28TH INTERNATIONAL CONFERENCE ON ENGINEERING AND PRODUCT DESIGN EDUCATION
2 – 4 SEPTEMBER 2026, UNIVERSITY OF BRISTOL, UNITED KINGDOM

RETHINKING DESIGN EDUCATION IN AN AI-ENABLED ERA: A COLLABORATIVE AUTOETHNOGRAPHIC APPROACH

Yasemin TEKMEN ARACI[1], Charlie RANSCOMBE[1], Linus TAN[1] and Wendy ZHANG[2]
[1]Swinburne University of Technology, Australia
[2]University of Canterbury, New Zealand

ABSTRACT
Artificial intelligence is rapidly transforming design practice, challenging educators to reconsider how design processes are taught and how future designers will work with emerging technologies. This paper presents an ongoing collaborative autoethnographic study undertaken by design academics at an Australian and a New Zealand University to examine how Generative AI (GenAI) is influencing the teaching of early-stage design processes, particularly discovery, problem framing, ideation, and early visualisation. Through a structured reflection framework, participants analyse their own teaching practices to identify opportunities, risks, and pedagogical priorities related to GenAI integration. Individual reflections are shared and collectively interpreted using Collaborative Autoethnography, enabling educators to co-construct insight grounded in studio practice. Reflexive Thematic Analysis guides the development of three pedagogical lenses; experiential learning, iterative problem solving, and critical reflection, through which educators' responses to GenAI adoption are interpreted. Rather than treating GenAI as a technical skill to be added to existing curricula, the study positions AI integration within the established foundations of studio-based pedagogy. The findings reveal a tension between professional efficiency and pedagogical intention, highlighting both the potential of GenAI to expand exploratory practices and the risks of premature convergence, fixation, and reduced engagement with foundational design thinking processes. The paper contributes insight into how design education can evolve to integrate GenAI while maintaining core commitments to iteration, reflection, and designer agency.

Keywords: Design education, design process, GenAI

1 INTRODUCTION
Generative AI (GenAI) is transforming education at every level, reshaping how knowledge is generated, delivered, and understood. Tools such as ChatGPT, Midjourney, and other generative systems are rapidly entering classrooms and studios, blurring boundaries between human cognition and machine capability. Educators across disciplines are now asking urgent questions: *how can we collaborate with GenAI in learning, what opportunities and risks does it present, how will it reshape professional roles, and how should pedagogy respond?* Such questions are particularly pressing in design education, where learning is grounded in creativity, iteration, and design thinking. AI has entered the design studio as both an opportunity and a provocation. While it expands designers' capacity to visualise, ideate, and experiment with speed and scale, it also challenges long-held assumptions about authorship, creativity, and human judgement. Design educators now navigate between experimentation and caution as they test emerging tools while seeking to preserve core "designerly" ways of knowing. This paper emerges from within that context. Drawing on the collective expertise of design educators and researchers, the study uses Collaborative Autoethnography (CAE) to reflect critically on how design education can evolve to prepare graduates for hybrid human–AI design practice. CAE positions educators' own teaching experiences, beliefs, and practices as legitimate sources of scholarly inquiry. The aim of this research is to explore how design educators can integrate GenAI meaningfully into teaching and curriculum design. Through structured reflection on their courses and areas of expertise, participants examine how GenAI is influencing different stages of the design process. The study seeks to identify

shared opportunities, challenges, and pedagogical priorities to support curriculum renewal and better prepare students to work critically, ethically, and collaboratively with AI.

2 BACKGROUNDS

2.1 Studio based pedagogy

Design education has a long tradition of employing the studio model as its core pedagogical approach [1], and it continues to function as the principal mode of teaching in contemporary design programmes [2]. The studio typically manifests as an open, practice-oriented learning environment that supports experimentation, feedback, and iterative development [3]. Central to the studio model is the notion of "learning by doing," where students are immersed in processes that closely resemble professional design practice [3]. This approach can be framed pedagogically as active learning" [4] rather than passive instruction of technical skills. These students typically engage in problem-based learning [1], addressing ill-defined or open-ended design challenges [5]. Such projects necessitate iterative cycles of development closely reflecting established models for the design process where emerging design propositions are continually evaluated and refined. Schön's concept of reflective practice developed during his research into architectural design studio education captures this process, emphasising reflection both in action and on action as a means of advancing design outcomes [6]. Through these iterative cycles, students exercise critical thinking by critiquing their own and others' ideas, and by evaluating tools, techniques, and strategies to determine the most appropriate next steps in the design process [3]. Collectively, the qualities of *experiential learning, iterative problem solving*, and *critical reflection,* are foundational for educating future designers to navigate complex design processes.

2.2 Design process

The increasing use of digital and AI-based tools across design activities, from research and idea generation to prototyping and visualisation, has prompted renewed attention to how the traditional Double Diamond model [7, 8] is used and taught in design education. Recent frameworks such as the Stingray model [9] advances the Double Diamond in light of technological change, emphasising feasibility, viability, and awareness of bias alongside human-centred thinking. However, such early proposed models still require further clarification regarding how AI-based tools can tangibly integrated into the design process. Therefore, in this paper, we focus specifically on the early stages of the design process: Discover and Define and contribute practical insights into how educators can integrate AI tools meaningfully into the design process. These stages are critical in shaping how design problems are understood and framed, involving inspiration seeking, ideation, problem reframing, scenario setting, and early sketching through an iterative process. Rather than progressing sequentially, these activities loop and inform one another, establishing the conceptual foundation of a project and strongly influencing all subsequent design decisions; making them a key focus for examining how AI can be integrated into design education.

3 METHODOLOGIES

This study employs Collaborative Autoethnography (CAE) to examine shared experiences while maintaining individual reflexivity. As researchers [10] define it, CAE is "the study of self, collectively" (p. 11), where its strength lies in transforming individual reflection into collective insight, connecting lived experience with broader educational and disciplinary contexts. CAE was used to support both critical reflection and community building among researchers. This study also draws conceptually on the notion of the reflective practitioner [11] and the framework [12] for critical reflection in teaching. The concept of reflection-on-action [11] informs the examination of past and current AI teaching practices, while the use of multiple reflective lenses [12] supports questioning assumptions and deepening pedagogical insight. These perspectives emphasise reflexivity, interpretation, and the value of educators lived experience in making sense of complex and evolving teaching contexts. Thus, they position CAE as both a reflective and interpretive practice. Each educator's narrative becomes a site for personal reflection and shared analysis, enabling the group to co-construct knowledge about the evolving relationship between GenAI and design education. Following prior applications of CAE in engineering education [13], this study adapts the approach to design context, treating educators lived experiences as a valuable form of pedagogical inquiry.

The authors are all educators and researchers from the design schools in an Australian and a New Zealand University. Each participant (P1, P2, P3 and P4) has a distinct design background, spanning

teaching, research, and professional practice, which ensures a rich spectrum of perspectives. Participants were invited to reflect on their teaching practice using a shared set of guiding questions, that were categorised into the four themes: (1) Context and Focus Area, (2) AI Tool-Specific Observation and Reflection, (3) Interpretation of GenAI challenges and opportunities, and (4) Responsible Educational Integration. These four topics, with their associated reflective prompts, were developed based on CAE [10], reflective practice [11] and critical reflection [12]. These topics helped the authors describe, observe, and interpret how GenAI is influencing the stage(s) of the design process they teach, and encourages reflection on both the current state of GenAI use and the future implications for design education. The study employs reflexive thematic analysis to identify shared meanings between reflections [10, 14]**.** The educators function as both participants and analysts, co-producing insight through reflection, discussion, and synthesis. Data was reviewed on a macro-level to gain a holistic view of emerging concepts, then on a micro-level to enable closer reading of individual cases [10]. Next, themes were constructed through group discussion and reflexive interpretation [14]. Reflections were initially guided by a framework, which provided a common structure for reflection, but then used flexibly by participants. Educators shared and reviewed each other's reflections, and themes were developed through identifying recurring patterns and insights across the cases. All reflections were based on participants' own teaching practice, with voluntary participation and no identifiable student data included.

4 RESULTS AND DISCUSSION

Across the four cases, educators reflect on how the use of GenAI is encountered within early stages of the design process. These encounters arise through different modes of engagement, including classroom teaching, observation across multiple design units and personal design practice. As such, the reflections capture how AI is experienced as part of everyday design education practice, rather than as a single or standardised implementation. While the focus was on early stage of the design process, the four educators chose different studio-based AI design activities to broaden the reflections on how AI intersects with established ways of thinking, making, and learning in design education. Namely, inspiration finding, scenario setting, early sketching, and problem framing and ideation. All educators position their reflections within studio-based pedagogy. Together, these reflections provide the contextual foundation for identifying shared pedagogical concerns and potentials. Explanation of each case along with reflections is given below.

4.1 Case summaries

P2 reflects on the use of text-to-image GenAI during inspiration finding and mood-board development. The focus is on how AI is encountered as a visual exploration and curation mechanism during early aesthetic definition, particularly in relation to form, material, and colour considerations. The reflection situates AI within inspiration finding rather than technical design skill development.

P3 focuses on the use of large language models during scenario setting and early conceptual ideation. This reflection examines how AI becomes involved in articulating future contexts and speculative narratives, positioning language as an early site of design work. The emphasis is on AI's role in supporting conceptual exploration during the formative stages of design thinking.

P4's reflection centres on AI-assisted sketching in early design development. P4 examines how AI intersects with established sketching practices that support ambiguity, exploration, and iteration. The focus is on how different types of sketches are encountered and used when AI-generated visualisation becomes part of the early design workflow.

P1 reflects on the use of both text-based and image-based AI tools during problem framing and early ideation. The reflection considers how AI supports interpretation, reframing, and inspiration at the outset of open-ended design briefs. The focus is on AI as a cognitive and visual support within early-stage design activity rather than as a solution generator.

Analysis of the four educator reflections reveals a strong shared awareness of preserving core pedagogical values of studio-based design education as artificial intelligence becomes increasingly present in early design activities. Drawing on the literature, *experiential learning, iterative problem solving*, and *critical reflection* were identified as key dimensions of studio-based design education [1,3,5,6]. Thus, these three dimensions define the themes for the thematic analysis of the educator reflections. While the reflections focus on different stages of the design process and different forms of AI, common concerns emerge regarding speed, fixation, authorship, and judgement. These concerns are

consistently framed in relation to how students learn to think and act as designers, instead of technical capability or tool proficiency.

4.2 Experiential Learning: Reconfiguring "Learning by Doing"

Experiential learning, understood as learning through active engagement and practical experimentation, remains a foundational principle across all four reflections. GenAI tools were frequently described as changing how students engage in experiential learning rather than eliminating it altogether. In several cases, AI accelerated the production of outputs, enabling students to explore ideas more rapidly and with greater breadth. This shift altered the nature of "doing" in the studio, moving it from manual production toward interaction, experimentation, and response. P2 reflects on the potential longer-term implications of this shift, noting that *"it may also inhibit creativity long term. Students' capacity to imagine may suffer when they can prompt images."* P2 also describes how generating inspirational imagery instead of searching for it enables students to articulate and test aesthetic intentions more fluently, but also requires sustained engagement in evaluating and refining outputs: "*For every image generated designers must think critically if the images represent their design intent, and to what extent, and how it could further meet their intent."*

Similarly, P1 frames AI as a cognitive and visual support that allows students to spend more time engaging with briefs and ideas rather than struggling with initial decoding: *"Students often struggle at the very beginning of a design project, not because they lack ideas, but because they misunderstand the brief or overlook important details."* However, educators also note that AI's efficiency risks reducing productive struggle, an important component of experiential learning in studio education. P4 observes that when AI-assisted sketching is introduced too early, students may bypass exploratory sketching practices that traditionally support learning through trial, ambiguity, and failure: *"Traditional sketching requires time, effort, and repeated failure… AI's efficiency risks removing these moments unless they are deliberately reintroduced through pedagogical design."*

Across the reflections, experiential learning is not abandoned but reframed. "Doing" increasingly involves interacting with AI systems, experimenting with prompts, and evaluating generated outputs. As P3 notes, the pedagogical focus shifts away from simply obtaining outputs toward understanding how human–AI interaction shapes thinking: *"Rather than focusing on how to obtain better answers from ChatGPT, I encouraged students to examine how particular prompts shaped the direction, tone, and limits of the ideation space."* Educators emphasise the need to design learning activities that preserve engagement, effort, and reflection, ensuring that prompt experimentation functions as experiential learning more than a shortcut to outcomes.

4.3 Iterative Problem Solving: Acceleration and Fixation

Iterative problem solving, characterised by cycles of idea generation, testing, and refinement, emerges as another shared pedagogical priority that is both supported and challenged by AI. All four educators describe AI as enabling rapid generation of alternatives, which can expand the exploratory phase of design when used deliberately. This aligns with existing research showing that AI can support early-stage design by expanding the exploration of the design space and enabling the generation of novel concept associations during ideation [15]. P3 notes that language-based AI can broaden conceptual space during scenario setting by producing multiple speculative propositions: *"ChatGPT supported this process by generating speculative propositions, reframing assumptions, and suggesting consequences that students had not initially considered."* This expanded capacity for iteration is closely tied to how design choices are surfaced and examined. As P3 further reflects, *"Designing for future scenarios are constructed through choices about what to emphasise, what to question, and what to leave unresolved. ChatGPT, when taught carefully, becomes a medium through which these choices can be examined."*

Similarly, P1 observes that image-based AI allows students to quickly explore visual variations that might not emerge through imagination alone, noting that *"unexpected forms, material expressions, or atmospheres often appear, which can trigger new ideas or directions."* At the same time, the reflections consistently identify risks of premature convergence and linear workflows. In studio practice, this was often addressed through structured activities where students generated multiple AI outputs, compared alternatives, and justified their selections through critique and discussion. While these activities primarily supported idea generation and exploration, they also encouraged students to engage more critically with AI outputs, treating them as a scaffold for critical thinking and design development rather than final solutions. High-fidelity outputs, whether visual or textual, can encourage students to settle too

quickly on initial ideas, shifting the design process from exploration to selection. P4 highlights this concern in early sketching: *"When persuasive sketches appear prematurely, they can disrupt the low-commitment nature of early ideation, encouraging students to evaluate and select ideas based on visual appeal rather than conceptual robustness."* P1 raises a related concern in inspiration finding, noting the risk of design fixation when students are exposed to polished imagery early in the process, specifically the *"risk of design fixation arising from the provision of sophisticated high-fidelity imagery."*
Across cases, educators note that the design process can become linear if AI outputs are treated as final answers instead of starting points for further exploration.

4.4 Critical Reflection and Designer Judgement

Critical reflection emerges as the most consistent and explicit concern across all four reflections. Educators repeatedly emphasise that GenAI integration heightens the importance of teaching students how to evaluate, interpret, and question outputs rather than accept them at face value.
P3 describes a deliberate pedagogical shift toward cultivating critical judgement, noting that *"some students treated the genAI outputs as authoritative, accepting its responses as plausible futures rather than provisional constructs."* This emphasis on comparison and interrogation recurs across the reflections. P2 frames AI use as demanding heightened criticality due to the sheer volume and persuasiveness of generated imagery, noting the *"risk of design fixation arising from the provision of sophisticated high-fidelity imagery."* P4 similarly stresses the importance of critical judgement when visually compelling outputs appear early, observing that such images can encourage *"students to evaluate and select ideas based on visual appeal rather than conceptual robustness."* P1 adds a related perspective, noting that *"highly polished and realistic AI outputs can encourage students to settle too quickly on one idea."* This concern links fixation not only to speed, but also to the apparent authority and completeness of AI-generated results.
Across the cases, critical reflection is not treated as an automatic outcome of AI use, but as a skill that must be explicitly taught and scaffolded. Educators express concern that without such awareness, students may over-rely on AI outputs, accept them as authoritative, or misunderstand their role in the design process.
Overall, the findings reveal a clear tension between professional efficiency and pedagogical intention in studio-based design education. While educators recognise the value of generative AI for speed and productivity in contemporary practice, they approach its integration cautiously in learning contexts, particularly for novice designers. The concern is not the presence of AI itself, but the possibility that efficiency may reduce engagement with foundational thinking processes central to experiential learning. Traditionally, studio pedagogy assumes that progressing through design tasks supports the development of design thinking through reflection-in-action [6]. Such iterative engagement with open-ended design challenges is central to studio practice [5] where learning grounded in experimentation, critique, and iterative engagement with ill-defined problems [3]. However, generative AI alters this relationship by enabling students to bypass exploratory stages and produce high-fidelity outputs rapidly. As a result, the link between process and understanding is no longer guaranteed, and may require more deliberate pedagogical structuring. This shift echoes established distinctions between professional practice and design education. In industry, designers rely heavily on digital tools such as CAD, yet educational programmes often delay CAD instruction until foundational visual and spatial thinking skills are established. Reflections in this study anticipate the need for similar interventions and careful sequencing when integrating AI within early stages of the design process, particularly within the Discover and Define phases of the Double Diamond model [7, 8]. While the Stingray model [9] acknowledges and even foregrounds AI-led early-stage design processes, it provides limited discussion of how these shifts should be scaffolded within studio-based design education. Our reflections contribute here providing some concrete guidance on integrating this model into studio education.
Finally, the study reinforces the continued importance of reflective practice within studio education. Reflection and critique must be deliberately structured elements of studio learning, supporting deeper engagement with design problems. The persuasive authority and fidelity of AI-generated outputs intensify the need for critical judgement, comparison, and interrogation. AI-generated outputs may also reflect cultural biases or dominant perspectives embedded in training data, which can influence design outcomes. This further reinforces the need for students to critically evaluate and question AI-generated content. If GenAI is used as a tool for exploration in design process, not as a source of fixed answers, it

can support deeper critical thinking by encouraging students to consider multiple interpretations and alternatives, while maintaining human-led design thinking.

5 CONCLUSIONS

This article examines how Generative AI is influencing the teaching of early-stage design processes, particularly discovery, problem framing, ideation, and early visualisation. Using a Collaborative Autoethnography approach, four educators critically analyse their own studio teaching practices to identify opportunities, risks, and emerging pedagogical priorities associated with integrating GenAI. The findings reveal a clear tension between the professional efficiencies afforded by GenAI and core pedagogical intentions within design education. While GenAI can expand exploratory practices and accelerate visualisation, it also carries risks of bypassing key exploratory stages, increasing the likelihood of premature convergence, fixation, and reduced engagement with foundational design thinking processes. Ultimately, the study suggests that the introduction of GenAI can distance/decouple the relationship between learning-by-doing and developing understanding of design thinking. Consequently, it highlights a greater need for deliberate and carefully structured pedagogical strategies may be required to sustain meaningful learning within GenAI supported studio education.

REFERENCES

[1] Brandt C. B., Cennamo K., Douglas S., Vernon M., McGrath M. and Reimer Y. (2013). A theoretical framework for the studio as a learning environment. *International Journal of Technology and Design Education, 23*(2), 329-348.

[2] McInerney D. and Hanna S. (2024). Reflections on a community of inquiry approach to design studio education: A case study. Paper presented at the DS 131: Proceedings of the International Conference on Engineering and Product Design Education (E&PDE 2024).

[3] Green L. N. and Bonollo E. (2003). Studio-based teaching: history and advantages in the teaching of design. *World Transactions on Engineering and Technology Education, 2*(2), 269-272.

[4] Kumar J. A., Silva P. A. and Prelath R. (2021). Implementing studio-based learning for design education: A study on the perception and challenges of Malaysian undergraduates. *International Journal of Technology and Design Education, 31*(3), 611-631.

[5] Hettithanthri U. and Hansen P. (2022). Design studio practice in the context of architectural education: A narrative literature review. *International Journal of Technology and Design Education, 32*(4), 2343-2364.

[6] Schön D. A. (1985). *The design studio: An exploration of its traditions and potentials*: RIBA Publications for RIBA Building Industry Trust London.

[7] Design Council. (2005). *The Design Process: What is the Double Diamond?* London: Design Council.

[8] Ball L. J. (2019). T*he double diamond: 15 years on*. Design Council Blog.

[9] Gibbins G. and Nair N. (2023). T*he AI-powered 'Stingray model' for innovation*. Board of Innovation.

[10] Chang H., Ngunjiri F. W. and Hernandez K. A. C. (2016). *Collaborative autoethnography.* Routledge.

[11] Schön D. A. (1983). *The reflective practitioner: How professionals think in action.* New York, NY: Basic Books.

[12] Brookfield S. D. (2017). *Becoming a critically reflective teacher (2nd ed.).* San Francisco, CA: Jossey-Bass.

[13] Bosman L. B., Wollega E. and Naeem U. (2022). Responsive educational transformations during emergency situations: Collaborative autoethnography applied to the engineering classroom. *International Journal of Engineering Education, 38*(2), 288–298.

[14] Braun V. and Virginia C. (2019). Reflecting on Reflexive Thematic Analysis. *Qualitative Research in Sport, Exercise and Health, 11*(4), 589–597.

[15] Chen L., Wang P., Dong H., Shi F. et al. (2019). An artificial intelligence-based data-driven approach for design ideation. *J of Visual Communication and Image Representation*, *61*.