ASCILITE 2026

The Future is Connection:

Collaboration, Creativity and Compassion in a Digital Society

Collective sensemaking of AI in higher education learning spaces

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Higher education is experiencing rapid and multifaceted change as artificial intelligence becomes increasingly embedded within teaching and learning. The attention of research and policy has focused on students' perspectives and securing assessment; less is known about how staff interpret what this means for the spaces where learning occurs. This qualitative case study examines the outcomes of a design-led professional learning workshop with 23 higher education professionals from diverse roles across Australasia. Workshop artifacts, including "How might we…" statements and associated memos, were analysed using reflexive thematic analysis. Five interconnected themes emerged from the analysis: Ideological positioning of AI within learning spaces; Critical design of learning spaces in the age of AI; Guiding student-centred ecologies with access, equity and inclusion; Co-intelligence in learning spaces; and Individual anxiety alongside a collective sense of opportunity. The findings suggest that participants conceptualised learning spaces as assemblages where ethical commitments, institutional values and emotional experiences are inseparable from spatial and technological design. This case study offers empirically grounded accounts of staff sensemaking and identifies key tensions and priorities for understanding learning spaces shaped by the emergence of AI.

Keywords: higher education, artificial intelligence, learning spaces, postdigital, co-intelligence, posthuman, case study

Introduction

In higher education, rapid social and technical changes, often unanticipated, have led to persistent changes in the learning behaviours and experiences of students (Bearman et al., 2023; Edgar et al., 2023; Wardak et al., 2022). To date, higher education has responded to the persistent changes of *artificial intelligence* (AI) by focusing predominantly on generative AI (GenAI) in assessment, academic integrity, and student use (Bearman et al., 2023; Huijser et al., 2026). These responses are not without reason; however, they leave open a broader

question of how AI influences the space where learning occurs. This gap is important as it risks overlooking the spatial, relational, and affective implications of learning in *higher education* spaces.

To understand this gap, an acknowledgement of the process of learning is required. While classroom and/or transmission focused models have been influential in education, they have existed alongside traditions that understand learning is constructive, social, contextual, and adaptive (Park & Choi, 2014; Sawyer, 2022). Today, learning can be more broadly understood as taking place across many different settings, with different resources and tools. In this process, students have ready access to information and bring their own experiences to build new knowledge (Gibbs, 2021). This aligns with a *postdigital* perspective of learning, where learning is not bound to physical sites, but emerges through the interrelations between people, technologies and contexts. From this perspective, *learning spaces* can be understood as assemblages of personal technologies, experiences, physical and digital/virtual infrastructure, pedagogical practice and relationships (Fawns, 2019; Gourlay, 2023). What students bring, alongside institutional infrastructure, governance, and technologies, therefore form part of learning spaces. While this study focuses on learning spaces, these are inseparable from broader educational spaces and contexts that shape how learning is designed and experienced.

Within these postdigital assemblages, the growing prominence of AI may introduce new complexity for how learning occurs. AI systems, more broadly than GenAI, are collecting data and performing analysis to inform decisions that impact educational systems, which come together in learning spaces (Shi et al., 2024; Yağanoğlu et al., 2024; Zhang et al., 2024). Therefore, AI could be said to redistribute agency across human and non-human elements within learning spaces. In doing so, AI may be influencing how learning activities are designed, monitoring behaviours and personalising experiences (Shafiq et al., 2022; Zhang et al., 2024). Therefore, AI falls within the sociomaterial construct of learning spaces, influencing learning. For this reason, this study looks to AI more broadly, rather than focusing on discrete tools such as GenAI, recognising its existing and emerging role in higher education learning spaces and potential influence on learning (Barola et al., 2022).

As AI becomes increasingly embedded within learning spaces, its influence extends beyond technical functionality. Therefore, understanding how learning spaces could be influenced by AI requires attention not only to technical capabilities but to the ethical, affective, and relational priorities shaping learning in these spaces. From a postdigital perspective, AI is not external to learning spaces but becomes part of the assemblages that constitute them. As such, AI, pedagogical practices, technologies, policies, infrastructure, values, and humans are mutually shaping one another through ongoing sociomaterial entanglements. These relationships may bring tensions between efficiency, monitoring, interaction and connection, as educators strive to maintain learning spaces as human-centred despite AI advances (Jandrić et al., 2018; Luckin et al., 2016). Therefore, this study asks, how is the concept of space in higher education learning environments evolving in response to AI, and what ethical, affective, and relational tensions arise as staff imagine physical, digital, and emotional learning spaces that sustain connection and wellbeing?

Conceptual framing of posthuman spaces for learning

To answer the research question, the study takes a *posthuman* framing of learning spaces. Learning spaces are understood as shaped by dynamic relationships between people, materials, technologies, and experiences (Ellis & Goodyear, 2016; Fenwick, 2012; Fenwick & Landri, 2012; Massey, 2005). How these elements come together influences learning activities within these spaces and, in turn, students' learning outcomes and satisfaction (Carvalho et al., 2025; Ellis & Goodyear, 2016; Kärnä & Julin, 2015; Perks et al., 2016). This understanding of space extends beyond formal physical classrooms to include online environments, homes, and community settings such as professional placements (Edgar, et al., 2024a; Edgar & Ziebell, 2024; Rudland et al., 2025). Rather than being discrete entities within education systems, learning spaces are mutually constituted through ongoing sociomaterial relationships that extend across wider spaces, environments and contexts. Consequently, research on learning spaces typically draws on multiple stakeholder perspectives and practices, including those of students, academics, architects, technologists, and infrastructure managers involved in designing and supporting learning environments (Ellis & Goodyear, 2016; Wilson & Randall, 2012).

Recent scholarly work suggests that postdigital education may reconfigure the role of the human in learning spaces (Jensen et al., 2025). As emerging technologies, including AI, become more deeply embedded within these spaces, the relationship between human and non-human agents is better understood not as binary, but as an entangled or dual essence (Wardak et al., 2022). From this perspective, AI does not create a new construct of learning spaces, but may reconfigure the assemblage of human, technology, and materials (Fawns, 2019; Philbeck, 2014). In doing so, AI could redistribute forms of agency, authority, and presence in the physical, digital, and emotional dimensions of learning spaces (Gravett, 2026).

These developments prompt a reconsideration of where learning occurs, who or what constitutes learning spaces, and how learning is enacted within them. Such questions align with broader debates in social and psychological studies of posthumanism, transhumanism, digital humanism, and digital humanities (Gravett, 2025). In this study, a posthumanist lens is adopted to understand learning spaces as interdependent systems, where human and non-human elements are codependent and mutual, rather than spaces that are backdrops for individual activity (Haraway, 2018). This framing foregrounds how learning spaces are continuously produced through relationships, practices, and technologies, as well as supports an analysis of how these sociomaterial configurations are interpreted and negotiated with the emergence of AI.

Materials and methods

This study was conducted as a qualitative case study design to explore the research question. The case study is used to generate an in-depth, multi-faceted understanding of the complexities faced in real-life institutional learning spaces (Yin, 2009). This study does not seek to resolve how learning spaces are evolving in response to AI, nor the ethical and relational considerations shaping connection and wellbeing. Instead, it examines how this question is collectively interpreted by those working in higher education within the context of design-led professional learning. Accordingly, we present this work as a qualitative case study, enabling rich description and interpretation (Stake & Vissie, 1995) and supporting learning from the experiences of others in higher education contexts (Eisner, 2017). This work aims to lay the foundation for continual discussions on similar topics in the future.

Setting

A professional development workshop was conducted with 23 participants who self-registered for the session. Participants represented a range of roles across higher education and institutional contexts in Australasia, including learning designers, educators, technologists, architects, and university leaders. The half-day workshop was designed and facilitated by two members of the research team, both of whom hold dual roles as higher education practitioners and researchers.

The workshop was designed to support collaborative reflection on how AI is reshaping learning spaces, using design thinking activities to prompt dialogue and collective sense-making. Participation was voluntary and focused on staff perspectives, with no personally identifiable information collected during the session. After the workshop, each participant was emailed and invited to contribute to a subsequent reflexive thematic analysis of workshop artifacts (Ahmed et al., 2025). This insider positioning of the researchers, workshop participants, and facilitators shaped the workshop and subsequent analysis. This positioning is accounted for in the reflexive approach to analysis, described below.

Design thinking

The workshop was designed to support collaborative reflection on how AI is integrating into learning spaces. Taking design thinking approaches, participants engaged in small-group activities that encouraged dialogue, framing, and collective sensemaking. Rather than progressing through the full five stages of design thinking (empathy, definition, ideation, prototyping, and testing), the workshop focused on the problem definition stage (Asano, 2023; Dunne, 2018). In doing so, participants were invited to explore perceived challenges with the emergence of AI in the context of learning spaces. This process deliberately enabled participants to explore tensions and opportunities as a broader issue, before narrowing down more deeply (Dunne, 2018).

The workshops brought together multiple perspectives while participants defined shared points to focus on, bringing together their professional contexts and experiences. These were translated through generative prompts through the development of "How might we…" statements (Asano, 2023; Dunne, 2018). These statements articulated the problem while opening up the opportunity to co-construct the actions. These statements and other artifacts were collected through annotated worksheets and drawings to capture the group's collective framing of key issues related to AI and learning spaces. These "How might we…" statements focused on the development of AI literacy, guiding learners, ethical decision-making in AI use, inclusive design, and sustaining human connection within technology-mediated spaces.

Data analysis

Workshop artifacts were analysed using reflexive thematic analysis (Ahmed et al., 2025), guided by Braun and Clarke's (2019) approach. The data was exported from Miro into an Excel file and cross-checked by a member of the research team to ensure accuracy. This analysis was undertaken by four researchers with diverse professional and research backgrounds in higher education, including expertise in learning spaces, educational design, and academic development.

The analysis followed a reflective and iterative process. Researchers began by familiarising themselves with data, reviewing the artifacts in Miro and the corresponding Excel file, and engaging with the material to identify initial patterns. At this stage, early insights were documented by the researchers through memoing. They also reflected on their initial interpretations and agreed on a systemic approach for progressing through the data. Subsequently, they independently generated initial codes from 25% of the data using manual coding before meeting to discuss any meaningful features uncovered. This process contributed to the development of an initial codebook, which was then refined through iterative cycles of coding and team discussions. Once all the data had been coded and discussed, the researchers grouped codes into broader patterns aligned with the research question, forming preliminary themes (Ahmed et al., 2025). These themes were subsequently reviewed for coherence, refined, and labelled through repeated comparison with the workshop artifacts. The whole research team then further refined the essence of each theme's relationship to the research question.

Ethics

This case study analysed artifacts from a professionally situated workshop and did not collect any personally identifiable information. In accordance with institutional guidance, the project was deemed exempt from formal ethics review at Deakin University.

Results

The thematic analysis surfaced insights into participants' values, tensions, and priorities, expressed across five themes (see Figure 1): Ideological positioning of AI within learning spaces; Critical design of learning spaces in the age of AI; Guiding student-centred ecologies through access, equity, and inclusion; Co-intelligence in learning spaces; and Individual anxiety alongside a collective sense of opportunity. These demonstrate consensus regarding ethical AI use, inclusion, and human-centred values, but also different views about institutional readiness and the role of AI in learning spaces.

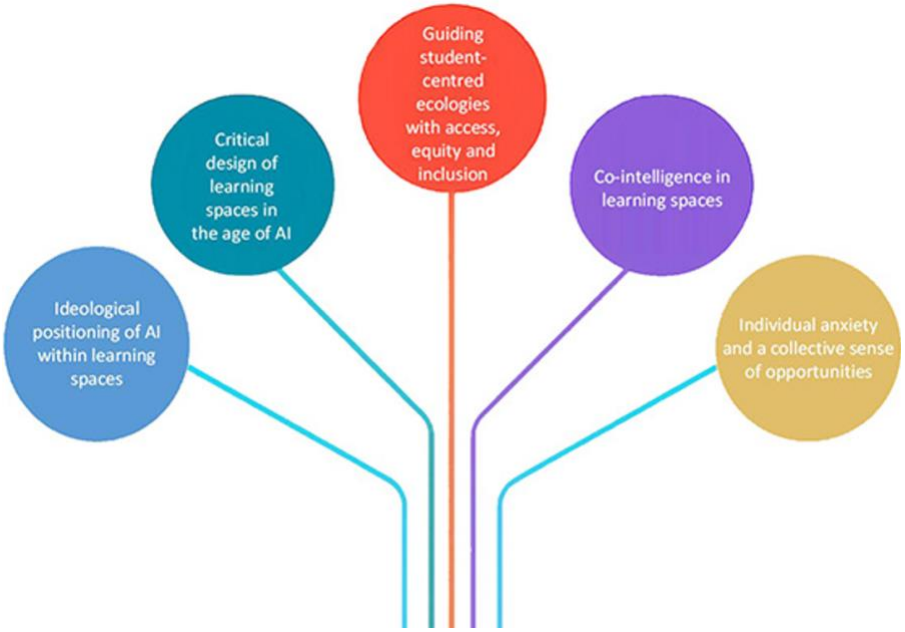


Figure 1
A map of key themes influencing learning spaces in the age of artificial intelligence, highlighting the interplay between design, equity, co-intelligence, and emerging individual and collective responses.

Theme 1: Ideological positioning of artificial intelligence within learning spaces

The participants demonstrated an awareness that the future requires more than just bringing AI tools into learning spaces for adoption. It requires conscious and critical reflection on what meaningful AI implementation within our learning spaces could be. The participants articulated this through calls for evaluations of current practice, a "need to look at curriculum." They also proposed concrete actions that needed to be taken, "assessment redesign". Their ideal state was that these actions would not position AI within learning spaces to be used for shortcuts to knowledge, but consciously integrated as part of the learning process, for example, "scaffolding learning about AI and how to use it as an assistant rather than as an oracle." In this way learning spaces could support developing critical capabilities in students, such as "teaching critical thinking skills."

The ethical considerations were also central to their ideological stances. In many ways, the participants highlighted the responsibility of higher education for "encouraging ethical and safe use" of AI. This was framed around AI literacy being inseparable from notions of Pedagogy of Kindness, with values such as compassion, respect, and relational integrity. For example, "creation of interactive installations that celebrate diversity of student voices and experiences" and "supporting awareness for all and using AI in ways that all feel safe and supported" in learning spaces. This positions AI literacy not only as technical competence, but also as a broader commitment to human-centred and inclusive learning spaces.

Theme 2: Critical design of learning spaces in the age of artificial intelligence

The participants also questioned the function of space with the emergence of AI: "What is learning together? Physically? Synchronous and reconfiguring identities." They recognised that AI might disrupt the social and cultural fabric of learning spaces, being "apprehensive about misinformation and misrepresentation". Such reflections suggest AI is prompting a rethinking of interaction and identity within spaces, challenging established constructs. Particularly with the need to consider the potential for bias and/or harm in learning spaces. In response, they thought creatively about "using AI to create safe environments," but mostly discussed how to address the potential impacts on safety in learning spaces and the need for "awareness towards students of different backgrounds." These concerns foreground AI to not just be a technical issue, but one that implicates the design of learning spaces.

Theme 3: Guiding student-centred ecologies with access, equity and inclusion.

Building on these first two themes, participants emphasised the need to guide the development of student-centred ecologies within learning spaces. The participants' statements resonated with the principles of Universal Design for Learning (UDL): Engagement, Representation, as well as Action and Expression, highlighting how AI may influence access to and participation in learning (Rose, 2000). Considerations for engagement emerged as participants recognised the potential impact of AI on diverse cohorts, including concerns for the known limitations of AI, "AI does reinforce exclusionary practices e.g., bias", alongside the need to empower students to feel safe in shared learning spaces by "providing choice" and supporting "student agency and student capacity." Participants also identified opportunities in relation to representation, imagining inclusive practices by "normalis[ing] students using AI to test their thoughts, ideas, assumptions, so they feel confident to share with peers" and breaking down barriers by encouraging teachers to "challenge [their] own content re: assumptions, biases". In addition, AI could be used to better represent diverse backgrounds and perspectives through "storytelling". Mostly, a strong focus on access and expression, particularly in relation to equitable access to technologies, emphasising a need for "consider[ing] equitable access that's safe" and there was potential for AI to "break structured barriers to participation of marginalised!!". Their perspectives position learning spaces as sites where equity, inclusion and access must be designed and supported, with AI enabling or challenging this in the creation of student-centred learning spaces.

Theme 4: Co-intelligence in learning spaces

Participants' reflections on the evolving relationships between human and non-human elements highlighted emerging forms of *co-intelligence* within learning spaces. Two interrelated forms of co-intelligence were identified, see Figure 2.

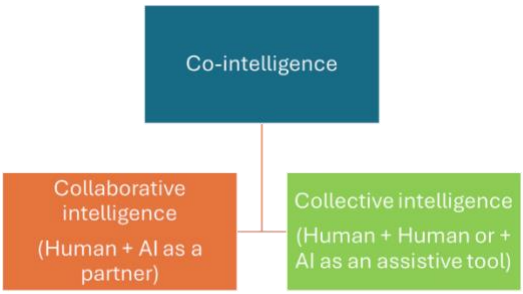


Figure 2
Two interrelated forms of co-intelligence were collective intelligence and collaborative intelligence.

The first is human-human collective intelligence, where problem-solving remains shared between individuals, with AI positioned as an optional or supporting tool. This was evidenced in references to partnership pedagogies where "students co-design [and imagine] their future," the importance of learning communities, where "academics need to work together," and an emphasis on collective thinking where AI is used "not to outsource thinking," but to support human engagement, despite concerns about "dependency [and] reliance." The second form reflects human and AI collaborative intelligence, in which AI is positioned more actively within the learning process as an emergent agent within learning spaces. Participants described "AI as a teammate" and as "augmented intelligence," signalling a potential shift towards relational forms of interaction between humans and AI. The participants discussed the extent to which AI was positioned as an active collaborator within learning spaces. Some participants framed AI as a tool to support human decision-making and collective intelligence, others imagined more collaborative relationships with AI acting as a teammate or learning partner. The divergent perspectives show ongoing negotiations being conceptualised about agency and the future roles of AI in learning spaces.

Theme 5: Individual anxiety and a collective sense of opportunities

Holistically, the sentiments from participants about AI within higher education learning spaces reflected a dynamic interplay between individual anxiety and a collective orientation towards opportunities. When the

individual participants placed themselves to face the emerging challenges posed by fast-changing AI technologies, there was a sense of anxiety and a generally negative view towards AI challenges. Some described their individual perspective as currently working in "isolation" and feeling "anxious, hopeless, frustrated, powerless, out of control." These contributions suggest AI is experienced as overwhelming when encountered without sufficient support, potentially reflecting gaps in professional development and AI literacy, or the perceived burden of responding to change at an individual level.

In contrast, when participants considered responses to AI collectively, their perspectives shifted towards greater optimism and agency. There was a clear willingness to "explore, connect and apply" in collaborative contexts, highlighting the value of shared approaches to navigating emerging challenges. This shift from individual anxiety to collective highlights affective elements of AI influencing learning spaces, and that uncertainty and opportunity coexist.

Discussion

This study examined how higher education staff collectively interpret the implications of AI for learning spaces, and what these interpretations reveal about ethical, relational and affective dimensions of the assemblage of space. Taken together, the findings suggest that learning spaces are evolving from bounded and primarily physical environments into dynamic, postdigital assemblages, where human and non-human elements co-construct the conditions for learning (Fawns, 2019; Wardak et al., 2022). Within the assemblages of space, AI is not positioned as an external tool, but part of the sociomaterial relationships that constitute learning spaces. Therefore, AI, pedagogical practices, technologies, materials, and humans collectively influence participation, entanglements, experiences and conditions for learning.

Across themes, the participants demonstrated that AI could be influencing learning spaces not as a technical agent, but as one underpinned by ideological commitments. Through the discussions of curriculum, assessment and pedagogy, they framed AI relative to the broader purpose of education, highlighting tensions between efficiency and the development of capabilities. This aligns with existing literature that foregrounds ethical concerns such as algorithmic bias, data misuse, and the displacement of human roles (Pikhart & Al-Obaydi, 2025; Slimi & Carballido, 2023). In learning spaces, this tension aligns with discussions of postdigital classrooms, where ethics and values emerge through engagement with the elements that constitute those spaces (Wardak & Zeivots, 2025), reinforcing the need to consider AI as having a more explicit role in influencing learning spaces, environments and contexts. While participants were concerned about the ethical use of AI, there were differences emerging from discussions on institutional preparedness, the distribution of agency and the extent to which AI should be a collaborator within learning spaces. From collective sense-making, these differences are expected as the participants draw on their diverse professional roles and experiences.

In support of these ideologies, staff emphasised the need to critically design learning spaces in ethical and responsible ways. Participants emphasised the need for critical design approaches that anticipate potential harms, including misinformation, bias, and exclusion. Rather than focusing on specific spatial configurations, design was understood as the orientation that shapes how learning spaces support participation, trust and safety. This perspective may contribute to the discussions on how technology could influence socially equitable learning spaces (Baskara, 2024), echoing prior work on the use of virtual simulations in supporting inclusive and participatory learning spaces (Edgar, et al., 2024b). Some scholars have begun exploring how AI might support empowerment and justice, for instance, by extending cognitive abilities (Baskara, 2024). This perspective exists in tension with others who highlight ethical concerns around destabilising existing pedagogical dynamics (Sarı et al., 2024). In this sense, learning spaces become sites where ethical and design considerations are continuously negotiated.

The findings also highlighted the importance of inclusion and equitable participation within learning spaces that are influenced by AI. In considering safe learning spaces, the analysis revealed tensions between the possibilities AI offers, such as reducing barriers and the ways in which it may inadvertently reinforce them. The participants' reflections related to UDL principles, emphasising the need to ensure access, representation, and expression, as AI is emerging in learning spaces in various ways. These reflections represent broader work on

inclusive learning design and the challenges with embedding emerging technologies within educational practice (Edgar et al., 2024a; Hyatt & Owenz, 2024; Song et al., 2024). Within postdigital assemblages, equity and inclusion are not additional considerations, but core aspects of how learning spaces are constructed.

In addition to design and inclusion, the analysis pointed to how agency is understood within learning spaces. Participants described emerging from co-intelligence, where knowledge and decision-making are distributed across human and AI relationships. This reflects a posthuman perspective in which agency is fluid and co-constituted, rather than fixed with individual actors (Wardak et al., 2022). These shifts raise important questions about how learning spaces can support meaningful human interactions, such as with learning communities and forms of new collaborative and distributed intelligence. In postdigital learning contexts, this suggests the need to explore co-intelligent frameworks and to consider how knowledge emerges.

Finally, participants highlighted the affective dimensions of AI within learning spaces, particularly in relation to connection and wellbeing. Participants' experiences revealed a tension between individual anxiety and collective opportunity. They suggested that AI is experienced differently depending on the conditions under which it is encountered. When approached in isolation, AI was associated with uncertainty, being overwhelmed, and loss of control. In contrast, collective engagement fostered optimism, connection, and shared agency. This highlights the importance of learning spaces as relational and supporting not only cognitive but also affective dimensions of learning. This perspective aligns with epistemic placemaking, where learning spaces foster connections, community and a sense of wellbeing (Carvalho et al., 2025). In these spaces, AI is continually being interpreted and enacted in the practice of teaching and learning.

Limitations

This case study is limited to the perspectives articulated by participants in a single workshop conducted within the specific context of higher education in Australasia. As participants self-selected into the workshop, the findings reflect the views of individuals already engaged in discussion about AI and learning spaces. Additionally, the dual role of researcher and participant influenced both the workshop dynamics and the subsequent analysis. While this positionality introduces potential bias, it also provides a deeper and contextually informed understanding, which is a recognised strength in case study research (Harland, 2014).

Conclusion

This study shows that AI is not simply impacting assessment and integrity in higher education with the rise of GenAI but is also being integrated into and shaping learning spaces. Exploring staff sensemaking, the findings highlight that learning spaces are evolving as postdigital assemblages in which ethical commitments, relational practices, and affective experience are inseparable from technological integrations. In this context, there arise questions of connection and well-being that are not peripheral, but central to how practice is enacted in learning spaces. This paper does not propose solutions but offers an empirically grounded account of how educators are negotiating changes in practice. It highlights the importance of collective approaches to understanding and responding to AI, positioning learning spaces as critical sites where learning comes together under tensions of efficiency and wellbeing, automation and agency, and individual versus collective experiences. Future research may build on this work to explore how these dynamics unfold and develop frameworks to support the design of learning spaces that prioritise wellbeing and innovation.

Acknowledgement

The authors would like to acknowledge all workshop participants.

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