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AIGC-Enhanced Curriculum for Interface Design: Integrating Prompt Engineering, Visual Logic, and User Empathy

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Abstract

In the rapidly evolving landscape of digital creativity, the integration of Artificial Intelligence Generated Content (AIGC) has introduced both disruption and opportunity within design education. This study investigates how an AIGC-enhanced curriculum can be purposefully implemented to support the development of three critical competencies in interface design: prompt engineering, visual logic, and user empathy. Conducted as a qualitative case study at a vocational university in China, the 8-week course engaged 28 undergraduate students in a series of studio-based projects that embedded generative AI tools—such as Midjourney and Uizard—across ideation, prototyping, and reflection. Drawing on thematic analysis of student artifacts, field notes, interviews, and peer/self-evaluations, the findings reveal that students not only gained fluency in prompt-based design communication, but also demonstrated growth in visual reasoning and empathetic problem-solving. Moreover, learners reported a shift in mindset—from passive recipients of software training to creative explorers co-authoring with intelligent systems. These outcomes suggest that when thoughtfully integrated, AIGC tools can deepen conceptual understanding, support iterative design thinking, and reposition students as active agents in the design process. The study contributes to emerging scholarship on postdigital pedagogy and proposes a model for reimagining interface design education in the age of human–AI collaboration.

Keywords: Artificial Intelligence Generated Content (AIGC), Interface Design Education, Prompt Engineering, Visual Logic, User Empathy

Introduction

In the evolving landscape of digital design education, the integration of Artificial Intelligence Generated Content (AIGC) into creative disciplines has become both a challenge and an opportunity (Ren et al., 2023). Particularly in interface design education, where technical fluency must coexist with aesthetic sensitivity and user-centered thinking, traditional curricula are struggling to keep pace with emerging tools and methodologies (Dai, 2024). The rise of generative AI technologies such as ChatGPT, Midjourney, and Stable Diffusion is reshaping the creative process, prompting educators to reconsider how future designers are

trained—not only in software proficiency, but in collaborative creation with intelligent systems (Sheng, 2024).

Interface design, by nature, demands a complex interplay of functional logic, visual language, and empathetic understanding of user needs. While conventional instruction emphasizes technical skills like layout, typography, and interaction design, there is often limited space for students to explore how design choices emerge from dialogue—both with users and with computational agents (Wang et al., 2024). In addition, most current UI/UX curricula do not explicitly teach the craft of "prompt engineering," a critical skill in leveraging generative AI tools to produce meaningful, context-appropriate content (Huang et al., 2024).

This paper argues that integrating AIGC into interface design education offers a timely opportunity to foster three interrelated competencies: (1) the strategic use of language prompts to communicate with AI models (prompt engineering), (2) the development of visual logic through iterative co-creation with generative tools, and (3) the cultivation of user empathy in the process of designing digital experiences. Together, these components suggest a reconfiguration of design education from static, tool-centered training toward a dynamic, dialogic process where students learn to think, write, and visualize in collaboration with AI (Sheng, 2024).

Drawing on insights from multiliteracies pedagogy, critical design theory, and recent developments in AI-assisted education, this paper proposes an 8-week curriculum model that embeds AIGC across stages of design learning. Through classroom experimentation in a digital media program in China, the curriculum emphasizes scenario-based prompt construction, generative visual exploration, and narrative-driven user interface prototyping (Wang, 2025). The aim is not only to introduce students to new tools, but to shift their role from passive consumers of AI outputs to critical, reflective co-creators.

By redesigning interface design education around AIGC, this study contributes to emerging scholarship at the intersection of digital literacy, human-AI interaction, and progressive education (Dai, 2024). It also responds to the urgent need to prepare students for a design future in which creative agency, technological fluency, and social responsibility must be cultivated together (Huang et al., 2024).

Literature Review

The rapid evolution of generative artificial intelligence (AIGC) technologies has generated significant discourse in both design and education research. As tools like ChatGPT, DALL·E, and Midjourney become increasingly accessible, educators and scholars have begun to explore their pedagogical implications across creative disciplines, including art, media, and interface design. This section reviews existing literature on three interrelated domains: (1) AIGC and creative education, (2) prompt engineering as a literacy practice, and (3) user-centered design and empathy in interface design education.

AIGC in Creative and Design Education

Recent scholarship has recognized AIGC tools as both enablers and disruptors in creative education. McCormack et al. argue that AI co-creativity challenges traditional notions of authorship, pushing educators to reframe creativity as a collaborative process between

human and machine (Rajcic, Rodriguez, & McCormack, 2024). In the context of design education, AIGC offers new modes of rapid prototyping, ideation, and visualization (Wang, 2025). However, as others caution, without critical framing, students may become overly dependent on AI-generated outputs, potentially undermining original thinking (Chen, Yuan, & Yin, 2024).

In interface design, AIGC has been used to automate routine visual tasks, generate interface mockups, and simulate user flows (Kim, 2023). Yet, its integration into curricula remains limited, particularly in Asia-Pacific education systems where design instruction is still heavily software-centric and assessment-driven. There is a growing consensus that educators must move beyond technical training to incorporate AI literacy and human-centered design thinking.

Prompt Engineering as Emerging Design Literacy

Prompt engineering—the ability to communicate effectively with AI models using structured input—has emerged as a new digital literacy essential to AIGC-enabled creativity (Bubeck et al., 2023). While not traditionally taught in design education, prompt engineering shares similarities with scripting, narrative design, and systems thinking. According to Floridi, prompting is not merely a technical task, but a form of "semantic interface" between human intention and machine cognition (Floridi, 2022).

In design learning environments, prompt engineering encourages students to articulate intentions clearly, refine ideas iteratively, and reflect on how language shapes visual or functional outcomes. Research highlights how students who practice prompt iteration demonstrate improved clarity in concept communication and greater awareness of bias and ambiguity in AI-generated outputs (Riche et al., 2025). Thus, prompt engineering can be positioned as a foundational competence in AI-era interface design education.

Visual Logic, Empathy, and Interface Design Pedagogy

Interface design education is grounded in visual logic—the coherent organization of visual and interactive elements—and empathy—the ability to understand users' needs, emotions, and behaviors (Garrett, 2011). Traditional curricula often teach wireframing, usability heuristics, and layout composition. However, as Buchanan and Norman emphasize, empathetic design is increasingly central to creating meaningful digital experiences [(Norman, 2020); (Buchanan, 2019)].

Empathy in design pedagogy can be fostered through user research, persona development, and participatory design methods. When integrated with AIGC, students can simulate user feedback, prototype emotional responses, or co-create narratives from multiple perspectives. This aligns with the multiliteracies framework, which encourages students to work across modalities—visual, textual, and oral—and to engage in socially situated design practices (Cope & Kalantzis, 2009).

Methodology

Research Design

This study adopts a qualitative case study approach to explore how an AIGC-enhanced interface design curriculum can facilitate learning in prompt engineering, visual logic, and user empathy. The case study method is particularly suited for investigating educational innovation in depth and in context (Yin, 2018). The research was conducted in a digital media design course at a vocational university in eastern China, where the instructor (the researcher) implemented and observed the new curriculum over one academic term (8 weeks).

Participants and Context

Participants included 28 second-year undergraduate students majoring in Visual Communication Design. Students had basic knowledge of interface design software (e.g., Figma, Adobe XD) but limited exposure to generative AI tools prior to the course. The class met once per week for 3-hour sessions, and the course was framed as a design studio integrating AI-driven ideation, prototyping, and storytelling.

The course emphasized three interconnected competencies:

- *Prompt engineering* (e.g., crafting prompts for visual output in Midjourney or layout generation in Uizard);
- *Visual logic* (e.g., consistency, hierarchy, and affordance in screen design);
- *User empathy* (e.g., designing for specific personas, interpreting AI-generated user feedback).

Data Collection

Data were collected through multiple sources to ensure triangulation:

- Student Artifacts: Design works, AI prompt logs, interface mockups, and design journals were collected as evidence of student thinking and process.
- Observational Field Notes: The instructor kept weekly reflection notes on student engagement, misunderstandings, and breakthroughs.
- Focus Group Interviews: Two rounds of semi-structured interviews (midterm and post-course) were conducted with 10 volunteer students to elicit deeper reflections on their learning experiences.
- Peer and Self-Evaluations: Rubric-based reflections submitted after final presentations were used to understand perceived learning gains and challenges.

Data Analysis

All qualitative data were coded thematically using NVivo software. Following Braun and Clarke's (2006) six-phase approach to thematic analysis, the researcher first familiarized themselves with the data, then generated initial codes related to the three core constructs: (1) prompt design literacy, (2) visual design reasoning, and (3) user-centered awareness. Themes were refined iteratively through constant comparison and cross-referenced with course objectives.

Trustworthiness and Ethical Considerations

To ensure credibility, peer debriefing was conducted with a fellow design educator. Member checks were performed by sharing findings with participating students for feedback and clarification. Students participated voluntarily and were assured that their coursework performance would not be affected by their participation in the study. All identifying information was anonymized in the reporting process.

Findings and Discussion

The data collected from student artifacts, interviews, and reflections revealed three major themes that demonstrate how integrating AIGC tools into the interface design curriculum enhanced student learning across technical, conceptual, and empathic dimensions.

Development of Prompt Design Literacy

One of the clearest outcomes was students' growing ability to craft effective prompts for generative tools such as Midjourney and Uizard. Initially, students relied on vague or overly simple inputs (e.g., "design a login page"), which resulted in incoherent or generic outputs. However, as the course progressed, students demonstrated increasing specificity and control in their language, learning to iteratively refine prompts (e.g., "mobile login page for elderly users, soft color palette, minimalist style, centered CTA").

> *"I didn't know words could shape images so clearly. Changing one adjective changed the whole interface!"* (Student A, Week 5)

This growth aligns with the concept of prompt engineering as a new literacy practice, where linguistic precision becomes a core design skill (Maloy & Gattupalli, 2024). Students reported that learning to communicate with AIGC required both creativity and logic—bridging technical and expressive modes of thinking (Haugsbaken & Hagelia, 2024).

Strengthening of Visual Logic and Design Reasoning

Student artifacts showed marked improvement in screen consistency, layout alignment, and hierarchy, especially in later assignments. Peer feedback sessions revealed increased attention to affordance and user flow—students could better justify design choices using visual logic vocabulary. For example, students began referring to spacing, icon placement, and font contrast as intentional decisions rather than arbitrary aesthetic preferences.

> *"I used to just copy styles from Behance. Now I understand how color and spacing guide user attention."* (Student B, post-course interview)

This evolution suggests that coupling AIGC outputs with design critique and reflection deepens conceptual understanding. Rather than replacing creativity, AI tools acted as provocations for discussion, revision, and interpretation, consistent with constructivist views of design learning (Chen, Yuan, & Yin, 2024).

Growth in User Empathy through Persona-Driven Design

The curriculum's emphasis on empathic scenarios—such as designing for elderly users or international students—encouraged learners to consider accessibility, emotional tone, and

narrative flow. Students used Midjourney not only for visual ideation but also to generate imaginary user portraits, helping them visualize end-user needs.

> *"When I saw the AI-generated image of an old man using my app, I started thinking about font size and contrast."* (Student C, Week 4)

Group projects also led to meaningful discussions about identity and audience, and students began integrating user personas, user journey maps, and even AI-simulated user feedback into their workflow. This finding supports the idea that AIGC tools can act as "third-party interlocutors," prompting reflection on user experience (Goloujeh, Sullivan, & Magerko, 2024).

Repositioning of Students' Role: From Passive Learners to Creative Explorers
Beyond technical outcomes, students expressed a shift in their learning mindset. They reported feeling more ownership over their projects, due in part to the open-ended nature of AIGC tools and the flexibility of prompt-driven tasks.

> *"It felt more like exploring than finishing an assignment. I could try ideas quickly, and the results gave me new directions."* (Student D, reflective journal)

This aligns with critical postdigital pedagogy, which advocates for human-AI collaboration as a space of experimentation and agency (Fawns, 2022). Importantly, students were not passively consuming AI output—they were learning to question, adapt, remix, and sometimes reject it.

Conclusion
This study explored how the integration of Artificial Intelligence Generated Content (AIGC) tools into an interface design curriculum can enhance learning in three critical areas: prompt engineering, visual logic, and user empathy. Findings suggest that, when thoughtfully embedded into a learner-centered framework, AIGC does not replace creativity or diminish critical thinking; rather, it acts as a catalyst for deeper engagement, reflection, and design fluency (Park, 2023).

Through structured activities and iterative tasks, students learned to construct effective prompts, analyze the logic behind interface layouts, and design for real human needs using persona-driven approaches. More importantly, the curriculum positioned students not as passive users of technology, but as active co-creators who explore, question, and humanize the role of AI in design (Brailas, 2024).

In reimagining the interface design classroom with AIGC, this study contributes to a growing body of work advocating for postdigital pedagogies—where humans and machines learn together in ethical, creative, and critically aware ways (Hogan & Harney, 2022). The experience of learners in this case underscores the potential of AIGC to empower young designers to think more clearly, see more deeply, and design more responsibly.

Future research may further examine the long-term development of these skills, as well as how AIGC-enabled curricula can be adapted for different learning contexts, disciplines, and

levels. As AI continues to evolve, so must our pedagogies—always with a focus on human meaning, agency, and inclusion (Jandrić & Hayes, 2020).

This study contributes to the evolving field of design education by offering a theoretically grounded framework for integrating AIGC into interface design pedagogy. The findings support the argument that AI tools, when aligned with learner-centered approaches, can strengthen not only design skills but also reflective and empathetic thinking—skills essential for 21st-century creative professionals. Theoretically, the study draws on postdigital and human-AI co-creativity perspectives to reframe how students interact with machine-generated content as part of meaning-making processes.

Contextually, the research is situated in East Asian higher education systems, where traditional design education often privileges technical execution over critical dialogue or cultural responsiveness. By demonstrating how AIGC-enabled curriculum design can shift focus toward agency, identity, and ethical awareness, this study offers a practical model for rethinking design education in similar institutional environments. It informs future curriculum reforms by highlighting how emerging technologies can be pedagogically harnessed not just for innovation, but for inclusion and humanistic growth.

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