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Research on Employment Structure and Skill Transfer of Design Students in the Context of Generative AI: An Empirical Study Based on Job Postings and Curriculum Analysis

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Abstract: Recent years, Generative Artificial Intelligence (GAI), represented by ChatGPT, Midjourney, Stable Diffusion, and Adobe Firefly, has rapidly permeated the design industry, triggering significant process restructuring in visual production, concept exploration, and content generation. Concurrently, employment anxiety among design students has intensified, with questions such as "Will AI replace designers?" and "Is the design major losing its value?" becoming frequent topics in higher education pedagogy and public discourse. Grounded in the structural changes of the labor market and the evolutionary trends of job roles within the design industry, this paper analyzes the mechanisms through which GAI impacts the employment and career development of design students. The analysis synthesizes data from authoritative reports by the World Economic Forum (WEF), McKinsey Global Institute, IBM, and Adobe.

The study posits that GAI is accelerating the differentiation of job roles and the upward shift of competency structures within the design industry. While demand for traditional roles centered on execution-based visual production shows a contraction trend, there is a sustained growth in demand for interdisciplinary design talent equipped with strategic capabilities, systems thinking, user research competence, and cross-disciplinary collaboration skills. Furthermore, this paper argues that the narrative of "AI destroying the future" is more accurately characterized as an anxiety narrative driven by skills mismatch and educational lag, rather than a factual judgment of the overall demise of the design profession. GAI has not diminished the fundamental value of design; on the contrary, it compels design to return to its disciplinary essence of "Problem Framing—Value Creation—Experience Verification."

Based on these findings, this paper proposes recommendations for design education reform and the transformation of job-hunting strategies for design students. These include curriculum restructuring, AI collaboration training, the upgrading of portfolio expression logic, and the strengthening of ethical and copyright awareness. The aim is to provide theoretical references and practical pathways for design talent cultivation and career development in the AI era.

Keywords: Generative AI; Design Education; Employment Structure; Career Development; Portfolio; AI Collaboration

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1. Introduction

The discipline of design has long been situated at the intersection of technological innovation and media evolution. Since

the proliferation of digital tools, design practice has undergone a significant evolution: transitioning from manual drafting to software-based production, from static layouts to interactive experiences, and from single-medium outputs to cross-platform communication. Since the rapid advancement of Generative Artificial Intelligence (AI) in 2022, production efficiency in sectors such as visual generation, conceptual sketching, advertising creative, and text ideation has improved significantly, exerting a substitution effect on traditional design workflows.

This transformation has triggered a collective professional anxiety among design students. A significant number of students have observed that software proficiency emphasized in traditional curricula (e.g., Photoshop, Illustrator, After Effects) is being partially superseded by AI. Design tasks that previously required hours of labor can now generate multiple solutions within minutes via prompting. Consequently, this has precipitated existential inquiries such as "Is learning design still meaningful?" and "Will design positions be replaced by AI?"

However, historical precedents and labor market dynamics suggest that technological innovation rarely results in aggregate unemployment; rather, it catalyzes job restructuring and skills upgrading. The World Economic Forum's Future of Jobs Report 2023 indicates that while there is a net decrease of approximately 14 million jobs globally, the core trend involves structural migration and competency renewal [1]. The design industry exhibits a similar trajectory: as low value-added roles are compressed, new professions and competency demands are emerging—such as AI Visual Curation, Generative Content Management, and Cross-modal Experience Design. These shifts are propelling designers to transition from "visual producers" to "strategists and experience managers."

This paper aims to explore the impact of Generative AI on the employment of design students, specifically addressing three categories of inquiry: changes in job structure and work content, the reconstruction of future competitiveness, and the adjustment of educational and job-hunting strategies. Based on this premise, the article constructs an analytical framework focusing on job structure, competency structure, and educational structure, and proposes actionable recommendations.

2. Literature Review and Theoretical Foundation

2.1 Technical Logic of Generative AI and Its Adaptability to the Design Industry

Generative Artificial Intelligence generally refers to model systems capable of learning large-scale data distributions to generate novel text, images, audio, or video content; its core competency lies in probabilistic modeling and high-dimensional feature representation. Scholars such as Goodfellow et al. posit that deep neural networks, through massive training, can develop complex representational learning mechanisms, thereby achieving high-quality content generation [2]. In recent years, the maturation of Diffusion Models and the Transformer architecture has significantly elevated the output quality of Generative AI in the domains of image and text.

The rapid integration of Generative AI into the design industry is intrinsically linked to the structural characteristics of design work. Design practice is characterized by high iterativity and combinability: from inspiration gathering to solution exploration, and from stylistic experimentation to version screening, the process entails numerous cycles of "generation–comparison–revision." Generative AI can output a vast array of optional solutions within a short timeframe, thereby drastically compressing the cost of early-stage design exploration and transforming the traditional creative workflow that relied on hand-drawn sketches or reference collages.

It is crucial to note that AI's strength lies not in "creating meaning," but in "rapidly generating form." Consequently, following AI intervention, the pivotal phase of design work is gradually shifting from "production" to "screening and decision-making," imposing higher demands on designers regarding judgment and control.

2.2 AI and the Labor Market: The Debate Between Substitution and Complementarity

Regarding the impact of artificial intelligence on employment, academic research has primarily coalesced around two theoretical perspectives. One stream of research emphasizes the substitution effect. Through an analysis of the computability of occupational tasks, Frey and Osborne argue that a significant number of positions face the potential of automation replacement in the future, particularly those characterized by explicit rules and high repetitiveness [3]. This perspective reinforces public anxiety regarding "machines replacing human labor."

Conversely, another stream of research emphasizes the complementarity effect. Autor posits that while technological progress

often erodes routine tasks associated with medium-level skills, it simultaneously generates new job demands and reinforces the value of high-skilled labor in decision-making, communication, and innovation [4]. Technology does not simply eliminate work; rather, it alters job structures and skill distributions, thereby precipitating occupational differentiation and skills upgrading.

The design industry sits at the intersection of these two logics: designers are responsible for both decomposable execution tasks (such as layout and photo retouching) and creative tasks that are difficult to formalize (such as aesthetic judgment, cultural understanding, and experience planning). Therefore, the impact of Generative AI on the design industry is more likely to manifest as a composite process of "partial substitution—occupational differentiation—upward mobility of competencies."

2.3 The Essence of Design: From Form Production to Value Creation

Design theory universally emphasizes that design is not merely aesthetic embellishment, but a systemic approach to solving real-world problems. In The Design of Everyday Things, Norman argues that excellent design must be grounded in user cognition and behavioral logic; otherwise, even the most exquisite forms may lead to usage failure [5]. The value of design lies in coordinating the relationships between humans and objects, and humans and systems, creating sustainable experiences and meaning within complex constraints.

In the AI era, this theoretical implication is particularly salient. As the capability for visual generation becomes less scarce, the core value of design will become increasingly concentrated in areas such as problem framing, experience verification, and value judgment. In other words, while AI lowers the "threshold of production," it raises the "threshold of decision-making."

Empirical evidence from human–robot interaction research further supports this argument by demonstrating that design decisions influence not only visual perception but also user psychological behavior and trust formation. For example, Zhu et al. found that variations in robotic appearance design significantly affected users' willingness to engage in self-disclosure, indicating that seemingly "formal" design attributes can directly shape interpersonal communication outcomes in technology-mediated contexts (Zhu, Liang, Xv, & Wang, 2023). This suggests that the true competitive advantage of designers lies in their ability to interpret human needs, cultural norms, and behavioral mechanisms, rather than merely generating visually appealing artifacts. Accordingly, even if Generative AI can rapidly produce high-quality formal outputs, it cannot autonomously evaluate whether a design solution is socially appropriate, ethically acceptable, or psychologically effective. Therefore, the future of design education should emphasize human-centered judgment, interaction logic, and value-based decision-making as core competencies that remain difficult to automate [9].

3. Research Methodology and Data Sources

This paper employs a methodology combining literature analysis with the synthesis of secondary data. The analysis is primarily grounded in authoritative sources, including the World Economic Forum's Future of Jobs Report 2023 [1], the McKinsey Global Institute's The Economic Potential of Generative AI: The Next Productivity Frontier [6], the IBM Institute for Business Value's CEO Study 2023 [7], and Adobe's Future of Creativity Report 2023 [8]. Through a comprehensive analysis of the data and research conclusions from these reports, this paper constructs an analytical framework encompassing "job structure–competency structure–educational structure," upon which strategic discussions are proposed.

4. The Impact of Generative AI on the Job Structure of the Design Industry

4.1 Contraction in Demand for Execution-based Roles: Accelerated Substitution of Low Value-added Visual Production

The most direct impact of Generative AI on the design industry is manifested in the enhancement of visual production efficiency. In the traditional design landscape, entry-level positions typically bear the brunt of foundational tasks, such as poster extension, social media layout, e-commerce photo retouching, background replacement, color scheme generation, and stylistic sketching. These tasks are characterized by repetitiveness and templating, often evaluated primarily by "visual completeness." Generative AI holds a distinct advantage in these areas. For instance, in e-commerce visual production, AI can rapidly generate diverse product scene images and automatically match lighting and material effects; in advertising creative, AI can batch-generate conceptual sketches across various compositions and stylistic directions. Consequently, enterprises

gain significant cost and efficiency advantages.

The McKinsey report indicates that Generative AI could contribute an annual potential value of $2.6 trillion to $4.4 trillion to the global economy, significantly boosting labor productivity in knowledge-intensive sectors [6]. As a creative labor-intensive field, the design industry is inevitably a primary arena for this productivity enhancement, implying that the demand for low value-added roles will tend to contract or become outsourced.

It can be inferred that design students whose core competency lies in "execution-based visual production" will face intensified job competition and a higher risk of substitution.

4.2 Upward Shift of the Job Value Chain: Transitioning from "Production" to "Strategy and Decision-making"

The intervention of AI does not merely signify a reduction in execution tasks; more importantly, it propels an upward shift in the job value chain. In the traditional model, designers were responsible for both creative conceptualization and extensive production and revision work. However, in the AI era, with the automation of the production phase, the core tasks of designers are gradually shifting towards strategy formulation, stylistic direction, user experience planning, and cross-team collaboration.

The World Economic Forum points out that the fastest-growing skill demands in the future include AI, big data, technological literacy, creative thinking, and analytical thinking [1]. These competencies align precisely with the trend of job upgrading in the design sector. Corporate expectations for designers will no longer rest on "aesthetic appeal" alone but will require them to articulate design logic, comprehend business objectives, and make effective decisions amidst multiple constraints. Therefore, the competitive focus in the design industry during the AI era is shifting from "output speed" to "decision-making accuracy."

4.3 Emergence of New Occupational Forms: Growth in Prompt, Curation, and Generative Content Management Roles

Generative AI has not led to the wholesale disappearance of design jobs but has instead catalyzed the emergence of new occupational forms. For instance, roles such as Prompt Designer, AI Visual Curator (or AI Art Director), Generative Content Manager, and AI Experience Designer (AI UX Designer) are gradually appearing. The common characteristic of these roles is an emphasis on the ability to control the generation process, screen output results, and integrate content for implementation.

From a professional logic perspective, these roles align more closely with "creative direction" or "design management." Their value lies in translating the batch generation capabilities of AI into executable brand assets and experience systems. Thus, the design profession is not ending; rather, it is differentiating and upgrading towards "strategic, systematic, and managerial" directions

5. The Reshaping of the Competitive Logic for Design Students' Job Hunting by Generative AI

5.1 Aesthetic Judgment as a Critical Competency: AI Generates "Plausible" but Struggles with "Appropriate"

Generative AI is capable of producing a vast quantity of visually plausible images; however, its deficiency lies in a lack of contextual understanding. While AI can mimic styles, it struggles to comprehend the significance of specific symbols within particular cultural and communication contexts. For instance, in cross-cultural communication, colors, patterns, and metaphors may carry sensitivities; in public issue communication, inappropriate visual symbols can precipitate public opinion risks. These issues are not matters of "image quality" but of "meaning judgment."

Therefore, in the AI era, the value of designers is increasingly concentrated in aesthetic judgment, cultural understanding, and value control. In other words, while AI can generate "aesthetics," it is the designer who must judge "appropriateness."

5.2 Transformation of Portfolio Evaluation Criteria: From "Outcome Showcase" to "Process Documentation"

With the proliferation of AI tools, corporate recruitment faces a new trust dilemma: whether a candidate's portfolio reflects their authentic capabilities or is merely a superficial packaging of AI-generated content. Consequently, portfolio evaluation standards are undergoing a transformation. Enterprises are placing greater emphasis on whether candidates possess capabilities across the complete design chain, including problem definition, research methodology, strategic deduction,

iterative optimization, and implementation verification.

In this sense, a portfolio should no longer serve as a "collection of renderings" but should present a structure akin to a "research-based project report." It must demonstrate competency through process documentation, explain decisions through logic, and substantiate proposals with evidence.

5.3 Interdisciplinary Competencies as a Threshold: The Transition Towards Systemic Talent

Design roles in the AI era are increasingly reliant on cross-disciplinary collaboration. Designers are required to comprehend business objectives, technical constraints, and user data, while also being able to engage in effective communication with development, operations, and marketing teams. The IBM CEO Study 2023 notes that enterprises generally anticipate approximately 40% of the workforce will require reskilling to adapt to AI and automation trends [7]. This finding implies that the core expectation for employees is shifting towards "learning agility and adaptability."

For design students, interdisciplinary literacy—such as product thinking, data awareness, and technical understanding—will become a significant threshold for entering high-value positions.

In addition, interdisciplinary competence extends beyond mere technical fluency to include the ability to integrate domain knowledge, pedagogical frameworks, and symbolic interpretation into real-world contexts. Drawing on educational research, Liang et al. (2025) argue that situational and scaffolding principles can foster connotative development among postgraduate learners by bridging theoretical knowledge with contextualized practice, highlighting that higher education must move toward integrated, interdisciplinary models rather than isolated skill training. This perspective implies that in the AI era, successful design practitioners will be those who can synthesize diverse disciplinary insights — from business strategy to cultural interpretation — rather than simply rely on automated generative outputs. Thus, the competitive advantage in recruitment increasingly lies in systemic thinking and cross-contextual judgment, which are not easily automated by GenAI.[10]

6. Analysis of the Realistic Dilemmas Facing Domestic Design Education Amidst the AI Impact

6.1 Curriculum Lag and the Trap of "Instrumental Rationality": The Absence of Foundational Research

Current design systems in domestic universities generally exhibit an inertia of "prioritizing technique over strategy." Software training—such as Photoshop and 3D modeling—dominates the curriculum, while systematic courses on user research, service design, and business logic are severely deficient. Generative AI has thoroughly breached the technical barriers of visual production, causing the competency model centered on "software proficiency" to rapidly depreciate. This has led to a predicament where many graduation projects are "exquisite in appearance but hollow in structure"—possessing mature visual effects yet lacking problem awareness and support from research evidence. Furthermore, driven by concerns over academic compliance, some universities have adopted a "one-size-fits-all" restriction strategy regarding AI. This approach not only fails to cultivate human-AI collaboration capabilities but also exacerbates the severe disconnection between students and the cutting-edge industry.

6.2 Ineffectiveness of Evaluation Systems: AI Dependency Leading to "Industrial Homogenization" of Portfolios

The proliferation of AI tools among the student population has directly triggered a crisis of homogenization in portfolios. A significant number of students rely on tools like Midjourney for illustration generation and packaging, spawning batches of works characterized by "high completeness but zero independent expression." Enterprises have acutely perceived this phenomenon, forcing a paradigm shift in recruitment screening mechanisms: a comprehensive transition from the traditional "visual result orientation" to a rigorous "verification of the deduction process." Today, project process documentation, underlying research logic, and records of iterative deduction have replaced mere visual tension as the sole touchstone for verifying a candidate's originality and core competitiveness.

6.3 Upward Shift in Industry Demand: Structural Misalignment Between the Collapse of Execution Roles and the Rise of Strategy Roles

In the internet and e-commerce sectors, Generative AI has been deeply embedded into real-world workflows. The automation

and batch generation of marketing posters and product scene images are significantly compressing the survival space for traditional "execution-based" design roles. Correspondingly, corporate expectations for talent have shifted significantly upwards. There is an urgent demand for "strategic minds" capable of 驾驭 (maneuvering) AI—requiring designers to thoroughly comprehend brand context, user psychology, and business objectives, and to exercise precise creative control and communication implementation based on AI-generated foundations.

7. The Reconstruction of Competency Structures for Design Students in the AI Era

7.1 Problem Framing: The Core Starting Point of Design Competition

As AI becomes capable of rapidly generating solutions, "solution generation" is no longer scarce; rather, "problem framing" has emerged as the critical competency. Designers must be able to distill core contradictions from complex requirements and translate them into verifiable design propositions. Problem framing competency encompasses identifying authentic versus pseudo-needs, differentiating between user demands and business objectives, and transforming abstract goals into concrete design indicators. This ability relies on a comprehensive understanding of the real world and the synthesis of stakeholder interests, making it a critical competency that is difficult for AI to substitute.

7.2 User Research and Experience Verification: AI Cannot Substitute Real-World Evidence

Norman emphasizes that design must be grounded in user cognition and behavioral logic; otherwise, the design may fail during usage [5]. While Generative AI can generate interface or visual schemes, it cannot substitute for user interviews, contextual observation, and usability testing. Design students who master research methods such as interviews, questionnaires, data analysis, and user journey mapping will establish a stable, differentiated advantage in the AI era.

7.3 Narrative and Communication Competency: Determining the Career Ceiling of Designers

In the AI era, designers must not only be "capable of doing" but also "capable of speaking." Design outcomes must be explicable, arguable, and persuasive to advance implementation within team collaboration and commercial decision-making. In portfolios and interviews, candidates are required to clearly articulate design rationale, strategic deduction, iterative pathways, and the logic behind trade-offs. Narrative competency will serve as a crucial indicator distinguishing mere

8. The Transformation of Student Portfolios and Job-Hunting Strategies in the AI Era

8.1 Portfolios Should Adopt a "Research-Based Structure"

In the AI era, a portfolio should present the complete design chain rather than merely showcasing renderings. It is recommended to adopt a "thesis-style structure," which includes: project background and problem definition; research methodology and insight synthesis; design objectives and strategic frameworks; AI generation processes and screening logic; iterative optimization and verification processes; final implementation schemes and effect evaluation; and reflection and transferable methods. This structure can effectively demonstrate a candidate's thinking and strategic capabilities.

8.2 AI Transparency and Copyright Awareness as Mandatory Requirements

Enterprises do not 排斥 (reject) AI; rather, they are concerned about candidates' lack of original capability and compliance awareness. Design students should explicitly annotate AI-involved stages in their portfolios and showcase human decision-making and secondary creation components. Simultaneously, students should strive to use generation tools with commercial authorization or adhere to platform agreements to mitigate copyright risks.

9. Conclusion

Synthesizing the analysis of authoritative data and design theory, it is evident that the proliferation of Generative AI is profoundly reshaping the developmental landscape of the design industry. It not only compresses the demand for low value-added, execution-based roles, precipitating differentiation and contraction within the industry's job structure [6], but also propels the value center of the design profession continuously upward, rendering design talent equipped with strategic thinking, research capabilities, and interdisciplinary collaborative literacy increasingly valued by enterprises [1].

For design students, core competitiveness is no longer confined to traditional practical production skills but is gradually shifting towards comprehensive capabilities encompassing aesthetic judgment, problem framing, user research, narrative expression, and AI collaboration [5]. In fact, Generative AI does not negate the future development prospects of design

students; rather, it compels a profound adjustment in design education and the career paths of practitioners to adapt to the new requirements brought about by industry transformation.

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