

From Attitudes to Action: Exploring Key Factors Influencing Chinese Mainland Design Educators' Intention to Integrate AI Into Creative Teaching Practice

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Abstract

The integration of generative artificial intelligence (AI) is reshaping how design knowledge is taught and practiced. AI tools now support concept generation, visual exploration and design evaluation, yet the behavioural and contextual factors shaping educators' adoption remain underexplored in Chinese mainland. This mixed-methods study explores key determinants influencing design educators' intention to integrate AI tools into teaching, using the Theory of Planned Behaviour (TPB) and the Technology Acceptance Model (TAM). Semi-structured interviews with ten design lecturers are combined with survey responses from 100 design educators, enabling statistical patterns to be interpreted alongside contextual insights (N = 100). Findings indicate relatively positive attitudes toward AI's efficiency and ideation benefits, with persistent concerns about over-dependence, academic integrity, and erosion of foundational skills. Industry and institutional norms strongly favour AI integration, while peer and student influences are more mixed. Educators indicated high self-efficacy but face structural constraints related to access, policy ambiguity, and assessment design. Sustainable adoption depends on aligning institutional resources, teacher professional development, and studio-based assessment so that AI operates as a co-creative partner rather than a replacement for human creativity.

Keywords: artificial intelligence, design education, Artificial Intelligence in Education (AIED), theory of planned behaviour, Technology Acceptance Model (TAM)

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Introduction

The rapid rise of generative artificial intelligence (AI) tools such as ChatGPT, Midjourney and Stable Diffusion provides both opportunities and challenges for the creative sector. Design professionals now use AI for concept generation, visual exploration and design evaluation, raising fundamental questions about pedagogy, curriculum design and the evolving role of human creativity in AI-augmented contexts. Industry expectations for AI literacy are increasing, and institutions are beginning to treat AI integration as a strategic priority. At the same time, educators must protect foundational skills, critical thinking, and student-centred pedagogy, creating tension between preparing students for AI-assisted workplaces and preserving core design competencies. Research on design educators' AI adoption remains limited, particularly in Chinese mainland, where most work has focused on students, technical implementation or ethics rather than teachers' perspectives. This study is filling in this gap by exploring how Chinese mainland design educators think about and implement AI in their teaching, focusing on attitudes, social influences and perceived constraints, using the Theory of Planned Behaviour (TPB) and insights from the Technology Acceptance Model (TAM) as guiding frameworks. Using semi-structured interviews with ten design lecturers and survey data from 100 design educators, the study provided an integrated insights of how educators balance AI's promises and risks in Chinese mainland design education.

Background

Generative AI has rapidly entered studio-based design education, where these tools are being integrated across the design process for ideation, iteration and visualisation, and there are calls for further work on co-creative workflows, creative autonomy, governance and authorship norms, and fair AI-assisted assessment (Gulzar et al., 2025). Within this context, studies of generative AI in undergraduate studio programmes remain scattered, so the empirical picture is fragmented and inconsistently reported, Gulzar et al. (2025) explored how GenAI is being integrated into studio-based design education by synthesising classroom practices, enabling and constraining conditions, pedagogical framings and directions for future research. Zawacki-Richter et al. (2019) identified four main areas of AIED application work: profiling and prediction, assessment and evaluation, adaptive systems and personalisation, and intelligent tutoring systems in their systematic review of AI applications in higher education, and concluded that research on AI in higher education rarely engages in critical reflection on challenges and risks, is only weakly connected to pedagogical theory, and leaves many ethical and educational questions under-explored. Holmes and Tuomi (2022) review existing AI systems in education and their underlying pedagogical assumptions, arguing that much AIED work has been shaped by narrow views of the functions of education and has largely been driven by computer scientists, which revealed the importance of engaging educators and local educational purposes more directly in future research (Holmes & Tuomi, 2022). However, because this emerging evidence is organised around reported classroom practices and conditions rather than educators' broader pedagogical narratives, how teachers themselves conceptualise AI's role in studio pedagogy and curriculum design remains only partially visible in the current literature (Gulzar et al., 2025).

Teacher beliefs and perceived support are central to technology adoption. Ertmer (1999) distinguished "first-order" barriers, such as lack of access, time and support, from "second-order" barriers, including beliefs about teaching, learning and the value of technology, and indicated that both types of barriers must be addressed if technology is to be sustainably integrated into classroom practice (Ertmer, 1999). Subsequent work showed that teachers'

pedagogical beliefs and the support they perceive from colleagues and administrators strongly shape whether and how they perform technology-rich curricula, even in the face of technological, administrative or assessment barriers (Ertmer et al., 2012), effectively positioning them as key pedagogical gatekeepers in decisions about technology use. According to the TPB, attitudes, subjective norms and perceived behavioural control jointly determine behavioural intention (Ajzen, 1991), and Teo's model of teachers' technology applied these constructs to show how attitudes, perceived usefulness and facilitating conditions shape teachers' intentions to use digital tools in their teaching (Teo, 2011). Research using the TAM and its extensions shows that perceived usefulness and perceived ease of use are core determinants of technology acceptance (Davis, 1989), while critiques of TAM emphasise the need to go beyond these individual perceptions to incorporate richer social, cultural and contextual factors in explaining technology adoption (Bagozzi, 2007). Meta-analytic and critical work has therefore highlighted the limits of models that focus only on individual perceptions, calling for approaches that engage more seriously with ethical, pedagogical and contextual dimensions of technology adoption (Bagozzi, 2007; Zawacki-Richter et al., 2019).

There remains a lack of theoretically grounded research concerning how design educators, particularly in Chinese mainland, assess generative AI, navigate societal and institutional pressures, and perceive their capacity to integrate AI into studio teaching. Guided by the TPB and grounded in the TAM, this study aims to address the following research questions:

1. How do design educators in Chinese mainland evaluate generative AI tools in relation to their pedagogical goals and core studio practices?
2. How do industry expectations, institutional policies, peer practices and student demands shape educators' decisions about whether and how to integrate AI into teaching?
3. How do educators perceived self-efficacy and structural conditions influence their perceived control over integrating AI?
4. Under what conditions do strong intentions to integrate AI translate into sustained, ethically responsible teaching practices in design education?

Methodology

Research Design

The study adopted a mixed-methods design. Qualitative and quantitative data were collected within the same time frame, analysed separately and then integrated to develop a comprehensive understanding of Chinese mainland design educators' AI integration. The qualitative phase explored how lecturers described their experiences, concerns and decision-making processes in depth. The quantitative phase examined how strongly TPB-related factors appeared among design educators in higher education institutions.

Participants

Qualitative Phase

Ten design educators from higher-education design programmes in Chinese mainland took part in semi-structured interviews. They were invited through existing professional contacts and then through colleagues' recommendations, with the intention of including different types of institutions, design disciplines and teaching experience, rather than targeting any specific institutional sector. Disciplines included visual communication, environmental design, product

design and digital media, and teaching experience ranged from roughly 5 to 10 years. All interviewees were directly responsible for studio and project-based teaching.

Quantitative Phase

The quantitative phase consisted of an online survey of design educators working in colleges and universities in Chinese mainland. The questionnaire was completed by 105 educators, after removing incomplete responses and cases where respondents did not hold a current design-teaching role, a final analytic sample of 100 design educators was retained (N = 100). Participants were recruited through professional networks, design institutional mailing lists. The analytic sample included 53 lecturers, 36 associate professors and 11 professors across programmes such as visual communication, environmental and spatial design, product design and digital media. Respondents generally had substantial experience teaching in design programmes and were responsible for studio courses, project modules or capstone projects.

Instruments

Interview

An interview guide was developed to align with TPB while leaving space for unanticipated themes. Questions addressed experiences using generative AI tools in personal practice and teaching, perceived benefits and risks for design learning and assessment, perceptions of industry, institutional, peer and student expectations, confidence and perceived constraints in integrating AI, and short and long-term intentions for AI use in studio and project teaching. Interviews were conducted via face to face and online video conferencing platforms, lasted between 45 and 90 minutes, and were audio recorded with consent and transcripts in Chinese for analysis.

Survey Questionnaire

A 100-item questionnaire operationalised key TPB constructs, informed by technology acceptance literature and prior AI in education studies. Items covered attitudes toward AI in design teaching, subjective norms (industry expectations, institutional climate, leadership encouragement, peer practices and student pressure), perceived behavioural control (self-efficacy, pedagogical knowledge, access and structural constraints), behavioural intention and future-oriented beliefs about AI and design education. All items used a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree), with several items reverse coded so that higher scores consistently indicated stronger endorsement of the underlying construct.

Procedure

After institutional ethical approval was obtained, recruitment emails were sent to potential participants and shared via professional networks. Interested lecturers contacted the researcher directly and received information sheets and consent forms. For the qualitative phase, interviews were scheduled at convenient times and conducted in Mandarin Chinese. Pseudonyms were used and institutional identifiers removed, audio recordings were transcribed, anonymised and stored securely. For the quantitative phase, the online survey was minimised re-identification risk, no specific institutional identifiers were collected; only broad academic rank, role and discipline area were recorded.

Data Analysis

Interview data were analysed using thematic analysis. Transcripts were read repeatedly to build familiarity, and initial codes were generated inductively with attention to TPB constructs of attitudes, subjective norms, perceived behavioural control and intention. Codes captured explicit evaluations of AI and more implicit assumptions about professional responsibility, student capability and institutional risk. Codes were iteratively organised into candidate themes describing patterned ways in which lecturers reasoned about AI integration, with attention to both convergence and variation across cases. Quantitative analyses used the cleaned analytic survey dataset (N = 100). For each item, means, and standard deviations were calculated. These results form the basis of the survey evidence reported in the Findings section and are directly triangulated with interview themes.

Findings

Finding 1: Design Educators Show Cautiously Positive, Conditional Attitudes Toward Generative AI

Interview data showed that design lecturers regard generative AI as a helpful assistant for accelerating repetitive tasks, supporting research and broadening visual exploration in early ideation and prototyping. At the same time, they have drawn clear boundaries around what AI should not replace, emphasising drawing, observational skills, material experimentation and iterative refinement as non-negotiable foundations of studio-based learning. Several lecturers worried that students might submit polished AI-generated outputs without engaging in underlying processes that develop judgement and tacit knowledge, and therefore framed AI as something that must augment rather than substitute core practices.

Table 1

Attitudes Toward AI in Design Teaching (N = 100)

Item	M	SD
AI improves efficiency in certain design tasks	4.59	0.53
AI helps weaker students produce higher-quality visual concepts	4.02	1.00
AI accelerates prototype iteration and class discussion	4.19	0.81
AI stimulates students' creativity	3.72	1.15
Over-reliance on AI may weaken critical thinking	4.20	0.99
AI may erode foundational design skills	4.08	0.94
Effective use of AI requires skills many students lack	4.03	0.99
AI outputs are often insufficient as final deliverables	4.22	0.92
AI's impact depends on how it is used in teaching	4.39	0.75
Overall, I have a positive attitude toward AI in design education	4.35	0.70

Note. Items measured on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree).

Survey responded from the full sample of Chinese mainland design educators ($N = 100$) supported this conditional stance. As shown in Table 1, perceived efficiency benefits were rated very highly ($M = 4.59$), and educators also agreed that AI can support weaker students and speed up prototyping and classroom discussion (all $M \geq 4.02$, except creativity at $M = 3.72$). At the same time, concerns about over-reliance, foundational skill erosion and student skill gaps were also strongly endorsed, with all concern items at or above $M = 4.03$. Overall attitude toward AI in design education was clearly positive ($M = 4.35$), but respondents strongly stressed that its impact depends on how it is used pedagogically (conditional item $M = 4.39$). These scores showed that both perceived benefits and concerns are rated highly, supporting the interpretation of pragmatically positive but tightly conditional attitudes toward generative AI in creative teaching.

Finding 2: Industry and Institutional Norms Strongly Promote AI Integration, While Peer and Student Influences Are More Mixed

Interviews revealed a clear hierarchy of normative influences shaping educators' decisions. Industry expectations emerged as the strongest and most uniform pressure: lecturers reported that internship partners and employers increasingly expect graduates to be familiar with AI tools and to demonstrate AI-supported workflows. Institutional norms were also visible through AI-related initiatives and signals from leadership, even when formal policies remained ambiguous. Peer norms and student expectations were more heterogeneous, with some colleagues and students pushing for AI use and others expressing scepticism or concern.

Table 2
Subjective Norms Regarding AI Integration (N = 100)

Source	Item	M	SD
Industry	Industry's emphasis on AI use is increasing	4.58	0.62
	Employers urgently expect AI-proficient graduates	4.36	0.69
	Industry expects teachers to integrate AI	4.45	0.64
Curriculum	Adopting AI is necessary to keep design courses relevant	4.30	0.70
Institutional	My department head actively encourages AI use	4.42	0.79
	AI integration is seen as a strategic priority	3.99	0.94
Peers	I feel pressure from colleagues to adopt AI tools	3.81	1.11
	Colleagues share a clear consensus on the importance of AI integration	4.07	0.79

The survey data confirmed this hierarchy of norms. As shown in Table 2, educators almost agreed that the design industry is paying increasing attention to AI ($M = 4.58$) and that industry expectations for AI-proficient graduates are high ($M = 4.36$). Respondents perceived strong expectations from industry that teachers integrate AI ($M = 4.45$) and largely endorsed AI adoption as necessary to keep design curricula relevant ($M = 4.30$). Institutional leadership encouragement was also high ($M = 4.42$), whereas peer consensus and especially peer pressure were more moderate ($M = 3.99$ and 3.81). Departmental climate around AI as a strategic priority sat between these poles ($M = 4.07$). These patterns indicated that industry and

institutional signals form the dominant subjective norms for AI integration, while peer-related pressures are more mixed and context-dependent.

Finding 3: Educators Feel Confident Using AI but Perceive Strong Structural Constraints

Lecturers described themselves as confident and willing to experiment with AI, but constrained by uneven access, unclear policies and assessment challenges. They indicated that many students lacked foundational design skills to use AI reflectively, and that institutional processes around software licensing, reimbursement and assessment templates created friction.

Table 3
Perceived Behavioural Control: Self-Efficacy (N = 100)

Dimension	Item	M	SD
Self-efficacy	I am confident in my ability to use AI in teaching	3.94	0.87
	I know how to apply AI appropriately in design education	3.94	0.84
	I lack sufficient confidence and knowledge to troubleshoot AI tools (reverse)	2.73	1.17
Structural barriers	Students' lack of foundational design skills is a major obstacle	3.78	0.99
	Institutional barriers (e.g., licensing, reimbursement) make AI implementation difficult	3.74	1.06
	Current AI technical limitations reduce the effectiveness of students' final products	3.63	0.97
	My institution provides sufficient technical/administrative support for AI use (reverse sense)	3.21	1.23

The survey results showed a similar contrast between internal capability and external constraints among design educators more broadly. As Table 3 indicated, respondents reported relatively high confidence in their ability to use AI in teaching (M = 3.94) and to apply it appropriately in design pedagogy (M = 3.94). In contrast, perceived institutional support was much lower (M = 3.21), with only 42% agreeing that their institution provides sufficient technical or administrative support for AI integration. Many educators saw student skill gaps (M = 3.78), institutional barriers such as software licensing and reimbursement rules (M = 3.74) and technical limitations of current AI tools (M = 3.63) as substantial obstacles. Agreement with the reverse-coded low-self-efficacy item was relatively low (M = 2.73), confirming that lack of confidence is not the primary barrier. These results showed a pattern of strong internal control but reduced external control, which helps explain why high intentions do not automatically translate into widespread, intensive AI integration.

Finding 4: Strong Intentions Lead to Staged and Conditional AI Integration

Lecturers expressed strong intentions to integrate AI but emphasised that implementation would proceed gradually and conditionally. They described experimenting with AI in

demonstrations, optional activities and specific project phases, while postponing full integration into core graded assignments until policies, access and pedagogy felt more secure. They were cautious in foundational courses, where they prioritised manual skills and process over efficiency.

The quantitative data underscored the strength and breadth of intention across Chinese mainland design educators. As shown in Table 4, all intention items have means above 4.46, with between 92% and 97% of respondents agreeing or strongly agreeing that they will further explore, gradually apply and share AI uses in teaching. Future-oriented belief items are similarly high (all means ≥ 4.40), including the expectation that AI will become a standard tool in the design industry ($M = 4.56$), that teachers have a responsibility to integrate AI ($M = 4.51$) and that future designers must combine strong foundational skills with AI proficiency ($M = 4.60$). These findings indicated that lack of willingness is not the bottleneck. On the contrary, the phased strategy adopted by educators reflects a deliberate and responsible pacing of progress within structural and pedagogical constraints.

Table 4
Behavioural Intention and Future Beliefs (N = 100)

Scale	Item	M	SD
Intention	I intend to further explore AI applications in my future teaching	4.54	0.59
	I will gradually apply AI in my courses in the coming years	4.52	0.60
	If adequate resources and training are available, I am willing to use AI	4.51	0.59
	I am willing to share AI-related teaching experiences with colleagues	4.46	0.67
Future beliefs	AI will become a standard, widely used tool in the design industry	4.56	0.56
	Teachers have a responsibility to integrate AI into curricula	4.51	0.69
	Design educators' roles are shifting toward conceptual curation and critical evaluation	4.46	0.78
	In a design industry enhanced by AI, solid fundamental design skills will become increasingly important, not diminished.	4.40	0.88
	AI should be viewed as a powerful tool that designers should master and control, rather than replacing human creativity.	4.61	0.78
	A key educational goal should be to teach students how to critically evaluate and improve AI-generated content.	4.61	0.62
	The most successful future designers will combine traditional skills with AI proficiency	4.60	0.72

Discussion

The combined qualitative and quantitative findings depict Chinese mainland design educators as pragmatically optimistic but professionally cautious about integrating generative AI into creative teaching. Attitudes are clearly positive in terms of perceived efficiency, support for weaker students and enrichment of prototyping (all benefit items $M \geq 4.02$), yet educators simultaneously express strong concerns about critical thinking, foundational skills and student readiness (all concern items $M \geq 4.03$). Rather than uncritical adoption or outright rejection, the present findings support a view close to what Gulzar et al. (2025) describe as responsible and effective GenAI use, in which AI functions as a powerful assistant but is carefully bounded through governance, authorship norms and assessment frameworks to protect core studio practices (Gulzar et al., 2025).

Subjective norms in this study are dominated by industry and institutional expectations. Almost all respondents perceive a strong industry shift toward AI and urgent demands for AI-proficient graduates, and they feel corresponding expectations that teachers integrate AI to keep curricula relevant (all key industry/institution items $M \geq 4.30$). Peer norms in the present study are more ambivalent, with moderate consensus and relatively low reported peer pressure, suggesting that while AI is increasingly framed as a strategic priority, day-to-day practice is still negotiated within diverse departmental cultures.

Perceived behavioural control findings highlight a crucial distinction between internal and external control. Educators report high self-efficacy for both technical and pedagogical use of AI ($M = 3.94$), and the low mean on the reverse self-efficacy item confirms that lack of confidence is not a dominant barrier ($M = 2.73$). In contrast, institutional support is comparatively weak ($M = 3.21$), while student skill gaps, institutional barriers and technical limitations are widely perceived as obstacles ($M = 3.63$ – 3.78). This pattern resonates with Ertmer's distinction between first-order (external, structural) and second-order (internal, belief-related) barriers and with broader technology-integration research showing that even teachers with positive beliefs and high confidence struggle to sustain innovation when resources, institutional policies and school culture are misaligned (Ertmer, 1999; Ertmer et al., 2012). In this context, the main constraints lie less in educators' ability to operate AI tools and more in whether those tools can be used in legally compliant, reliable and fairways within existing policies, infrastructure and assessment regimes.

Behavioural intention and future-oriented beliefs in this study are uniformly strong. Nearly all respondents intend to further explore and gradually integrate AI, conditional on appropriate resources and training (all intention items $M \geq 4.46$), and they strongly endorse AI as a standard future tool, a teacher responsibility and a key dimension of hybrid professional competence (all future items $M \geq 4.40$). These strong intentions and future-oriented beliefs suggest that high perceived usefulness and social legitimacy can sustain commitment to AI integration even when external control remains weak.

These findings have several implications for policy and practice. First, interventions to support AI integration in Chinese design education should prioritise institutional conditions, such as stable and equitable access to tools, clear policies on acceptable AI-assisted work, and assessment frameworks that make AI use transparent and assessable rather than hidden. Second, the results suggest an emergent professional identity for design educators as orchestrators of human–AI collaboration. Rather than banning AI outright or allowing it to displace core practices, educators in this study are experimenting with staged integration,

designing tasks that make AI use explicit and discussable, and teaching students to combine AI outputs with traditional skills in reflective ways. Systematic work on AI in design education similarly emphasises the value of integration requires positioning AI as a co-creative partner and foregrounding critical evaluation, iteration and material practice. Supporting this evolving role will require not only technical resources but also time, collegial spaces and institutional recognition for the curricular design work. In the context of Chinese mainland design education, such support may be decisive in determining whether very strong intentions to integrate AI can translate into sustainable, ethically grounded practice.

Conclusion

This study demonstrates that Chinese mainland design educators' intentions to integrate generative AI into creative teaching are strong, widespread and grounded in clear perceptions of industry necessity and pedagogical potential. The primary barriers to rapid, comprehensive AI integration are not attitudinal resistance or lack of technical confidence but structural and contextual constraints: insufficient institutional support, unclear policies on acceptable AI-assisted work, uneven access to tools and platforms, assessment frameworks that were designed before AI became ubiquitous, and student cohorts with varied foundational skills.

These findings have several implications for policy and practice. First, interventions to support responsible AI integration in Chinese design education should prioritise institutional conditions, stable and equitable access to tools, clear policies on acceptable AI-assisted work, and assessment frameworks that make AI use transparent and assessable rather than hidden. Focusing only on tool training would overlook the primary constraints identified in this study. Second, vocationally oriented and applied design programmes, where employability imperatives and craft-based pedagogies intersect most sharply, are often at the forefront of AI education tensions that other disciplines will soon encounter. If AI integration can be made to work in these settings, where questions of authorship, skill erosion and fairness are particularly salient, it may offer transferable models for wider higher education.

The study points to an increasingly important role for design educators as orchestrators of human–AI collaboration. Rather than banning AI outright or allowing it to displace core practices, educators are experimenting with staged integration, designing tasks that make AI use explicit and discussable, and teaching students to combine AI outputs with traditional skills in reflective ways. Supporting this evolving role will require not only technical resources but also time, collegial spaces and institutional recognition for the curricular design work involved. Future research should explore longitudinal trajectories of AI integration, tracking how initial experimental uses evolve as policies stabilise and pedagogical models mature. Comparative studies across different institutional tiers and disciplinary traditions would illuminate how context shapes the pace and form of AI adoption. Studies could also investigate student perspectives on AI-augmented pedagogy, particularly around the development of critical judgement and reflective practice in AI-supported design processes.

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

The author declares that ChatGPT, an AI-assisted writing software, was used in proofreading and refining the language used in the manuscript. The usage was limited to correcting grammatical and spelling errors and rephrasing statements for accuracy and clarity. The author further declares that, apart from Grammarly, no other AI or AI-assisted technologies have been

used to generate content in writing the manuscript. The ideas, design, procedures, findings, analyses, and discussion are originally written and derived from careful and systematic conduct of the research.

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