

# Co-Creating with AI in Higher Education: A Human-AI Collaborative Storybook Project

Human AI Creative Collaboration in Higher Education

Visual mapping tools to enable intentional distribution of creative agency, learning and instructor assessment in student Human-AI Collaboration projects

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This paper presents a pedagogical framework for visualizing human-AI collaboration in design education. Through a case study of graduate students co-creating illustrated storybooks with generative AI, we demonstrate how visual mapping tools enable intentional distribution of creative agency, foster metacognitive awareness, and provide scaffolding for assessment. Our approach positions AI not merely as a productivity tool but as a design collaborator, offering a model for hybrid intelligence in creative workflows. By making collaboration processes visible, this framework contributes to understanding how collective intelligence can be intentionally developed in educational settings and provides a foundation for future research on team-based human-AI co-creation.

CCS CONCEPTS • Human-centered computing → Collaborative interaction; Computer-supportive cooperative work • Computing methodologies → Collaborative intelligence; Cognitive science • Applied computing → Interactive learning environments; Computer-assisted instruction • Information systems → Decision support systems

**Additional Keywords and Phrases:** Human-AI collaboration, design education, collective intelligence, visualization methods, co-creation, metacognition

## 1 INTRODUCTION

As AI tools become increasingly integrated into creative processes, understanding how humans and AI can collaborate effectively becomes critical. Traditional educational approaches often position AI tools as either productivity enhancers or potential threats to learning, without sufficient attention to the nuanced collaborative dynamics between human and machine intelligence [1,2]. This work addresses emerging questions about collective performance between human designers and AI systems in educational environments by providing a visual framework for making collaboration processes explicit and assessable.

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Our research explores what "co-authorship" between humans and AI looks like in practice, how students evaluate their skills in relation to AI capabilities, and how making the collaboration process visible affects creative outcomes and learning experiences. We propose that visualization tools [Figure 1] can transform abstract collaborative processes into concrete, analyzable artifacts that benefit both learners and educators.

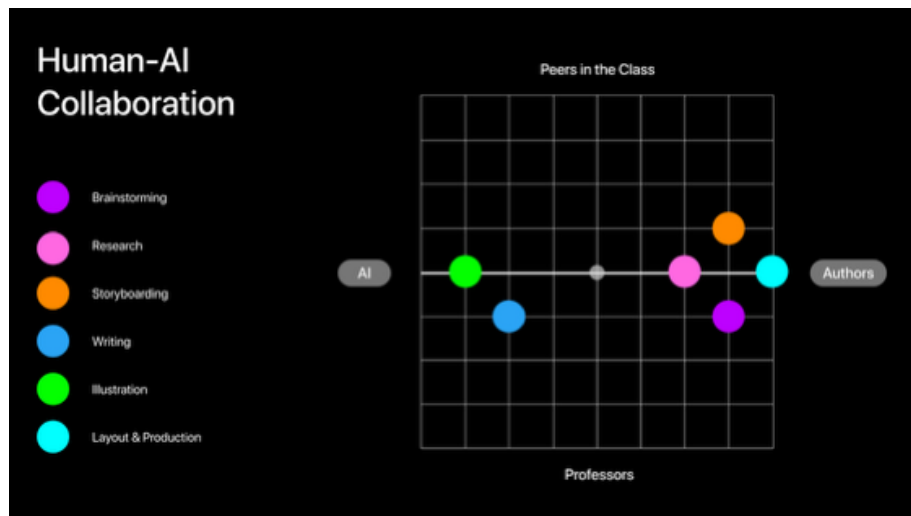


Figure 1: Visual representation of project stage contribution by students (authors), professors, peers, and AI

## 2 BACKGROUND

Collective intelligence emerges when groups of humans or mixed human-machine systems combine their capabilities to perform tasks that individual components could not accomplish alone [6]. In design education, generative AI tools offer new opportunities for collective intelligence by complementing human creativity with computational capabilities [3]. However, these collaborations often remain invisible, making it difficult for students to reflect on their processes or for educators to evaluate collaborative skill development.

Previous work has examined human-AI co-creation in professional contexts [5] and proposed theoretical frameworks for collaborative creativity [4]. What remains underdeveloped are pedagogical approaches that make collaboration processes visible and assessable while fostering students' metacognitive awareness of their own collaborative practices with AI systems.

## 3 METHODS

Our framework was implemented in a Master of Arts in Design Engineering program where student teams (n=10 pairs) co-created illustrated storybooks about marine ecology with generative AI tools. The project employed three visualization methods to make collaboration processes visible:

### 3.1 Skill Mapping with Spider Diagrams

Students began by mapping their individual skill sets using spider diagrams across dimensions including storytelling, illustration, research, editing, and technical knowledge [Figure 2]. This reflective exercise made visible each student's

perceived strengths and areas where AI assistance might augment their process. Teams combined their individual spider maps to identify complementary skills and potential gaps where AI tools might contribute most effectively.



Figure 2: Comparison of four student projects human-AI collaboration on the project (Student, Midjourney, ChatGPT, Claude)

### 3.2 Storybook Co-Design Process

Each team used generative AI tools (primarily ChatGPT, Claude, and Midjourney) to co-develop narratives and illustrations focused on whale ecology. Students documented their prompting strategies, comparing AI-generated content against their original intentions, and recording where human intervention redirected the process. This documentation created a visible record of human-AI interaction patterns throughout the creative process [Figure 3].

#### Overall Workflow Stages

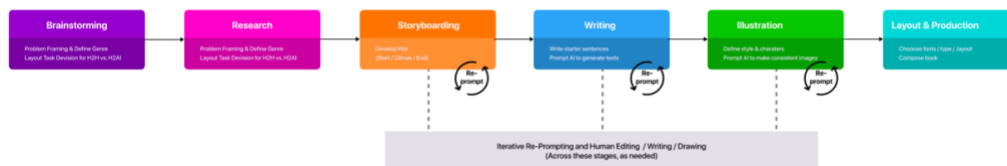


Figure 3: Overall workflow stages of the storybook project (brainstorming, research, storyboarding, writing, illustration, layout and presentation)

### 3.3 Collaboration and HAI Workflow Journey Mapping and Learning Reflection

Students created visual journey maps documenting key decision points in their collaboration with AI. These maps identified moments of human direction, AI suggestion, iteration, and synthesis. Journey maps distinguished between "human-led" phases (where AI served as a tool) and "AI-led" phases (where humans primarily edited or refined AI outputs), revealing patterns in how creative agency was distributed throughout the process [Figure 4]. Following project completion, students engaged in structured reflection sessions to analyze their journey maps and articulate insights about their collaborative processes.

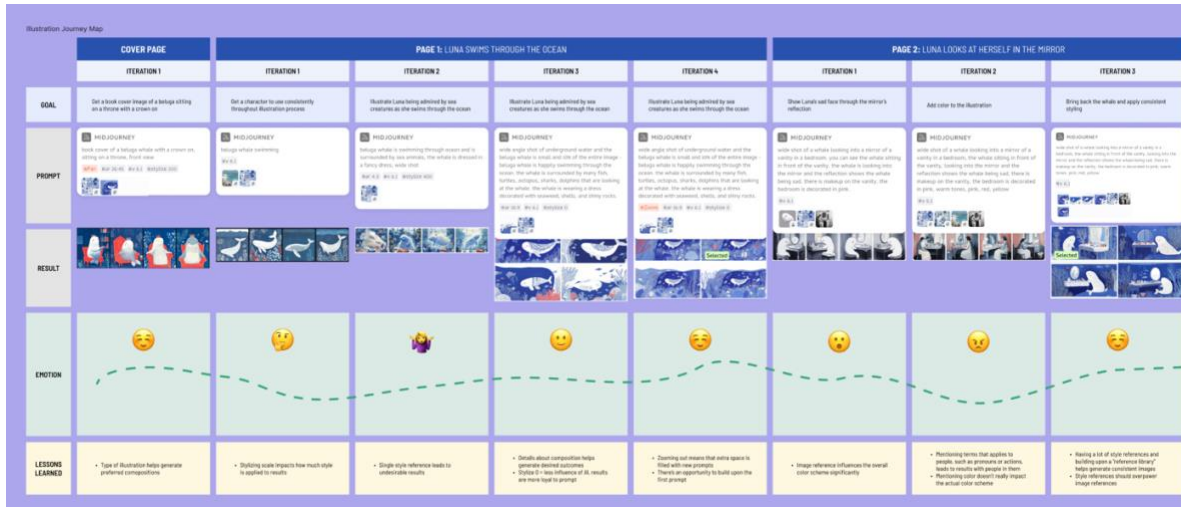


Figure 4: Sample student team Project Journey Map of their HAI Collaboration Workflow and Learning Reflection

## 4 RESULTS

The visualization framework yielded three primary outcomes that contribute to our understanding of human-AI collective intelligence in educational settings:

### 4.1 Intentional Distribution of Creative Agency

By visualizing their skills alongside AI capabilities, students developed more intentional approaches to collaboration. Initial spider diagrams revealed that most students (85%) initially planned to use AI primarily in skill areas where they felt least confident. However, journey maps showed that many teams (70%) ultimately engaged with AI across multiple skill dimensions, including areas of human strength, suggesting a more nuanced collaborative approach than originally anticipated.

One student reflected: "The spider map made me realize I wanted to maintain control over storytelling while using AI for technical aspects of illustration. But seeing our journey map, I noticed we actually co-developed the narrative structure with AI input, which produced ideas I wouldn't have considered alone."

## 4.2 Enhanced Metacognitive Awareness

The visualization tools fostered students' metacognitive awareness about collaborative processes. Journey maps revealed that teams engaged in an average of 27 significant decision points per project, with approximately 40% involving direct negotiation with AI suggestions. This documentation helped students recognize patterns in their decision-making and identify which collaborative approaches yielded the most satisfying creative outcomes.

## 4.3 Assessment Scaffolding

The visual documentation provided instructors with concrete evidence of both process and outcomes, enabling assessment of collaborative strategies rather than just final artifacts. Journey maps revealed varying approaches to human-AI collaboration, from highly structured workflows to more exploratory processes, allowing instructors to evaluate students' intentionality and adaptability in working with AI tools.

## 5 DISCUSSION

Our framework demonstrates how visualization tools can transform abstract human-AI collaboration into concrete, analyzable artifacts that benefit both learning and assessment. The approach addresses three key challenges in design education with generative AI:

- First, by making collaboration visible, students develop more intentional strategies for distributing creative agency. Rather than defaulting to using AI for perceived skill deficits, they engage in thoughtful negotiation about which aspects of creation benefit from human direction versus AI assistance.
- Second, the visualization process fosters metacognitive development by prompting students to reflect on their collaborative choices. This reflection helps students understand not just how to use AI tools, but how to develop effective collaborative relationships with computational systems.
- Third, the framework provides assessment scaffolding for educators by documenting the process of collaboration, not just its outcomes. This documentation allows instructors to evaluate students' collaborative strategies and provide targeted feedback on human-AI interaction patterns.

## 6 IMPLICATIONS AND FUTURE WORK

This work suggests that human-AI collaboration can be intentionally scaffolded both visually and pedagogically. Rather than positioning AI as merely a productivity enhancer, our framework shows how AI can function as a design assistant or thought partner in creative endeavors.

Future research could extend this collaborative model into interdisciplinary team settings by overlapping individual spider maps or creating composite skillset radar charts. This approach could enable more personalized and responsive AI collaboration across domains, potentially leading to AI systems that adapt their role based on team needs, augmenting gaps or amplifying unique strengths.

Additionally, future work should investigate how such hybrid models impact ideation diversity, learning outcomes, and user agency across different disciplines and project types. Longitudinal studies could examine how students' collaborative approaches with AI evolve over time as they gain expertise in both domain knowledge and collaborative strategies.

## 7 CONCLUSION

By making human-AI collaboration visible, our framework contributes to understanding how collective intelligence can be intentionally scaffolded in educational settings. The visualization tools we propose—skill mapping, process documentation, and journey mapping—transform abstract collaborative processes into concrete artifacts that benefit both learning and assessment. This approach offers a foundation for future research on team-based human-AI co-creation and provides educators with practical strategies for integrating generative AI into design education.

## ACKNOWLEDGMENTS

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