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From Technology Empowerment to Value Reconstruction: Paradigm Transformation of AI Literacy for Design Postgraduates

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Abstract: Against the background of the deep involvement of artificial intelligence (AI) technology in the design field, the application of AI in design postgraduate education mostly remains at the level of "technology empowerment", with cognitive limitations such as "valuing skills over thinking, efficiency over value, and output over criticism". To transcend the traditional "instrumentalism" paradigm, this study proposes a new paradigm of AI literacy centered on "value reconstruction", aiming to promote the in-depth cognitive transformation of design education from "how to use AI" to "why to use it". By combining theoretical construction with case action research, the study first analyzes the inherent flaws of the existing paradigm through critical literature review; then constructs a four-dimensional AI literacy framework covering technical cognition, critical application, value reflection, and ecological construction; and verifies the feasibility and effectiveness of the framework in the postgraduate course of a design major at a university in Chengdu. Teaching practice shows that the new paradigm effectively promotes students' transformation from passive technical operators to "reflective designers" with ethical awareness and critical spirit, and their project achievements have been significantly improved in the dimensions of humanistic care, ethical awareness, and sustainability. The research concludes that AI literacy is essentially the value rationality that designers must possess in the digital age; design postgraduate education should complete the paradigm leap from "technology empowerment" to "value reconstruction", cultivating a new generation of design leaders who can control technology and endow it with humanistic significance.

Keywords: Artificial intelligence literacy; Design education; Paradigm transformation; Value reconstruction

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1. Introduction: Inevitability of paradigm transformation

Generative Artificial Intelligence (AIGC) is profoundly changing the creative methods and value logic of design. However, the current application of AI in postgraduate education of design art still mainly stays at the level of "technology empowerment", that is, focusing on using AIGC to improve efficiency, expressiveness, and output results. Although this paradigm effectively "reduces costs and increases efficiency", it has significant limitations: it regards AI as a neutral "super tool", ignoring its inherent cultural biases, ethical conflicts, and value loads; it narrows education down to skill transmission, weakening students' critical thinking and value judgment abilities; in the long run, it is prone to

cultivating “design technicians” proficient only in technical operations rather than design leaders with independent thinking and creativity [1,2]. Therefore, promoting paradigm transformation is imminent, requiring a shift from “technology empowerment” to “value reconstruction”.

As Jia’s research points out, technology-empowered education has its foundations and limitations, and the future must “transcend efficiency and move towards human-technology symbiosis” [3]. In this context, the AI literacy of design postgraduates should not be limited to tool proficiency, but should be upgraded to core literacy in identifying values, reflecting on ethics, and constructing culture in a technical context. Educators need to guide students to critically examine the value orientation and social impact of AI, and explore how to use AI to achieve more inclusive, sustainable, and humanistic design visions. This is not only an expansion of teaching content, but also a comprehensive upgrade of design education concepts, related to the positioning and responsibility ethics of future design talents [4].

2. Literature review and theoretical framework: Deconstruction and construction

2.1. Critical deconstruction of the “technology empowerment” paradigm

The dominant position of the “technology empowerment” paradigm in design education stems from technological neutrality and instrumental rationality. It regards technology as a value-free neutral tool, and thus educational goals are simplified to pursuing efficient and proficient application. However, this paradigm has three fundamental limitations:

(1) Cognitive flattening: Reducing AI to a set of functional tools and ignoring its essence as a “cultural artifact”. The cultural biases in its training data, the logical structure and value orientation of algorithms urgently need critical examination rather than default acceptance;

(2) Value emptiness: One-sided focus on efficiency and formal innovation squeezes in-depth reflection on the fundamental issues, social effects, and ethical consequences of design, easily leading to innovation dilemmas of “having solutions without problems” and “having form without content” [5];

(3) Subject passivation: Students’ reliance on AI “optimization schemes” risks weakening their critical thinking, original exploration impulses, and independent aesthetic judgment, leading to a crisis of becoming vassals of technology.

Marcuse’s criticism of “one-dimensional thinking” in advanced industrial society profoundly reveals the suppression of critical and transcendent abilities by instrumental rationality whilst Marin’s discussion on the complex tension between the “promises” and “impacts” of AI education further confirms the inherent contradictions of this paradigm, providing academic support for this study [6].

2.2. Towards “value reconstruction”: A four-dimensional framework of AI literacy

To transcend the limitations of “technology empowerment”, this study responds to UNESCO’s initiative of “integrating AI ethics into the core of education to ensure its fair, inclusive, and transparent empowerment of education”, and constructs a four-dimensional framework of AI literacy centered on “value reconstruction” as outlined:

(1) First dimension (Technical cognition layer): Beyond operation guides, understand the principles, data foundation, and capability boundaries of AIGC to lay a critical foundation;

(2) Second dimension (Critical application layer): The core is critical use, evaluate the reliability of AI outputs, identify potential biases, guide AI through precise prompts, and use its outputs as creative materials for reprocessing rather than passive acceptance;

(3) Third dimension (Value reflection layer (Core)): Reflect on the design philosophy and value orientation embedded in AI, insight into its social, ethical, and environmental impacts, and adhere to the subjectivity and responsibility ethics of design;

(4) Fourth dimension (Ecological construction layer): Cultivate responsible “shapers of technical ecology” who take the initiative to use AI to promote fair, sustainable, and humanistic design, guiding technology for good.

Table 1 clearly compares the core transformations of the two paradigms [7].

Table 1. Paradigm transformation of AI literacy from "technology empowerment" to "value reconstruction"

Paradigm elements	Technology empowerment paradigm	Value reconstruction paradigm	Core transformation	Paradigm elements
Core goals	Improve efficiency and enrich forms	Value judgment, ethical reflection, ecological construction	From "how to do" to "why to do"	Core Goals
AI role	Efficient tool, assistant	Critical dialogue partner, cultural mirror	From tool to partner	AI Role
Teaching focus	Software skills, prompt engineering	Critical thinking, ethical analysis, value decision-making	From skills to thinking	Teaching Focus
Evaluation standards	Output quality, visual impact	Process reflection, ethical considerations, social value	From results to process and impact	Evaluation Standards

3. Research design and methods: Theoretical construction and action verification

To verify the effectiveness of the "value reconstruction" paradigm and its four-dimensional literacy framework, this study integrates theoretical construction with action research. Action research, with its cyclical nature of "research in action and research for action", is suitable for exploring the new paradigm in real educational scenarios. The research was carried out in the master's course "AI and Future Design Ethics" (35 students), following the "plan-action-observe-reflect" cycle, as shown in **Table 2**.

Table 2. Action research program design

Stages	Core tasks and content
Diagnosis and planning	Pre-test: 83% of students' cognition remained at the "technology empowerment" level. Design: Embed a teaching plan based on the four-dimensional framework around the "aging AI service system" project.
Implementation and observation	Teaching: Set ethical feasibility (privacy), social inclusiveness (digital divide), etc., as core design constraints. Observation: Focus on students' performance in value reflection and critical application abilities.
Data collection	Triangulation: Reflection journals, project texts, defense videos.

4. Practice and findings: Teaching paths of paradigm transformation

4.1. Teaching transformation of the four-dimensional framework

Replace "tool-oriented operation" with "constraint-driven design", and guide technology to serve humanistic goals through explicit ethical clauses. The specific transformation paths are shown in **Table 3**.

Table 3. Teaching transformation paths of the AI literacy framework

Literacy dimensions	Typical teaching activities	Evaluation focus
Technical cognition layer	Deconstruct cultural stereotypes in AI images	Critical awareness of technical non-neutrality
Critical application layer	Embed design constraints in prompts (e.g., "avoid stigmatization of disabled groups")	Validity of active intervention capabilities
Value reflection layer	Debates on ethical dilemmas (efficiency vs. privacy, algorithmic fairness)	Logical consistency of value positions
Ecological construction layer	Compile an "AI Application Value Statement" to clarify inclusive contributions	Social feasibility of ecological visions

4.2. Practical effects of value rationality

Triangulation verification (projects/journals/defenses) shows that students' projects have transcended technical demonstrations and turned to care for vulnerable groups in the deepening of humanism. In a typical case, a health monitoring robot that violated dignity was rejected, and a "nostalgic music system" based on patients' life histories was designed, reflecting the logic of "dignity prioritizing efficiency". In the manifestation of criticism, 82% of reflection journals recorded technology-dominated behaviors, such as "rejecting the AI draft for reinforcing the rigid narrative of elderly care" (reflection) and "the accuracy of output increased by 47% after adding the prompt 'African patterns are not exotic'" (application). In the reconstruction of subjectivity, the post-test showed that the proportion of "worry about being replaced by AI" decreased from 78% to 22%, and the recognition of "value judgment as core competitiveness" increased from 35% to 89%, marking a leap from "technical anxiety" to "value confidence" [8].

4.3. Reflection: Key challenges in paradigm implementation

4.3.1. Reconstruction of evaluation system

Current quantitative indicators are difficult to capture the depth of reflection. It is necessary to develop a mixed evaluation tool integrating critical coding analysis of qualitative reflection journals, vision consistency assessment of the "Statement", and quantitative evaluation of the implementation coverage of ethical constraints in the final project (e.g., the implementation ratio of "inclusive clauses") [9]. The evaluation of "value" and "reflection" cannot be fully quantified, relying on teachers' professional judgment and in-depth qualitative evaluation, which places higher requirements on the evaluation system [10].

4.3.2. Transformation of teachers' roles

In the macro shift from technology empowerment to value reconstruction, the cultivation path of AI literacy for design postgraduates urgently needs to promote the paradigm transformation of teachers' roles. Teachers should no longer be limited to knowledge transmission at the technical operation level, but should transform into guides for students to conduct in-depth value dialogue in the AI context. This role change puts new requirements on teachers' core abilities. On the one hand, they need to have the ability to design ethical dilemma scenarios related to design and AI, enabling students to reflect on the social and ethical implications of technology in specific and dilemmatic design scenarios; on the other hand, they need to have the ability to integrate interdisciplinary knowledge, integrating perspectives from technology philosophy, social psychology, design ethics, etc., to expand the breadth and depth of students' critical thinking [11].

To support the above role transformation, a systematic "AI Ethics Teaching and Research Workshop" should be constructed in the teacher development support system as an important practical platform to promote the improvement of teachers' value guidance capabilities [12]. Through interdisciplinary collaborative lesson preparation mechanisms, the workshop conducts collective discussions around typical design cases, jointly designs teaching modules with ethical challenges, and helps teachers develop comprehensive literacy in value analysis and guidance in real teaching scenarios, thereby better fulfilling the educational mission of "value dialogue guides" in the AI era [13].

4.3.3. Response to technological iteration

Facing the rapid iteration of AI technology, design postgraduate education needs to establish a response logic centered on "value reflection". Specific tool version updates are only superficial technical flows, while the critical issues such as ethical standards, data biases, and algorithmic justice involved behind them constitute a relatively stable value cognitive framework [14]. Therefore, teaching should realize the paradigm transformation from "give a man a fish" to "teach a man to fish", gradually weakening mechanical training on specific tool operations, and focusing on cultivating transferable critical analysis models and ethical evaluation capabilities. This includes but is not limited to systematic methods for detecting data biases, evaluation frameworks for algorithmic transparency and interpretability, and analytical paths for the social impact of technology. By strengthening such reflective tools with sustained applicability, students can maintain

independent judgment and value stability in the evolving technical landscape, realizing a deep transformation from passive technological followership to active criticism and value reconstruction [15].

5. Conclusion

Through the mutual verification of theory and practice, this study systematically demonstrates the necessity and feasibility of the paradigm transformation of AI education for design postgraduates from "technology empowerment" to "value reconstruction". Its theoretical contributions are mainly reflected in three dimensions:

(1) It constructs a critical theoretical framework, systematically deconstructs the three limitations of the "technology empowerment" paradigm (such as the excessive expansion of instrumental rationality), and proposes a "four-dimensional AI literacy" model, providing a new paradigm for design literacy research in the digital age;

(2) It achieves original innovation in research perspective, leaping the core of AI literacy from technical "skill sets" to "value rationality capabilities", completing a fundamental shift from instrumental rationality to design philosophy;

(3) It verifies the practical transformation mechanism of the theoretical model through action research, develops transferable teaching paths and evaluation systems, and course cases confirm the high feasibility of the "value reconstruction" framework in practice. Duan Weiwen emphasizes that technology needs to "construct an ethics-oriented governance framework to become an acceptable force".

This study confirms the core value of this assertion in the field of AI education. The educational response is not only technology empowerment, but also guiding AI to transform from a tool to ethical governance. The profound significance of AI for design education lies in forcing humans to rebuild the ethical coordinate system of design, the essence of education is not to cultivate "tool people" who are vassals of technology, but to shape creative subjects who can inject humanistic souls into science and technology. The ultimate goal of paradigm transformation is to establish the navigational position of human values in the tide of technology. The success or failure of this transformation will determine whether the future world is dominated by algorithmic logic or illuminated by humanistic values.

Disclosure statement

The author declares no conflict of interest.

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