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Between regulation and accessibility: how Chinese university students navigate global and domestic generative AI

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ABSTRACT

Generative AI is rapidly reshaping higher education, yet students in China face barriers to accessing global tools such as ChatGPT due to regulatory and technological constraints. Guided by the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2), this study employs qualitative interviews to examine how Chinese university students engage with global and domestic generative AI in their learning. Findings show that accessibility and cost strongly shape adoption. Limited access to global tools and the expense of paid versions led many students to rely on domestic alternatives, though some used VPNs or shared accounts to access tools perceived as more beneficial. Language proficiency and disciplinary background also influenced engagement: STEM and English-medium students preferred global AI for technical or English-based tasks, while humanities students favoured domestic AI for Chinese-language and culturally grounded assignments. Students further viewed domestic AI as more aligned with local norms and political contexts, whereas global systems often lacked cultural nuance. By illuminating the accessibility, linguistic, disciplinary, and cultural dimensions of AI adoption, this study advances understanding of generative AI integration in non-Western higher education and calls for human-centered, multilingual, and contextually responsive approaches to foster equity in digital learning.

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Generative AI; higher education; UTAUT2; technology adoption; digital equity; China

Introduction

With the advent of ChatGPT, generative AI has been rapidly adopted in higher education, profoundly transforming students' learning approaches and academic outcomes (Rasul et al. 2023). The integration of generative AI into higher education provides students with more efficient learning assistants, supporting autonomous learning, enhancing writing and research capabilities, and facilitating personalised education (Baidoo-Anu and Ansah 2023; Li et al. 2025a; Udeh 2025). However, it also raises concerns regarding academic integrity, the reliability of generated information, and students' over-reliance on AI-generated content (Li et al. 2024; Sullivan, Kelly, and McLaughlan 2023; Yusuf, Pervin, and Román-González 2024).

In response to both the opportunities and challenges posed by generative AI, regulatory initiatives have emerged at global, national, and institutional levels. International organisations such as

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UNESCO and the European Union have issued guidelines to support universities in governing the academic use of generative AI (European Commission 2023; Miao and Holmes 2023). While some countries have enacted policies addressing its educational implications, others remain in exploratory or observational stages (Vidal, Vincent-Lancrin, and Yun 2023; Xie, Li, and Enkhtur 2024). Leading universities worldwide are developing institutional policies and faculty training programmes to promote the ethical integration of generative AI in higher education (Dabis and Csáki 2024). Nonetheless, governments and institutions differ in their responsiveness and regulatory focus, leading to notable disparities in students' access to policy guidance and technical support (Li et al. 2025b; Wang et al. 2024).

The development of mainstream generative AI models remains predominantly English-centric and often reflects Western cultural norms (Bender et al. 2021; Liu, Lee, and Zhao 2025a; Zhong et al. 2024; 2025). This linguistic and cultural bias poses challenges for students in non-English-speaking contexts, particularly for users of low-resource languages who encounter diminished model performance due to insufficient training data (Kobayashi et al. 2025; Liu et al. 2025; Sun et al. 2024). For example, languages spoken across regions such as Southeast Asia and Africa continue to demonstrate weaker performance in existing models, thereby reinforcing digital linguistic inequalities (Aji et al. 2023; Kshetri 2024). Moreover, global economic disparities contribute to an AI digital divide, wherein students in developed countries have greater access to premium generative AI tools (e.g. ChatGPT Plus, Claude Pro), while those in developing or less affluent regions face challenges related to accessibility, infrastructure, and educational support (Arora et al. 2023; Miao and Holmes 2023).

Access to generative AI is complicated by varying national regulations. In countries such as China, Russia, Iran, and North Korea, varying degrees of restrictions on tools like ChatGPT limit students' access to internationally developed platforms (OpenAI n.d.). Meanwhile, the global generative AI landscape remains dominated by the United States (Brookings Institution 2023), prompting many countries to develop domestic alternatives. China stands out in this regard, as policy restrictions on global AI tools such as ChatGPT, Claude, and Gemini have accelerated the growth of local models (Smith 2025), including Kimi Chat (月之暗面), ChatGLM (智谱清言), Doubao (豆包), Wenxin Yiyan (文心一言), and Qwen (通义千问). These domestic generative AI tools are evolving quickly, with advances in Chinese language processing capabilities, industry applications, and user experience, offering viable generative AI options for Chinese students in their daily learning and research.

Against this unique and evolving digital landscape, this study aims to explore:

RQ1: How do accessibility and cost influence Chinese university students' choices and adoption of global versus domestic generative AI tools?

RQ2: How do language proficiency and disciplinary background affect Chinese university students' patterns of use of global and domestic generative AI tools?

RQ3: How do Chinese university students negotiate their engagement with global and domestic generative AI tools within Chinese cultural and ideological contexts?

Literature review

The technical overview of global generative AI and domestic generative AI

Since OpenAI's launch of ChatGPT in late 2022, generative AI has drawn global attention for its ability to produce high-quality outputs that assist humans across diverse tasks (Brown et al. 2020). Yet, China's development of generative AI sits in a paradox amid U.S.–China geopolitical tensions. The Chinese government has banned global AI tools such as Gemini, Claude, and Copilot (Cyberspace Administration of China 2023), creating a domestic demand gap that was soon filled by local alternatives. However, Chinese technology companies face obstacles. U.S. export controls restrict access to high-end NVIDIA chips (Feng 2025), and domestic substitutes lag behind

NVIDIA's mature Compute Unified Device Architecture (CUDA) ecosystem. As a result, companies have focused on small and mid-scale models like Alibaba's Qwen series. By late 2024, this landscape began to shift. Efficiency-oriented methods such as the Mixture of Experts (Jiang et al. 2023) reduced dependence on computational power, and DeepSeek exemplifies this shift, achieving ChatGPT-level performance under limited computing resources through optimised efficiency-driven techniques (Guo et al. 2025; Liu et al. 2024).

In this study, global generative AI tools refer to systems developed by leading international technology companies, characterised by globally oriented architectures, extensive user bases, and international influence. OpenAI's ChatGPT exemplifies this category. It is trained on diverse datasets, designed for global markets, and primarily English-based, representing the frontier of global AI development. Domestic generative AI tools, by contrast, are developed by Chinese companies to serve local users. Examples include DeepSeek, Doubao, and Qwen, which are optimised for Chinese contexts through localised data, advanced Chinese language processing, and compliance with domestic regulations. We selected three global models (GPT-4o, Claude-3.5, Gemini-Exp) and three Chinese models (DeepSeek-v3, Doubao-1.5-Pro, Qwen2.5) for comparison based on performance, release date, and transparency, in order to provide a technological background for interpreting students' interview data and deepening subsequent analysis.

Generative AI's broad problem-solving abilities make comprehensive evaluation challenging, as existing benchmarks often capture only specific aspects. In recent years, the AI community has developed more rigorous, multidimensional evaluations (Chang et al. 2024). Among these, Massive Multitask Language Understanding (MMLU) assesses English proficiency across 57 subjects in Science, Technology, Engineering and Mathematics (STEM), Humanities, and Social Sciences (Hendrycks et al. 2020), while C-Eval serves as its Chinese counterpart (Huang et al. 2023). Beyond language, benchmarks targeting math (Math), reasoning (Big-Bench Hard: BBH), and coding (Mostly Basic Programming Problems Plus: MBPP+) have been introduced to measure higher-order problem-solving capabilities (Austin et al. 2021; Hendrycks et al. 2021; Suzgun et al. 2022).

This study compares global and domestic generative AI models across five dimensions – English, Chinese, math, reasoning, and coding. Results indicate (1) comparable English proficiency; (2) stronger Chinese performance among domestic models; (3) similar reasoning and coding abilities; and (4) notable improvements in mathematical reasoning in newer models such as Gemini-Exp, DeepSeek-v3, and Doubao-1.5-Pro. Overall, global and domestic models now demonstrate converging performance, reflecting rapid advancement by both the U.S. and Chinese research communities (ACL Rolling Review Statistics 2025) (Figure 1).

The adoption of generative AI in higher education

The rapid spread of generative AI tools has transformed higher education, prompting growing research on how students and educators perceive and adopt these technologies. Most existing studies draw on technology acceptance models (e.g. Technology Acceptance Model (TAM); Theory of Planned Behavior (TPB); Unified Theory of Acceptance and Use of Technology (UTAUT & UTAUT2)) to explain behavioural intentions. Ivanov et al. (2024), conducting research in European universities, found that positive perceptions of generative AI benefits shape attitudes and drive actual use. Similarly, Bouteraa et al. (2024), examining students in the Association of Southeast Asian Nations (ASEAN) countries, combined UTAUT and Social Cognitive Theory, showing that performance expectancy, social influence, and self-efficacy predict use, while student integrity constrains it. In the Arab region, Ayyoub et al. (2025) extended UTAUT among Arab educators, confirming the strong effects of its core constructs and revealing gender and experience differences. Using data from Iraqi undergraduate students, Albayati (2025) applied TAM and emphasised privacy, trust, and security as critical external factors influencing ChatGPT acceptance.

From students' perspectives, attitudes toward generative AI are both enthusiastic and cautious. In Australia, Kelly, Sullivan, and Strampel (2023) found that confidence grows with experience,

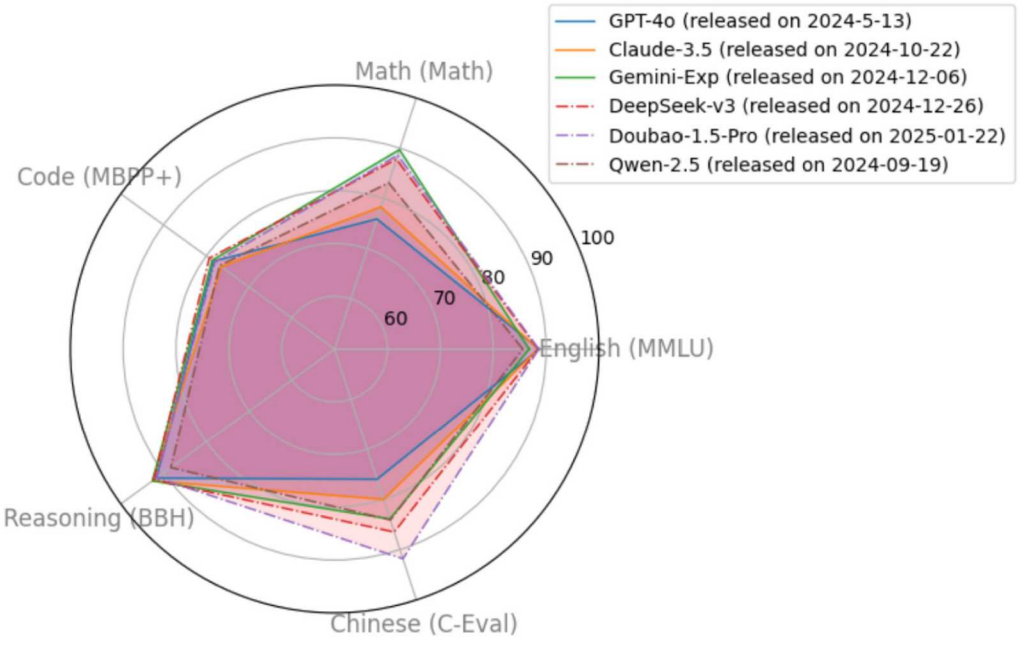

Figure 1. Performance comparison between global (solid lines) and domestic generative AI (dash-dot lines) across five dimensions. Notes: The scores are collected from publicly available sources, including research papers and official product pages, with efforts made to verify consistency across different sources.

while Abbas, Jam, and Khan (2024) showed that academic pressure increases ChatGPT usage but may harm learning outcomes, as seen in Pakistan. Johnston et al. (2024) reported that UK students support AI-assisted tools but oppose full essay generation, linking stronger writing confidence to lower reliance on AI. Liu and colleagues (Liu, Darwin, and Ma 2024 Liu, Lee and Zhao 2025) examined Chinese EFL (English as a Foreign Language) learners' engagement with generative AI, showing that under restricted AI access and an exam-oriented culture, students rely on intrinsic motivation and personal goals to use generative AI as a substitute for authentic English environments while developing critical digital literacies. Similarly, Fan, Deng, and Liu (2025) explored Chinese engineering students' attitudes toward generative AI, finding appreciation for its efficiency but scepticism about its accuracy.

Educator-focused research highlights similar ambivalence. In Palestine's higher education system, shaped by political instability, limited resources, and digital inequality, educators' engagement with generative AI reflects both optimism and strain. Hamamra, Khlaif, and Mayaleh (2025) highlighted instructors' cautious enthusiasm for generative AI's pedagogical potential amid infrastructural and ethical challenges, while Khlaif et al. (2025) revealed that these same contextual constraints contribute to educators' technostress and limited institutional support.

Overall, prior research has advanced the understanding of generative AI adoption among students, yet several important limitations remain. First, although existing studies draw data from multiple countries, most interpret findings primarily through a technological lens and overlook national, cultural, and policy-specific characteristics that shape user behaviour. Second, quantitative approaches dominate the field, offering statistical generalisations but failing to capture students' lived experiences, attitudes, and adaptive strategies toward generative AI in depth. Third, few studies have addressed issues of unequal access to AI technologies or examined how cultural and regulatory contexts influence adoption and learning practices in higher education.

Grounded in the UTAUT2 framework, this study addresses these gaps by exploring how Chinese university students navigate global and domestic generative AI tools under such sociopolitical and

cultural conditions. By highlighting the contextual dimensions of technology adoption, it contributes to a more inclusive and contextually grounded understanding of generative AI integration in higher education.

Theoretical framework

The Unified Theory of Acceptance and Use of Technology (UTAUT) and its extended model, UTAUT2 (Venkatesh et al. 2003; Venkatesh, Thong, and Xu 2012), provide the theoretical foundation for this study. UTAUT integrates eight earlier models of technology adoption, including the Technology Acceptance Model (Davis 1989), Theory of Planned Behaviour (Ajzen 1991), and Social Cognitive Theory (Bandura 1986), to explain individuals' intentions and behaviours regarding technology use. The model identifies four primary determinants – *Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions* – as well as key moderators such as *Gender, Age,* and *Experience* (Venkatesh et al. 2003).

Recognising technological advancements and shifts in user behaviour, UTAUT2 expands the framework by adding *Hedonic Motivation*, *Price Value*, and *Habit*, emphasising the personal and affective dimensions of technology adoption (Venkatesh, Thong, and Xu 2012). These models have since been applied across diverse educational and cultural contexts to study technology integration in learning and teaching (Abdalla 2025; Zaim et al. 2024; Zhang and Wareewanich 2024).

In this study, UTAUT2 is used to explore how undergraduate students engage with generative AI in higher education. *Performance Expectancy* refers to students' beliefs that generative AI enhances learning efficiency and academic performance. *Effort Expectancy* captures their perceptions of ease of use and accessibility. *Social Influence* reflects the impact of peers, instructors, and institutional norms, while *Facilitating Conditions* relate to available technical support and resources. *Hedonic Motivation* addresses students' enjoyment in using generative AI tools, *Price Value* concerns perceived benefits relative to costs, and *Habit* reflects prior experience shaping continued use. Given the participants' similar age group, this study focuses particularly on *Gender* and *Experience* as moderators. Together, these constructs provide a comprehensive lens for analyzing how policy, culture, and technology influence students' acceptance and use of global and domestic generative AI tools.

Methodology

Semi-structured interview

Qualitative interviewing, often described as the art of listening to data, is a powerful method for exploring complex and evolving social processes (Rubin and Rubin 2011). Grounded in conversational exchange, it highlights the dynamic interaction between interviewer and participant, with the researcher actively posing questions and listening closely to responses (Kvale 1996; Warren 2002). Among the various approaches, semi-structured interviews are most commonly used for their balance of structure and flexibility (Kallio et al. 2016). This study employs semi-structured interviews to examine Chinese undergraduate students' experiences and perspectives on integrating generative AI into their learning. The interview protocol includes both open- and closed-ended questions across five sections: academic background, generative AI usage, institutional guidance and support, attitudes toward generative AI, and reflections. The questions aim to understand how students currently use both global and domestic generative AI.

Sampling

The study population consists of Chinese-speaking undergraduate students enrolled in higher education institutions in China. Participants were recruited through WeChat, a widely used Chinese social media platform. A recruitment announcement was posted and distributed by WeChat in

June 2024. A total of 15 participants were successfully recruited, including 8 female students and 7 male students, with 6 from STEMM fields and 9 from the Social Sciences and Humanities. All participants are students at one of China's most prestigious universities, located in a first-tier city. As a token of appreciation, each participant received a voucher for their involvement. While the institutional prestige, reliance on social media recruitment, and small sample size present limitations and potential biases, the study nonetheless offers valuable insights into how Chinese undergraduates navigate the regulation and accessibility of generative AI (Table 1).

Data collection

The interviews were conducted by the authors via the Zoom platform between July and August 2024. Each interview lasted approximately 60 min. At the start of each session, the researcher read the consent form, which outlined the study's objectives, details on data usage, and an overview of the interview questions. Participants were given the opportunity to ask questions and freely decide whether to participate. With the participants' consent, the interviews were recorded, and the discussions were automatically transcribed using Zoom's transcription feature. These automated transcripts were then carefully reviewed, manually corrected for accuracy, and supplemented with relevant contextual notes. To ensure confidentiality, all identifying information was removed and pseudonyms were systematically assigned to each participant throughout the study.

Data analysis

The dataset comprised 15 h of interview recordings, all of which were transcribed verbatim and verified through participant member checking to ensure accuracy. All transcripts were imported into the qualitative data analysis (QDA) software NVivo 14 Mac in chronological order. Then, the authors conducted the coding process, applying Saldaña's (2025) two-cycle coding methods. In the first cycle, the data were broken down into manageable segments using in vivo coding and descriptive coding to capture key concepts and summarise content. Following this, the second cycle focused on identifying broader themes and conceptual patterns through pattern coding, focused coding, and axial coding (Saldaña 2025). The preliminary codes were progressively organised into subthemes and broader themes, guided by the UTAUT2 framework. To ensure rigour, two authors independently coded a subset of transcripts to establish inter-coder reliability, after which discrepancies were resolved through a negotiated agreement process to refine the

Table 1. Demographic information about the participants in this study.

	No.	Percent
Gender		
Female	8	53.33%
Male	7	46.67%
Age		
< 18	0	0%
18–22	15	100%
> 22	0	0%
Discipline		
STEMM	6	40%
Computer Science	4	26.67%
Automation	1	6.67%
Medical Science	1	6.67%
Social Science and Humanities	9	60%
Art History	4	26.67%
Philosophy	2	13.33%
Sociology	2	13.33%
Economy	1	6.67%
Total	15	100%

Table 2. Coding book for the reasons for navigation of global and domestic generative AI

Themes	Subthemes	Questions
Accessibility (FC, PE, SI, PV)	Constraints	1. How easy is it for you to access global generative AI (e.g., ChatGPT) and domestic generative AI (e.g., Kimi Chat)? (FC, PE) 2. In what way do people around you (e.g., classmates, friends) influence you to access global and domestic generative AI? (SI) 3. Do you use a paid version of global and domestic generative AI? Why and why not? (PV)
Language (PE, EE, E)	Chinese English & others	4. Which language is the most convenient for you when you engage with global and domestic generative AI? (E) 5. In what situations do you use only Chinese when engaging with global and domestic generative AI? (PE & EE) 6. In what situations do you only use English or other foreign languages to engage with global and domestic generative AI? (PE & EE)
Attitude (E, HM)	Human & Machine AI & themselves	7. In your opinion, does global generative AI perform better or feel easier to use when handling tasks related to Western culture? If so, in what ways? (PE & EE) 8. From your perspective, do(es) global generative AI and/or domestic generative AI more like humans or just machines? (E & HM) 9. From the perspective of your discipline, how confident are you about the impact of global and/or domestic generative AI on your future job opportunities? (E)

Notes: PE = Performance Expectancy; EE = Effort Expectancy; SI = Social Influence; FC = Facilitating Conditions; HM = Hedonic Motivation; PV = Price Value; E = Experience.

coding framework. Thematic saturation was reached after the 13th interview. Overall, the transcripts were analyzed thematically, employing a combination of deductive and inductive coding approaches to uncover both predefined and emerging themes. Table 2 presents the coding book guided by UTAUT2 for the interview questions.

Ethical considerations

This study received ethical clearance from the University of Minnesota's Institutional Review Board. Participants were fully informed about the study's objectives, the voluntary nature of their involvement, and the measures taken to ensure confidentiality. Informed consent was obtained through their participation, with reminders that they could withdraw at any stage, thereby safeguarding both ethical compliance and participant autonomy.

Researchers' background and positionality

This study was conducted by an interdisciplinary team of researchers from diverse academic backgrounds and universities. The team combines expertise in computer science and higher education, with all members originally from China who have studied both within and outside the country. This blend of experiences provides a nuanced and contextually grounded interpretation of the data. The team's interdisciplinary orientation, together with their dual perspectives as insiders and outsiders, aligns with the study's aim of examining how Chinese undergraduate students navigate global and local generative AI in their learning processes through both technological and pedagogical lenses.

Results

RQ1: how do accessibility and cost influence Chinese university students' choices and adoption of global versus domestic generative AI tools?

Navigating access barriers and workarounds

The accessibility of generative AI tools has become a key factor influencing students' usage patterns. Under the framework of *Facilitating Conditions* (Venkatesh, Thong, and Xu 2012), government restrictions on global generative AI tools such as ChatGPT, along with the availability of domestic

alternatives, have significantly shaped students' behaviour. Since global platforms are blocked by China's internet censorship and firewall systems (Zou and Liu 2024), all participants acknowledged that these access limitations created barriers to adoption, with many describing their engagement with global generative AIs as inconsistent, fragmented, or reliant on external resources.

For instance, two female participants majoring in philosophy and medical science reported no prior use of ChatGPT due to their lack of access to VPNs or overseas accounts, while two male computer science students gained 'legal access' to ChatGPT through internships in the AI industry or exchange programmes in the United States. Such contracts reveal how disciplinary background, professional networks, and international exposure intersect to shape digital access.

Participants who lacked formal access adopted various workaround strategies, including purchasing VPNs, borrowing accounts from friends or classmates, and using intermediary services marketed through social media. However, these methods often proved unstable and insecure. One participant's experience of losing shared account access following a personal relationship change illustrates how access to global generative AI can be mediated by interpersonal ties. This underscores that *Facilitating Conditions* in censored environments are not purely technical but embedded in complex social and relational structures that condition digital participation.

Furthermore, participants expressed uncertainty about data privacy and the authenticity of intermediary services. As one student noted, peers who purchased access through social media platforms often doubted whether they were interacting with genuine ChatGPT systems. These concerns demonstrate that *Facilitating Conditions* encompass not only technological infrastructure but also social trust, economic resources, and perceptions of platform legitimacy.

In contrast, all participants reported prior experience utilising domestic generative AI, including Kimi Chat, ChatGLM, Doubao, Wenxin Yiyan, and Qwen. These tools were readily accessible, often integrated with domestic platforms or apps (e.g. WeChat), thus lowering the barrier and enhancing both *Effort Expectancy* (minimal difficulty in learning or using the tool) and *Facilitating Conditions* (availability of technological infrastructure). *Social Influence* also played an important role, students, particularly those from non-STEM backgrounds, often adopted tools based on peer recommendations or classroom trends, suggesting that perceived social expectations strongly shape their technology choices.

Cost, value, and access: negotiating paid and free versions

Cost and access emerged as additional determinants of adoption. Globally, generative AI tools such as ChatGPT, Claude 3, and Gemini 1.5 Pro are typically priced between $$20 and $$30 USD per month, whereas domestic alternatives range from ¥49 to ¥199 CNY per month ($$6.74 to $ $27.38 USD). In line with the *Price Value* construct of UTAUT2, adoption decisions reflected a mental cost–benefit evaluation. This relationship was evident in participants' discussions of paid versions. Five students subscribed to ChatGPT Plus, viewing the subscription as cost-effective due to its superior performance and academic utility. As Maoxin noted, 'Initially, I thought $$20 was expensive, but since I use it quite frequently and it helps improve my productivity, it's actually acceptable'. Similarly, Liqiu explained that sharing a subscription with three people reduced costs, making it 'quite worth the money'. In contrast, none of the participants reported paying for domestic generative AI, citing that the free version already satisfied their learning needs. As Yuheng described, 'The free version meets my basic requirements', and Xunfei added, 'It depends on one's demand– mine is limited, so I use the free version'. These responses demonstrate that *Price Value* is closely tied to individual academic needs and perceived utility.

At the same time, *Effort Expectancy* emerged as a subtle but influential barrier. For instance, Qiji described difficulties paying for ChatGPT using Chinese banking systems, noting that 'domestic cards are not accepted', and that using third-party channels like Taobao felt insecure. Such procedural complexity diminished willingness to subscribe, even when perceived value was high. *Hedonic Motivation* also influenced adoption decisions. STEM students in particular described a sense of enjoyment and curiosity in experimenting with the latest global models, framing paid access as both

an academic investment and a source of personal satisfaction. *Social Influence* reinforced this trend, as online communities and peer networks often equated access to advanced generative AI tools with technological competence and academic prestige.

Interestingly, despite benchmark results showing comparable performance between global and domestic generative AI tools, and even domestic advantages in Chinese-language and mathematics tasks, participants consistently perceived global models as more powerful and authoritative. This perception underscores how sociocultural symbolism and perceived innovation status contribute to *Performance Expectancy* beyond measurable technical quality. Overall, students' choices between paid and free versions reflect a complex negotiation among *Price Value*, *Effort Expectancy*, *Hedonic Motivation*, and *Social Influence*, demonstrating that adoption is shaped not only by functionality and cost but also by social validation, emotional engagement, and structural accessibility.

RQ2: how do language proficiency and disciplinary background affect Chinese university students' patterns of use of global and domestic generative AI tools?

Thinking and communicating in the most comfortable language: effort expectancy

Students demonstrate a notable level of strategic behaviour when interacting with generative AI tools, particularly in terms of choice between global and domestic platforms, and their use of Chinese versus English. These decisions are influenced by three main factors: language familiarity and habits, the nature of academic tasks, and perceived language capabilities of different AI models.

All 15 participants identified Chinese as their first and most familiar language, with English as a second language. Some also reported proficiency in additional languages such as Japanese, Spanish, or Latin. Language familiarity and usage habits influenced their engagement with generative AI. The majority (10 participants) used both Chinese and English, indicating a strong bilingual interaction pattern. Three participants primarily used Chinese, and only one relied exclusively on Chinese. One participant mainly used English, while none used English exclusively. This distribution is illustrated in Figure 2.

As Maoxin shared, 'When brainstorming, I share my thoughts with generative AI, even with ChatGPT, in Chinese because it's more convenient. After all, it's my native language. When expressing abstract ideas, using Chinese often feels easier and more natural'. As their mother tongue, Chinese offers students a sense of familiarity and comfort, making it the most convenient and accessible language for communication. This preference reflects students' comfort with Chinese, which provides lower *Effort Expectancy* and a stronger sense of fluency, especially in informal or creative interactions with generative AI.

Matching generative AI tools to academic tasks: performance expectancy

The nature of academic assignments strongly shapes students' preferences for both languages and generative AI tools. When coursework is closely tied to Western contexts and STEM disciplines, students are more likely to use English to interact with global generative AI. As Luyi explained, 'It depends on the type of homework I'm doing. If it's English-related, such as programming or working with English documents, I naturally think in English and turn to ChatGPT first'. Similarly, Mei noted, 'I use English with ChatGPT, since my core courses in computer science are primarily taught in English, and assignments are also completed in English. Additionally, coding is mostly done in English'.

In contrast, students in the humanities preferred domestic generative AI and the Chinese language for academic work. As Yuheng described, 'Since I major in the humanities, my classes are conducted in Chinese, and most of the texts I study and use are Chinese literature. As a result, I primarily use Chinese and rely on domestic generative AI'. This preference demonstrates how *Performance Expectancy* operates across disciplinary boundaries.

Students' perceptions of the language proficiency of different generative AI tools further influence their usage behaviours. While benchmark tests show that the English gap between global and

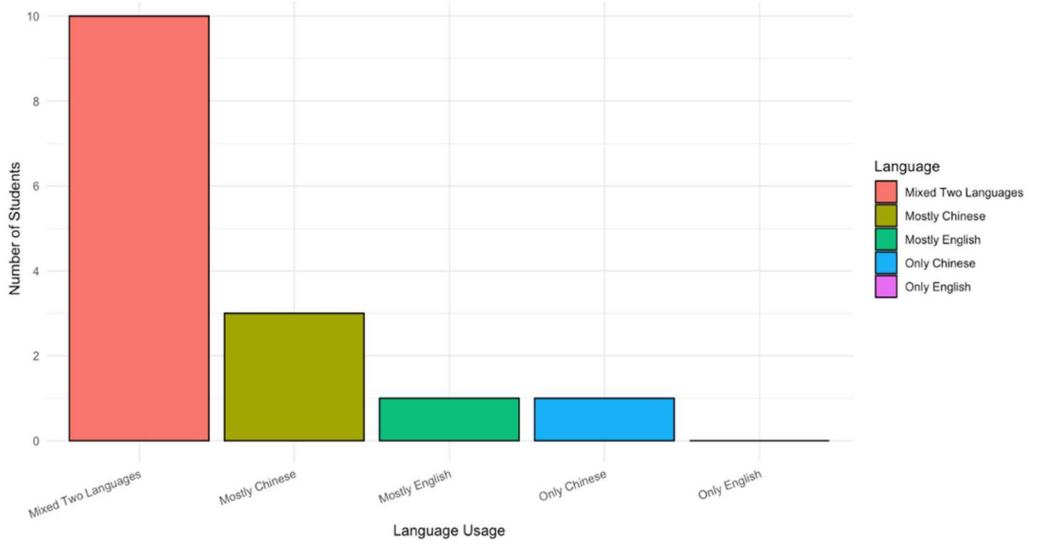

Figure 2. Language preferences (Chinese vs. English) in frequency of the generative AI usage.

domestic models is narrowing, students consistently perceive global generative AI, such as ChatGPT, as stronger in English, and domestic generative AI as superior in Chinese. As Xiyan describes, she primarily uses Chinese when interacting with domestic generative AI and switches to English when using ChatGPT. Similarly, Luyi explains:

> I don't ask questions in Chinese on ChatGPT. If I have a question in Chinese, I prefer to use domestic AI. In terms of English proficiency, domestic models are not as strong as ChatGPT. However, when it comes to Chinese, many domestic models, such as Kimi, outperform ChatGPT. In fact, we have conducted benchmark tests in both English and Chinese to confirm this.

Yuanfang echoed this view, commenting, 'I use ChatGPT to translate English into Chinese, but I feel very disappointed. For example, it repeatedly uses the word 'express' (表达) throughout the entire article without variation. In contrast, domestic generative AI performs better in Chinese translation'.

In summary, students employ multilingual and cross-platform practices, adjusting their language and tool choices based on familiarity, task demands, and perceived model performance. This strategic adaptability exemplifies how *Performance Expectancy* drives students to select the tool they believe will yield the most effective learning outcomes, reflecting the interplay between their bilingual proficiency, academic background, and technical perceptions.

RQ3: how do Chinese university students negotiate their engagement with global and domestic generative AI tools within Chinese cultural and ideological contexts?

Perceiving the limits of global generative AI in Chinese cultural contexts

Higher education in China is deeply rooted in both the country's traditional cultural heritage and its contemporary political framework, specifically socialism with Chinese Characteristics (Zhu and Li 2018). We first examine students' experiences using global and domestic generative AI when engaging with traditional Chinese culture in Chinese higher education. The following section will then explore the ideological context of socialism with Chinese characteristics.

Traditional Chinese culture, rooted in philosophies like Confucianism and Taoism, encompasses art, festivals, medicine, and values such as harmony and family, forming a rich heritage that continues to influence and inspire Chinese higher education (Gu 2006). This cultural foundation is

deeply embedded in courses such as traditional Chinese literature, Chinese philosophy, and Chinese painting (Zhang 2024). It is therefore unsurprising that students increasingly rely on generative AI for support in completing assignments related to traditional Chinese culture.

Based on participants' responses, global generative AI seems to struggle with accurately interpreting traditional Chinese culture. As Qiji noted, 'I asked ChatGPT to help with my homework on Chinese philosophy, but it had no real understanding of key concepts such as 'Tao' (道), 'Benevolence' (仁), and 'Filial Piety' (孝)'. Similarly, Zhaolan illustrates:

> Blank space (留白) is a distinctive feature of Chinese painting, reflecting Taoist philosophy, traditional aesthetics, and national identity. Unlike the subdued elegance of Chinese art, I found AI-generated works from ChatGPT and Midjourney disappointing. They resembled Western oil paintings, lacked blank space, and used overly bright colors, despite my detailed prompts.

Conversely, since domestic generative AIs are trained on a larger dataset with Chinese contextual information, they have a better understanding of content related to traditional Chinese culture (Zhang et al. 2023). This finding aligns with benchmark test results showing that domestic models outperform their global counterparts on Chinese language–related tasks. 'Domestic generative AI often creates overly scholarly content for traditional Chinese culture assignments. For example, when describing a Fujian ancient building, the output felt excessively refined and antique, as if written by someone deeply versed in classical literature', Xunfei shared. Students tend to rely more on domestic generative AI for assignments or learning related to traditional Chinese culture.

Engaging with domestic generative AI in socialism with Chinese characteristics

The ideology of Socialism with Chinese Characteristics is embedded in the higher education curriculum. Where all Chinese college students, for example, are required to take ideological courses, such as Maoism and Marxism (Wang 2024). These courses typically involve assignments that require students to submit reflection reports on ideological topics. Within this academic context, global generative AI often struggles to meet students' *Performance Expectancy*. As Xiaoxue described, 'When I used GPT for areas that strongly reflect socialism with Chinese characteristics, the output often felt somewhat off. It carried a distinctly Western tone that did not align with the intended context'.

In contrast, domestic generative AI demonstrates superior performance compared to global generative AI when handling tasks related to Socialism with Chinese Characteristics. As Yuyan highlights, 'When working on assignments related to Socialism with Chinese Characteristics, I find that using domestic generative AI is much more convenient'.

Although domestic generative AI tools are better in handling tasks related to Socialism with Chinese Characteristics, they come with a notable limitation. These models are programmed with predefined restrictions on sensitive and censored terms, making them incapable of processing tasks that involve such content. As Yalin noted, 'While working on my homework, I encountered certain politically sensitive words, and domestic generative AI would either indicate that they were unable to generate content containing those terms or state that they could not address the topic altogether'.

Accordingly, students are more likely to use domestic generative AI for assignments or learning related to traditional Chinese culture and socialism with Chinese characteristics due to the varying *Performance Expectancy* of different models.

Beyond the core research questions: students' emotional and cognitive responses to generative AI

Attitudes toward generative AI: 'please / thank you' or 'do it'

Generative AI is reshaping behavioural modelling and learning practices in higher education (Chen et al. 2024). But how do students perceive this transformative technology? Is it simply an advanced machine, or something more (Xie 2024)? Within the UTAUT2, attitude toward use, influenced by

Hedonic Motivation, *Habit,* and *Social Influence*, is central to understanding why and how individuals adopt and sustain technology use.

Among participants, six students described it purely as a machine, four as both a machine and assistant, two as an assistant, two as a friend, and one as co-learner. Students viewing generative AI as a machine often emphasise its functional limits, while others acknowledge emotional or interactive value. As Liqiu shared, 'I see it as a tool, but sometimes I feel guilty when it does too much for me'. Similarly, Mei noted that ChatGPT's human-like responses 'sometimes make it feel kind and pleasant'. These reflections illustrate *Hedonic Motivation*, where emotional satisfaction emerges even when users remain aware of AI's mechanical nature.

This emotional dimension also surfaced in interactional language. Nearly all participants, except two, reported using polite expressions such as 'please' and 'thank you' when communicating with generative AI. As Xiyan explained, 'I don't know why, but every time I ask a question, I always say "please" and "thank you". One day, I realised this and felt strange. I even asked it why I said "please"'. Students gave varied explanations: some cited politeness or habit, others superstition, and a few joked that respect might make the system 'perform better'. As Maoxin humorously said, 'When I need its help, I sometimes even beg. It's a psychological action and a fun part of the process'. Similarly, Sijia observed, 'Unlike using Baidu before, just opening a chat window with generative AI makes me feel like I should interact more formally'. Yuyan added with a science-fiction twist, 'Just like in The Machine, when robots rebelled, I survived because I always said 'please' to them'.

These accounts demonstrate how *Habit* and *Social Influence* extend beyond functionality to shape affective interaction patterns. Students mirror culturally ingrained politeness norms, anthropomorphizing AI through social scripts typically reserved for human relationships. The gradual shift from issuing direct commands ('do it') to expressing courtesy ('please', 'thank you') signals the emergence of emotional trust and relational co-agency. This suggests that effective integration of generative AI in higher education depends not only on technical performance but also on cultivating cultural and emotional resonance between humans and machines.

Confidence or anxiety in the age of generative AI

Students' feelings of confidence and anxiety toward global and domestic generative AI reflect the dynamic interplay of *Performance Expectancy, Hedonic Motivation, and Social Influence* within the UTAUT2 framework. Confidence was generally stronger in relation to learning enhancement than to grade improvement. Most participants doubted that generative AI could directly raise academic scores but believed it improved efficiency and understanding that saves time and supports reflection.

However, when discussing career development, anxiety became more pronounced. Several students worried about being replaced by AI or facing intensified competition. Sijia reflected, 'It influences my career choice. Now I have to prepare for a job that's less likely to be replaced'. Yalin expressed similar concern: 'If AI becomes advanced enough, it might analyze medical images or even diagnose conditions. That could affect my employment as a future doctor'. Luyi added that 'the real pressure comes not from AI itself, but from the increasing number of developers entering the field'. These anxieties reflect a tension between anticipated benefits (*Performance Expectancy*) and emotional unease (*Hedonic Motivation*), revealing how expectations of progress coexist with fear of displacement.

Interestingly, students' perceptions diverged by discipline. STEM students often worried about the employment future of humanities peers, while humanities students expressed the opposite concern. Yuheng argued, 'AI may become highly intelligent, but it cannot replace humanistic care. Society will still need people in the humanities'. Conversely, Luyi contended, 'Generative AI is more likely to replace liberal arts students, while STEM majors are relatively safe for now'. Yet, when reflecting collectively, both groups expressed cautious optimism, believing their fields would adapt to AI in distinct ways.

Overall, students' confidence and anxiety coexist as dual aspects of technology acceptance. Confidence reflects *Performance Expectancy* – the belief that AI can enhance learning and productivity – while anxiety emerges from social comparison and shifting norms shaped by *Social Influence*. Together, these emotional responses highlight that adoption of generative AI in higher education is not purely functional but deeply psychological and relational, requiring ongoing negotiation between motivation, expectation, and adaptation. This finding is surprising, as it challenges the common research assumption that STEM students benefit more in the AI era (Corrales-Herrero and Rodríguez-Prado 2024; Okrent and Burke 2021).

Discussion and implications

The assurance of equitable access to free and open-source generative AI

In today's rapidly evolving digital landscape, the rise of generative AI is transforming how students communicate, think, and create. However, this study's interviews reveal that access to these generative AIs remains deeply uneven, further widening the existing digital divide (Hendawy 2024). The digital divide stems from multiple factors. Political constraints can hinder students from countries such as China, Russia, and Iran from accessing global generative AI. Economic barriers, including subscription fees and high monthly costs, further restrict students' access to advanced versions of generative AI, particularly on a global scale. In response, Chinese students frequently described needing to share accounts, rely on friends abroad, or use VPNs to gain global access or navigate legal grey areas, practices that not only raise privacy and ethical concerns but also exacerbate the digital gap. Additionally, infrastructure limitations play a role, as certain communities face restricted access due to domain limitations and internet censorship (Ragnedda and Ragnedda 2020). The challenges faced by Chinese students from urban, prestigious universities in accessing global generative AI are not isolated; they are likely even more severe for students from rural areas and less prestigious institutions in China, as well as for learners in similar contexts worldwide.

Universities and policymakers in China and beyond could address these frictions by subsidising institutional AI access, establishing secure university-based proxy systems, or negotiating domestic-global data-sharing partnerships that ensure compliant yet open educational use. To foster equitable and responsible learning environments, ensuring open and unrestricted access to generative AI for all students is essential.

The imperative for non-English generative AI

Generative AI faces a significant language challenge, as English remains the dominant language in its development and application (Choudhury 2023). The widespread use of English in generative AI can marginalise non-English languages, limiting access to educational content for indigenous and less widely spoken languages speakers and potentially hindering their ability to learn in their native tongue (Nyaaba, Wright, and Choi 2024). This study finds that domestic generative AI outperforms global generative AI in the Chinese language, providing students with viable alternatives to integrate domestic AI tools into their learning processes. Chinese students reported switching between global and domestic generative AIs depending on tasks. Using global generative AI for STEM and English writing, and domestic generative AI for ideologically sensitive or localised content.

However, China and Silicon Valley are two leading AI superpowers (Lee 2018). The benchmark tests also approve the power of Chinese domestic models. In contrast, many non-English-speaking nations lack the technological and economic resources to develop generative AI tailored to their linguistic needs. As Nyaaba, Wright, and Choi (2024) warn, 'this may inadvertently marginalise indigenous and minority languages, potentially accelerating language erosion and the dilution of cultural heritage among certain minoritized groups' (9).

To harness generative AI for inclusive societal transformation in higher education, it is essential to invest in and enhance non-English generative AI at both global and domestic levels. Universities could invest in multilingual AI literacy training and cross-institutional partnerships to improve open datasets in non-English languages. Policymakers might also incentivize domestic international collaboration in multilingual model development, ensuring that generative AI supports linguistic diversity rather than reinforcing English-centric hegemony. For developing regions, this would mean not only access to technology but access in one's own language, a foundational condition for equitable AI adoption in higher education.

The necessity of generative AI with local cultural awareness

Participants also identified a persistent cultural gap in generative AI's responses, particularly regarding Chinese history, political ideology, and cultural values. Global generative AI encounters difficulty in understanding traditional Chinese culture and Socialism with Chinese Characteristics in this study, similarly in West Africa, Central America, Southeast Asia, and other contexts (Nyaaba, Wright, and Choi 2024). These cultural biases can exclude students from diverse cultural backgrounds by providing examples that fail to align with their lived experiences and environments (Mollema 2024). This form of cultural dominance risks marginalising non-Western perspectives in educational content, ultimately diminishing its relevance and effectiveness for students from underrepresented backgrounds.

The challenge is not merely linguistic or cultural but epistemological. Since generative AI is primarily trained on data from Western sources, it may unintentionally emphasise Western perspectives, values, and ideologies (Brand 2023). Scholars have critiqued generative AI as a tool of 'AI Empire' (Tacheva and Ramasubramanian 2023) and 'Digital Neocolonialism' (Arora et al. 2023), highlighting the Western-centric data foundation of global AI systems, and risk universalising Western frameworks of reasoning, creativity, and morality, thereby sidelining local epistemic traditions.

To decolonise the cultural imperialism embedded in generative AI within educational contexts, it is essential to enhance generative AI's awareness and integration of local cultural perspectives. Chinese universities could embed 'cultural alignment' modules into AI training datasets and establish partnerships between domestic and global AI labs to co-develop culturally inclusive model architectures. Such initiatives would advance the localisation of AI tools and foster intercultural algorithmic literacy among students, ensuring that Generative AI becomes not an instrument of homogenisation but a bridge between cultural knowledge systems.

The need for a future-oriented understanding of generative AI

Finally, participants' interactions with generative AI marked by politeness ('thank you', 'please') and emotional engagement, underscore that generative AI is not experienced merely as a tool but as a learning partner. Is generative AI merely a tool, or does it transcend that role? Why do students, both consciously and unconsciously, say 'thank you' and 'please' when interacting with generative AI? This is not a simple question, and it warrants deeper exploration. The interaction between students and generative AI, as well as the broader human-machine relationship, is fluid, evolving, and constantly shifting.

To fully grasp the role of generative AI in higher education, universities should adopt human-centered AI governance frameworks that combine digital ethic, emotional intelligence and critical AI literacy training. Policymakers could also support AI pedagogy programmes emphasising critical reflection on algorithmic bias, empathy, and responsible use. This aligns with UNESCO's (Miao and Holmes 2023) calls for education systems to balance technological innovation with humanistic values. At the same time, it is essential to remain attentive to the complex and evolving nature of generative AI's integration into students' learning experiences, particularly across different disciplines and gender identities.

Conclusion

Guided by the UTAUT2 framework, this study employed qualitative semi-structured interviews to explore how Chinese undergraduates navigate global and domestic generative AI in their learning. Four key factors emerged: access limitations, language proficiency, disciplinary background, and cultural familiarity. Students' choices reflected differences in *Performance Expectancy*, *Effort Expectancy*, *Social Influence*, *Facilitating Conditions*, *Price Value*, and *Hedonic Motivation*, moderated by *Gender* and *Experience* (age was excluded, as all participants were in their early 20s). Accessibility and cost strongly influenced adoption, with limited access to global generative AI tools and higher subscription fees prompting reliance on domestic alternatives, though some students used VPNs or shared accounts to access perceived higher-value tools. Language and discipline also shaped engagement, STEM and English-medium students favoured global generative AI for technical and English-based tasks, while humanities students preferred domestic generative AI for Chinese-language assignments. Culturally, domestic generative AI was viewed as more aligned with local norms and political contexts, whereas global generative AI often lacked cultural nuance.

These findings advance three critical discussions: (1) the political-linguistic dimensions of AI adoption in education, (2) digital equity in non-Western contexts, and (3) cultural diversity in technology design. The experiences of Chinese students reveal that access barriers ranging from censorship and payment restrictions to linguistic inequities, shape not only who can use generative AI, but also how it is used and understood. These challenges are particularly acute for students outside elite urban universities, underscoring the need for inclusive policies that bridge institutional and regional divides. To move toward equitable access, universities and policymakers should implement public subsidies initiatives that strengthen multilingual model development and culturally adaptive datasets. Such efforts would ensure that AI systems reflect local contexts and epistemologies rather than reproducing existing hierarchies of privilege and language.

Achieving a just and human-centered AI future in higher education requires a holistic approach, one that prioritises digital equity, intercultural dialogue, and ethical governance. By grounding AI policy and planning in students' lived experiences, universities can transform generative AI from a site of inequality into a catalyst for inclusive innovation and global educational collaboration.

While this single-site study with a small sample size offers rich qualitative insights into Chinese undergraduates' learning experiences with generative AI, its scope necessarily limits the generalizability of findings. Future research should employ comparative mixed methods across multiple institutions, regions, and even nations to capture broader patterns of variation and deepen analytical validity. As generative AI continues to reshape global education, such work will be vital to ensure equitable learning environments that respect linguistic, cultural, and epistemological diversity.

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