the core principle of collaborative learning: positive interdependence.

Collaborative learning constitutes a key foundation for inclusion, as it is built on shared participation and collective activity. In educational escape games, inclusion is reinforced by multisensory and experiential structures that offer alternative ways of participating and draw on diverse strengths. In adult education, collaborative learning supports inclusion particularly because learning takes place through interaction with others. Each learner's role is meaningful, and group-based learning enables multiple perspectives.

From the perspective of self-determination theory, inclusion in adult learning is grounded in supporting three basic psychological needs: relatedness, autonomy, and competence. Inclusive learning can be promoted by strengthening a sense of community, supporting learner autonomy, and providing space for interaction (Deci & Ryan, 2000). Escape games are based on a shared goal principle in which the learning tasks and game structure guide participants towards a common objective achievable only through collaboration (Veldkamp et

al., 2020). As collaborative learning environments, educational escape games often include tasks that cannot be solved individually, requiring active interaction and diverse problem-solving strategies. In adult learner groups, collaboration does not always emerge spontaneously; thus, educational escape games provide a safe and structured framework that supports collaborative learning and the social nature of learning. The narrative dimension of educational escape games helps build an immersive frame for learning, promoting social inclusion by reducing group hierarchies and highlighting diverse strengths in achieving the shared goal.

Collaborative learning in educational escape games supports metacognitive collaboration within the group. This involves conscious monitoring, regulation, and evaluation of thinking and learning processes, as players share cognitive tasks during gameplay. Metacognition is evident when group members explain their reasoning to one another, construct shared understanding, and make decisions collectively (Papadopoulos & Tenta, 2021). In adult education contexts, collaborative learning deepens learning and promotes the co-construction of knowledge, as learners justify their viewpoints (Johnson & Johnson, 2014; Leppilampi, 2018). At the same time, it fosters conditions for inclusive learning, as peer support reduces uncertainty and encourages participation (Nzuza & Chitiyo, 2024).

By their very nature, educational escape games support collaborative learning and creative problem-solving. Within them, adult learners' diverse backgrounds, levels of expertise, and learning styles contribute to collaborative learning and enable the solving of escape game challenges by drawing on different strengths. When designing educational escape games, it is therefore important to ensure that tasks allow the use of varied competencies, such as logical reasoning, creativity, and technological skills, so that learner diversity actively supports shared problem-solving (Taraldsen et al., 2020)

ACTIVE AGENCY IN EDUCATIONAL ESCAPE GAMES

In adult learning, agency is closely connected to learners' perceptions of their own competence and their willingness to engage with uncertainty and challenging learning situations. Bandura's concept of self-efficacy emphasises that individuals' beliefs in their capabilities influence whether they are willing to try new approaches, take risks, and commit to the learning process (Bandura, 1977). Among adult learners, this process is often complicated by prior expertise and professional identity. The more strongly a learner identifies as an expert, the greater the likelihood of experiencing fear of failure or concern about having their competence questioned.

Consequently, participation in educational settings entails not only cognitive challenges but also a perceived risk of compromising expert identity and credibility, which may diminish the willingness to engage actively and share unfinished ideas. This dynamic has also been evident in our own implementations, particularly in escape game contexts addressing areas where participants have strong existing expertise, where pressure to perform flawlessly has increased uncertainty and reduced readiness for collective problem-solving.

However, uncertainty is not only a barrier to agency but also a central element of adult learning from the perspective of transformative learning. The literature on transformative learning suggests that learning is often triggered when previously held assumptions and certainties are challenged. Reviews of Mezirow's theory of transformative learning indicate that adult learners require so-called "disorienting dilemmas" to critically reassess and renew their thinking (Fleming, 2018). Research also shows that tolerance of uncertainty is associated with learners' engagement and resilience, which are key factors in lifelong learning among adults (Yu, Wang & Xia, 2022).

Because learning requires the ability to tolerate uncertainty and accept incompleteness, psychological safety is an essential prerequisite for adult learning. According to Edmondson (2014), psychologically safe environments enable individuals to take learning-related risks, express unfinished ideas, and make mistakes without fear of negative consequences. In adult learning contexts, psychological safety is particularly critical in group settings, where fears of evaluation or of compromising one's professional identity may lead to withholding questions, ideas, and mistakes essential for learning. Research shows that teams with high psychological safety learn more precisely because participants are willing to share uncertainty and explore solutions openly (Edmondson & Lei, 2014).

Educational escape games provide learning environments in which agency, psychological safety, and the handling of uncertainty can be practised simultaneously. A defining feature of escape games is that learners cannot predict how the game will unfold or which solutions are correct; progress therefore requires uncertainty, experimenting, and making mistakes. This normalises uncertainty as an integral part of the learning experience and prompts learners to accept incompleteness as a given condition (Rawlinson & Whitton, 2024). Unlike in many traditional learning situations, prior expertise and competence does not guarantee correct answers; instead, learning is constructed through shared experimentation and collaborative problem-solving.

The combination of theory, practical application, and error resilience supports holistic learning. Making and correcting mistakes is a natural part of learning, as learning from errors effectively deepens understanding and strengthens memory, especially when accompanied by feedback and reflection (Mera et al., 2022; Burch et al., 2019). The gamified frame of educational escape games creates a safe space for trial and error, as mistakes are framed as part of a collective solution process rather than individual shortcomings. A shared goal and a collaborative game setting support participation and encourage learners to attempt different approaches without the stigma of failure (Rawlinson & Whitton, 2024). Such error-tolerant and exploratory environments support psychological safety and strengthen adult learner agency by helping learners tolerate incompleteness, take learning-related risks, and view uncertainty as an integral element to learning rather than an obstacle.

CONCLUSIONS

In the context of lifelong learning, learning environments that support experiential and multisensory learning, collaborative learning and social inclusion, as well as active learner agency, are particularly significant for the implementation of inclusive education. This analysis is grounded in three complementary perspectives, which demonstrate that escape game pedagogy is not merely a gamified teaching method but rather an approach that actively advances inclusion in lifelong learning. Through these perspectives, escape game pedagogy emerges as an innovative practice that addresses core pedagogical needs and challenges of lifelong learning.

Inclusive learning requires pedagogical solutions that enable diverse ways of participation and learning. Educational escape games offer a flexible approach that combines experiential activity, shared problem-solving, and reflection. Multisensory and experiential elements support inclusive learning by providing adult learners with participatory ways of constructing knowledge. Collaborative learning further contributes to inclusivity through shared participation and positive interdependence. In educational escape games, the principles of collaborative learning are realised naturally, creating conditions for achieving shared goals by drawing on learners' diverse strengths. In adult learning, agency is fostered within psychologically safe environments where uncertainty and mistakes can be encountered

without threatening professional identity. Within escape game pedagogy, uncertainty and incorrect solutions function as elements that deepen learning and strengthen active agency.

While escape game pedagogy offers considerable pedagogical potential, its implementation involves important design considerations. Different implementation formats pose distinct challenges: physical escape games require careful attention to accessibility, whereas digital and hybrid formats may better accommodate diverse learner needs. Designing educational escape games is also time-consuming, particularly for educators new to the approach, and requires deliberate pedagogical planning to align gameplay with learning objectives. Moreover, escape games alone do not constitute a complete learning process; their educational value emerges when gameplay is integrated into a broader learning process, particularly through post-game reflection.

When thoughtfully designed and pedagogically integrated, educational escape games appear as flexible, adaptable, and multifaceted learning environments that can be applied to different educational contexts, target groups, and modes of delivery. This versatility makes escape game pedagogy particularly well suited to the needs of lifelong learning, where learning environments are expected to be versatile, participatory, and capable of responding to changing situations.

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BUILDING THE FUTURE OF LEARNING IN THE AGE OF AI. THREE QUESTIONS TO HEATHER HASELEY

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Interview

Artificial intelligence is rapidly transforming higher education and lifelong learning. Over the last few years, AI has moved from being an emerging technological innovation to becoming an increasingly pervasive presence in educational environments, influencing how learning experiences are designed, delivered, assessed, and supported. Universities across the world are exploring its potential to personalise learning, expand access, improve efficiency, and respond more effectively to rapidly changing societal and labour-market needs. At the same time, the growing integration of AI into educational systems raises important questions.

Heather Haseley is the inaugural Chief Lifelong Learning Officer at Imperial College London, where she leads Imperial Lifelong Learning as part of the institution's Science for Humanity strategy. Throughout her career, she has held leadership positions at several internationally recognised institutions, including the University of Exeter, Arizona State University, the University of Pennsylvania, Northwestern University, and Columbia University. Her work focuses on learning innovation, educational transformation, digital credentials, skills development, immersive technologies, and the future of learning, with particular attention to how emerging technologies can support more equitable, human-centred, and future-oriented educational systems.

While technological innovation offers unprecedented opportunities, it also challenges long-established assumptions about teaching, learning, expertise, and human development. Concepts such as personalisation, scale, efficiency, and accessibility are frequently invoked in discussions about AI-enhanced education, yet they are often interpreted in simplistic or purely technological terms. Personalisation, for example, can easily be reduced to automated adaptation; scale can become synonymous with mass content delivery; and efficiency can risk overshadowing deeper educational purposes. These tensions are particularly relevant within the field of university lifelong learning. Lifelong learners represent highly diverse populations, characterised by different educational backgrounds, professional trajectories, aspirations, and learning needs. In this context, the challenge is not simply how to use AI, but how to use it in ways that strengthen rather than diminish the human dimensions of learning. Questions of equity, critical thinking, learner agency, social connection, and pedagogical quality become increasingly important as AI systems become more powerful and more widely available. These questions have become central to Heather Haseley's work on the future of learning and the evolving relationship between artificial intelligence, higher education, and lifelong learning.

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Rather than focusing exclusively on technological capabilities, her research and leadership have consistently explored the broader educational and societal implications of AI, encouraging institutions to reflect on the kind of learning ecosystems they seek to create. A recurring theme throughout her work is the idea that AI should help us become more human, not less, by strengthening rather than diminishing the relational, reflective, and developmental dimensions of learning. In this interview, she reflects on three themes that have become central to contemporary debates on AI and lifelong learning: personalisation beyond automation, the responsible use of AI in educational settings, and the challenge of scaling learning opportunities without losing meaning, quality, and human connection.

Ester Cois: Personalisation is often presented as one of the main promises of AI in education. Different people need different things at different times and in different ways and therefore require highly relevant and responsive learning solutions. At the same time, we should be careful not to equate personalisation with automated adaptation or content customisation alone, recognising instead the importance of learners' contexts, motivations, and learning trajectories. How can AI support forms of personalisation that go beyond automation and truly respond to learners' diverse needs without oversimplifying learning or replacing human pedagogical judgement?

Heather Haseley: One of the first things we need to recognise is the pace at which this field is evolving. The answers I would have given six months ago would already be different today, and by the time this interview is published, what is possible will have changed again. Universities therefore need to think carefully about how they develop learning experiences and maintain their relevance in an environment characterised by rapid technological change.

A useful distinction is between personalisation and hyper-personalisation. Hyper-personalisation resembles the logic of social media feeds, where individuals are exposed only to information that aligns with their interests and preferences. While this may appear beneficial, it can create informational bubbles, encourage atomisation, and ultimately become dehumanising. Educational experiences should not become so personalised that they are detached from context, community, and meaningful interaction with others.

Instead, AI should be used to help us become more human, not less. It should create space for connection, conversation, collaboration, and practical application. This begins with good pedagogy. The emergence of AI does not invalidate decades of educational research. Scaffolding remains important. Universal Design for Learning remains important. Learners still need opportunities to encounter concepts in meaningful sequences, to be stretched, and to struggle productively, because learning often occurs precisely in those moments of challenge and growth.

Within this pedagogical framework, AI can support learners in several valuable ways. One important application is helping individuals analyse their existing skills and capabilities and identify personalised pathways towards specific goals. Rather than decontextualising learning, AI can help learners understand which courses, experiences, or learning opportunities are most relevant for achieving their personal and professional aspirations.

AI can also facilitate just-in-time learning. Learners often need support at the exact moment a problem emerges, whether that is during a class, at work, or in the middle of the night. AI can provide immediate guidance and access to information when it is needed most. At the same time, learners must develop the capacity to critically evaluate the information they receive rather than accepting it uncritically.

Another important area concerns personalised support and intervention. Educational institutions already collect large amounts of information about learner engagement and behaviour. AI can help identify patterns that indicate when learners are struggling and can do so earlier than traditional approaches. This allows educators to provide timely and targeted human support, making interventions more effective and helping learners achieve success more quickly.

AI can also contribute significantly to accessibility and inclusion. Whether through translation, adaptation of materials, or support for learners with disabilities and diverse learning needs, these technologies can help make educational opportunities more equitable and accessible.

At the same time, institutions must intentionally design opportunities for learners to engage with one another. Personalisation does not eliminate the need for community. Learners need spaces where they can discuss ideas, challenge assumptions, collaborate in teams, and benefit from perspectives that differ from their own. Human peers often provide forms of critical feedback that AI systems cannot currently replicate. AI tends to be highly self-affirming; it rarely tells us that an idea may be flawed or that we may have overlooked an important perspective. Other people do. They bring alternative experiences, different viewpoints, and constructive disagreement, all of which remain essential for meaningful learning.

For the same reason, learners need opportunities to engage with authentic problems, real-world debates, and complex challenges that require dialogue, judgement, and collective reflection. These are fundamentally human dimensions of education that cannot simply be delegated to AI.

Finally, AI can serve as a connector between learners. It can help match individuals with peers who share similar goals, with coaches and mentors who can provide targeted support, and with people who have already succeeded in the areas to which they aspire. In this way, AI can help build relationships, strengthen learning communities, and connect learners with sources of inspiration and guidance.

Ultimately, the most meaningful forms of personalisation are not those that isolate learners, but those that help them navigate pathways towards their goals while strengthening the human relationships that support learning and development.

Ester Cois: How can we make responsible use of AI in educational settings and support learners in engaging with these tools in a balanced way—avoiding both fear and over-reliance—while fostering awareness of the importance of maintaining such balance?

Heather Haseley: I think this is a particularly important question because discussions about AI often become polarised. On one side, there are those who believe AI will solve nearly every problem and fundamentally improve society. On the other, there are those who view it as a threat that will undermine education, work, and human relationships. The reality is much more complex. AI offers significant opportunities, but it also raises important challenges that require careful governance, critical reflection, and deliberate choices about how these technologies are used.

The research landscape around AI and learning is evolving rapidly, and recent studies highlight a critical tension at the heart of AI-assisted learning. Shaw and Nave (2026) introduce the concept of “cognitive surrender,” referring to the tendency for individuals, particularly under time pressure, to defer decision-making entirely to AI rather than engaging their own reasoning. Shen and Tamkin (2026) demonstrate that AI use affects skill formation

differently depending on the learner's stage of development: experienced users may risk deskilling through cognitive offloading, while novices who rely excessively on AI may never develop foundational competencies in the first place. Gerlich (2025) similarly warns that habitual cognitive offloading can negatively affect critical-thinking capacity over time.

At the same time, Wang and Zhang (2026) provide an important nuance, showing that learners who engage AI as a genuine pedagogical partner rather than as a shortcut can simultaneously exercise critical evaluation and strategic offloading, thereby freeing cognitive resources for deeper and more transformative learning. The crucial distinction is therefore not whether AI is used, but how and why it is used.

Together, these studies reinforce a foundational principle of learning science: growth occurs within what Vygotsky (1978) termed the Zone of Proximal Development: the space between what learners can accomplish independently and what they can achieve with appropriate guidance and support. As educators, we have an ethical responsibility to remain informed about emerging evidence and to design learning experiences that preserve this space for development. AI should function as a scaffold rather than a substitute. We must intentionally create opportunities for reflection, critical thinking, and productive struggle because the stakes involve nothing less than the long-term cognitive development of learners.

This means that learners should not simply be given unrestricted access to AI tools without guidance. Just as learning itself requires scaffolding, AI use requires scaffolding. Students need opportunities to develop foundational knowledge and competencies before relying extensively on

AI support. If AI consistently bridges the gap between what learners can currently do and what they are expected to achieve, they may never fully develop the underlying skills required to evaluate, challenge, or improve the outputs they receive. Critical thinking cannot be reduced to telling students to "check the answer;" learners must possess sufficient knowledge and understanding to judge whether an answer is actually good or bad.

For this reason, educational design should continue to create spaces where learners grapple with complexity, encounter uncertainty, and engage directly with challenging tasks before turning to AI for support. We should use these technologies to extend learning, not to bypass it. Equally important is helping learners understand how learning itself happens, fostering reflective practice and metacognitive awareness alongside technological fluency.

More broadly, responsible use requires open and informed conversations about AI. Universities, educators, learners, and policymakers need sufficient levels of AI literacy to engage in meaningful debate about the values that should guide these technologies and the roles we want them to play in society. If we do not actively discuss these issues, we risk allowing technological development to proceed without sufficient consideration of its educational and societal implications.

Another important issue concerns ownership and the development of AI models. At present, much innovation is driven primarily by commercial interests and profit incentives. History reminds us that technological progress does not automatically translate into social benefit. Universities therefore have an important role to play in shaping alternative futures. Rather than simply adapting to technologies created elsewhere, higher education institutions should collaborate to help create and influence the kinds of tools they want to see in the world.

This includes supporting the development of open models and smaller, more sustainable systems that require fewer resources and can be used in a wider range of contexts. Such tools could be particularly valuable in regions with limited connectivity or infrastructure,

enabling local deployment, offline use, and broader accessibility. Equally important is ensuring transparency about how these systems operate and what their costs are.

Learners and educators should understand not only the benefits of AI but also its human, environmental, economic, and societal implications. Many AI systems are becoming embedded in everyday technologies so seamlessly that their presence often goes unnoticed. Yet every interaction carries costs in terms of energy consumption, infrastructure, labour, and social impact. Making these implicit dimensions visible is essential if we want learners to become informed and responsible users.

Finally, we are beginning to observe signs of societal concern regarding the economic consequences of AI, particularly in relation to employment. Public attitudes towards AI appear to be shifting as people begin to experience some of its wider social and economic effects. Whether these concerns represent a temporary adjustment or a longer-term challenge remains to be seen. What seems clear, however, is that new forms of work and new skill requirements will continue to emerge. Universities therefore have an ethical responsibility not only to educate learners about AI but also to support large-scale reskilling and upskilling efforts that enable individuals and communities to participate successfully in these evolving futures.

Ultimately, responsible use is not simply a matter of regulating technology. It is about making conscious choices regarding how AI is integrated into learning, how learners develop alongside it, and how educational institutions contribute to shaping technological futures that enable both human flourishing and social good.

Ester Cois: Scale is another recurring theme in current debates on education and lifelong learning. AI is frequently described as a way to expand access and provision at scale, yet scaling learning is not the same as merely scaling content delivery. In your view, how can AI help scale learning opportunities while preserving pedagogical quality, relational dimensions, and meaningful engagement with learners?

Heather Haseley: The first question we should ask is why we want to scale in the first place. Educational research consistently shows that smaller learning environments, personalised support, and even one-to-one tutoring can often be more effective. Therefore, scale should never be treated as an objective in itself. We need to be clear about why we are scaling any learning activity before deciding whether scale is the right approach.

If the goal is to increase access to learning opportunities that would otherwise be unavailable, then scaling can be highly valuable. Access does not automatically equate to learning, but making knowledge and learning opportunities available in contexts where they would otherwise be inaccessible is a worthwhile objective. At the same time, many institutions pursue scale because it reduces the cost of delivery. If more learners can be reached with fewer resources, provision becomes more efficient. The important question, however, is at what cost. If efficiency comes at the expense of deep learning, meaningful engagement, or educational quality, then we need to reconsider what we are doing.

For this reason, I believe we should always design for impact first and then determine whether scale is the most appropriate mechanism for achieving that impact. Rather than designing for scale and only later asking what impact it might produce, we should begin by identifying the outcomes we hope to achieve. Is the goal greater reach? Improved competency development? Faster creation and dissemination of knowledge? Once we are clear about the desired impact, we can decide whether and where scale is appropriate.

AI can support scale in several important ways. For educators and instructional designers, it can accelerate the creation and updating of learning materials, enabling more timely and contextually relevant content. The pace of discovery and change is significantly faster than it once was, and AI can help us shorten the development cycle so that learners receive relevant knowledge more quickly. Human expertise and pedagogical design remain essential, but AI can help increase the pace at which high-quality learning experiences are created.

Feedback represents another domain in which AI can add considerable value. AI can facilitate faster feedback, more frequent assessment opportunities, and earlier identification of learning difficulties. The feedback may not always be as deep as that provided by a human expert, but it can be delivered more quickly and more often. This creates more opportunities for iteration and improvement, while also enabling educators to identify where learners need additional support. In this sense, scale and personalisation become closely connected: AI can help us target human interventions more effectively and make those interventions more meaningful.

Beyond individual feedback, AI can help identify broader patterns of misunderstanding and recurring learner difficulties. These insights can inform redesign efforts and guide educators towards the areas where human support will have the greatest impact. In this way, technology can help ensure that human contact is used where it matters most.

Particularly interesting opportunities emerge in the design of simulations, game-based learning, and iterative practice environments. AI can support the creation of learning experiences in which learners repeatedly attempt tasks, receive feedback, revise their approach, and try again. It can help generate multiple variations of challenges within defined parameters, making it easier to create opportunities for practice, experimentation, and gradual skill development. These forms of test–feedback–revision cycles are often difficult to provide at scale through traditional approaches.

From the learner's perspective, one of the most significant benefits concerns opportunities for practice, particularly in areas such as language learning. One of the longstanding challenges in language education is that learners rarely receive enough opportunities to practise speaking. AI can help provide additional conversational practice, immediate feedback, and low-stakes opportunities to build confidence before engaging in real-world interactions. It does not replace human communication, but it can help learners arrive better prepared for it.

It can further support mastery at an individual pace, recognising that learners progress in different ways and at different speeds. Learners vary in the amount of practice they need, the speed at which they progress, and the kinds of support they require. By providing additional opportunities for practice, feedback, and iteration, AI can help learners identify areas where they are struggling and make the pathway towards their goals more visible and more achievable.

Perhaps one of the most transformative possibilities lies in contextualisation. One of the challenges of large-scale and global learning is that educational examples and case studies are often developed for a generic audience. Yet the realities faced by learners differ significantly across countries, professions, and communities. The challenges encountered by a learner in the United Kingdom may not be the same as those faced by a learner in Italy or elsewhere. AI can help generate contextually relevant scenarios, case studies, and problems that reflect learners' own environments and make learning more meaningful and immediately applicable. Ten years ago, creating this level of contextual adaptation for individual learners would have required considerable time and effort. Today, AI makes it increasingly feasible.

At the same time, we must remain vigilant. Scaling learning should not mean scaling content alone. The most important challenge is ensuring that we scale opportunities for practice, reflection, interaction, experimentation, and genuine learning rather than merely increasing the volume of information delivered. If we lose context, relationships, and human engagement, we risk undermining the very purpose of education. The goal should not be to scale content delivery, but to scale meaningful learning.

Ester Cois: Thank you very much.

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