

Original Paper

Research on College Students' Usage Intention and Influencing Factors Regarding Generative Artificial Intelligence

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Abstract

This study aims to explore college students' willingness to use generative artificial intelligence (AI) and its influencing factors. It adopts a mixed-methods approach, including a questionnaire survey covering students' usage status, perceived barriers like operational complexity and academic integrity concerns, and in-depth interviews focusing on specific usage scenarios, prompt optimization experiences, and attitudes towards independent thinking impacts. The results show that while most students recognize generative AI's value in learning and daily tasks, factors such as unclear usage norms, content accuracy doubts, and concerns about reduced independent thinking significantly hinder their willingness to use it. The study concludes that colleges should provide targeted training and clear usage guidelines to help students use generative AI rationally and effectively.

Keywords

Generative Artificial Intelligence, Usage Intention, Influencing Factors, Technology Acceptance Model

1. Introduction

Against the backdrop of global digital transformation, the integration of generative artificial intelligence (AI) with higher education has emerged as a critical research focus. Nationally, China has established a supportive policy framework: "Interim Measures for the Management of Generative AI Services (2023)" encourages cross-industry innovation, while "Outline for Building a Strong Education Nation(2024-2025)" prioritizes AI-driven educational modernization, providing institutional guarantees for technology adoption. Technologically, advancements in deep learning and big data have propelled generative AI into an expectation-driven phase, with widespread adoption in academia. Empirically, the Blue Book of Intelligent Education Development: Generative AI Educational Application (2024) reveals that 85.6% of Chinese university students now rely on generative AI for academic tasks, from

homework completion to complex problem-solving, indicating its indispensable role in contemporary learning. This study examines the multifaceted implications of this technological integration, aiming to provide evidence-based guidance for sustainable development.

2. Research Meaning

Currently, in the field of education, generative artificial intelligence empowers learning, promotes the ubiquity of learning spaces, meets personalized needs across the entire learning process, and fosters a human-machine collaborative learning model (Yang, 2023). However, research on generative AI in education in China has primarily focused on technical application aspects, while theoretical exploration of user acceptance mechanisms remains relatively limited. Therefore, this study incorporates classic theoretical frameworks such as the Technology Acceptance Model and Cognitive Load Theory to construct a model examining the factors influencing college students' willingness to use generative AI, thereby enriching the application scenarios of technology acceptance theory in emerging technological environments and deepening our theoretical understanding of learners' technology adoption behaviors in the age of artificial intelligence.

This study systematically investigates the key factors influencing college students' use of generative artificial intelligence and the mechanisms through which these factors exert their effects, thereby addressing the theoretical gap in existing research that tends to prioritize technology over humanities and applications over mechanisms. It also provides references for constructing a theoretical framework for AI education applications with China-specific characteristics, serving as a response to the national strategic initiative of "comprehensively advancing intelligence and leveraging AI to drive educational transformation." After conducting a systematic analysis of 353 papers published in core journals, Wang Yuanyuan (2023) found that research on how generative AI empowers education has achieved significant progress in areas such as "establishing theoretical foundations," "building rational consensus," and exploring viable pathways. However, further efforts are needed in tapping into educational potential, ensuring ethical considerations, and coordinating systemic development (Wang, 2025). The findings also offer theoretical support for deeper exploration of how intelligent technologies can be integrated with education, contributing to the establishment of a more robust theoretical framework for AI education applications.

Currently, generative artificial intelligence is transforming teaching methodologies and students' learning habits in higher education institutions. Students encounter various challenges when using AI tools, including insufficient understanding of their functionalities, unclear grasp of academic norms, and difficulty in assessing information accuracy. This study will conduct a questionnaire survey to systematically collect baseline data on college students' use of generative AI, examining usage frequency, primary application scenarios, and attitudes, thereby identifying practical issues and needs arising from current usage practices.

After thoroughly investigating the current landscape, this study will employ theoretical frameworks

such as the Maturing Technology Acceptance Model to develop a factor model identifying the determinants of college students' willingness to use generative AI in higher education settings. Empirical data will then be utilized to examine how these factors operate and analyze how key variables—including perceived usefulness, perceived ease of use, social impact, and perceived risks—Influence student decision-making. Research by Liu Bangqi et al. (2025) demonstrates that generative AI holds significant application potential across educational domains such as teaching, learning, assessment, management, and research, and can drive transformations in talent cultivation approaches, instructional organization models, and educational evaluation systems (Liu, Nie, Wang et al., 2025). Based on data analysis results, this study proposes targeted recommendations across three dimensions: student guidance, teacher instruction, and school management. Specifically, it advises guiding students to use AI tools judiciously and avoid excessive reliance; assisting teachers in defining appropriate boundaries for AI application and providing standardized guidance in teaching; and recommending that schools develop usage guidelines and offer relevant training programs to enhance students' AI literacy.

3. Research Design

This chapter details the research design and implementation for investigating college students' utilization of generative AI tools. The study population comprises undergraduate students across diverse disciplines and grade levels, characterized by high digital literacy but superficial AI application habits. A mixed-methods approach was employed, combining quantitative surveys and qualitative interviews. A structured questionnaire, developed based on the Technology Acceptance Model, was distributed online via Wenjuanxing, yielding 300 valid responses (85.7% response rate). The instrument assessed usage patterns, tool preferences, disciplinary applications, user experiences, and adoption intentions, with separate sections for AI users and non-users. Semi-structured interviews were conducted with 10 strategically selected participants, representing different usage frequencies and academic backgrounds, to complement survey data. Data analysis integrated descriptive statistics and cross-tabulations for quantitative data, alongside thematic analysis of interview transcripts, providing comprehensive insights into students' AI engagement behaviors and attitudes.

4. Empirical Analysis

4.1 Distribution by Discipline and Major

The distribution of college students using generative AI across various majors is shown in Figure 1.

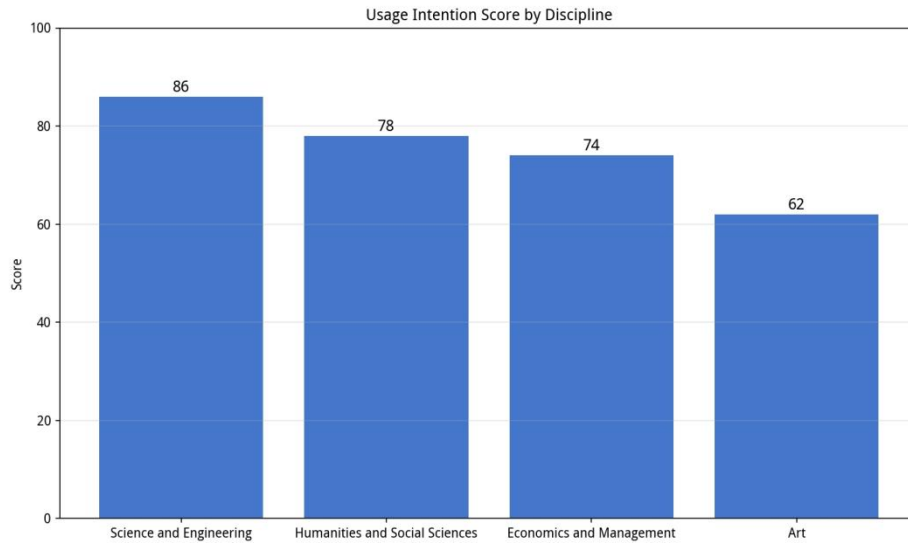


Figure 1. Distribution of Majors within the Graphics Discipline

As shown in Figure 4-2, the distribution across disciplines is relatively balanced: 86 students (28.7%) in science and engineering, 78 (26%) in humanities and social sciences, 74 (24.7%) in economics and management, and 62 (20.7%) in arts. While science and engineering disciplines have slightly more participants and arts disciplines slightly fewer, the overall disparity is minimal, effectively illustrating differences in AI application among students from various academic backgrounds.

4.2 Usage Behavior Analysis

4.2.1 Usage Frequency

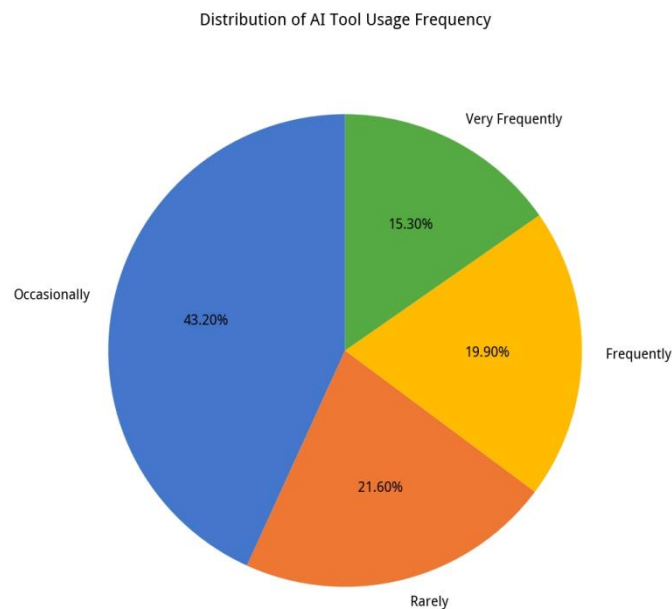


Figure 2. Usage Frequency Analysis

As shown in Figure 2, most students have developed relatively stable usage habits, though the majority

still use it at a moderate frequency. Specifically, over 40% of students use it 2 to 4 times per week, indicating that generative AI has become a routine auxiliary tool for completing learning tasks. However, only 15.3% of users employ it frequently multiple times daily, suggesting that while students recognize its usefulness, they have not integrated it into every aspect of their daily learning process, highlighting significant room for improvement. This phenomenon may be attributed to students' limited proficiency with the tool, unclear understanding of its application boundaries, and concerns about potential risks.

4.2.2 Usage Duration Analysis

Regarding usage duration, the highest proportion of students reported a single session lasting "15–30 minutes" (46.2%, 109 individuals), followed by "30 minutes to 1 hour" (23.7%, 56 individuals), "within 15 minutes" (19.1%, 45 individuals), and "over 1 hour" (11%, 26 individuals), as shown in Figure 2.

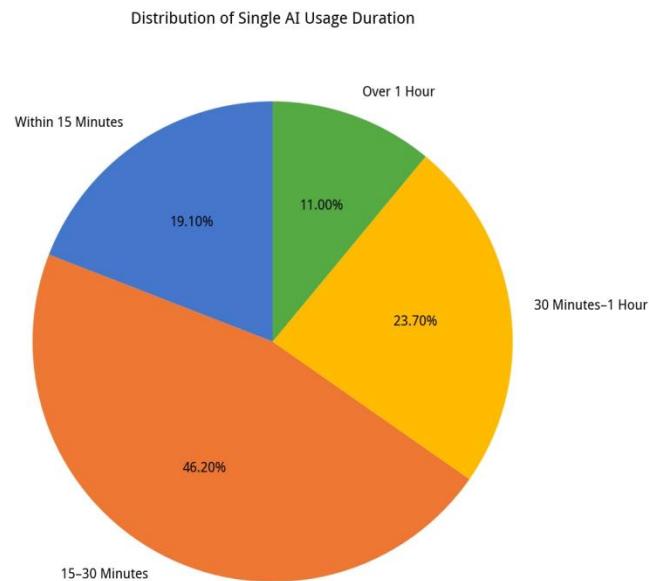


Figure 3. Usage Duration Analysis

As shown in Figure 3, the majority of students spend less than 30 minutes per session, accounting for approximately two-thirds of the total usage time. This indicates that students employ generative AI in a "short-term, focused" manner, primarily to solve specific problems rather than relying on it extensively over extended periods. Two factors may underlie this behavior: first, students perceive AI as a rapid problem-solving aid rather than a replacement for deep learning; second, current generative AI systems still perform inadequately when handling complex tasks and struggle to support prolonged, in-depth use.

4.2.3 Analysis of Common Tools

In terms of tool selection, DouBao was the most widely used (39%), followed by DeepSeek (31%) and Wenxin Yiyang (26%). Additionally, 4% of students chose other tools, as shown in Figure 4.

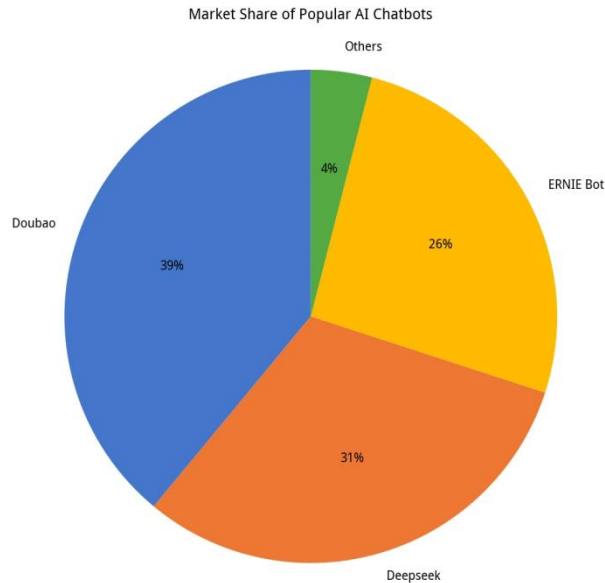


Figure 4. Analysis of Common Tools in the Chart

As shown in Figure 4, domestic AI tools have become the preferred choice among students. Among them, DouBao has the highest adoption rate at 39%; DeepSeek ranks second with 31%; Wenxin Yiyang follows closely at 26%; and another 4% of students chose other tools.

Doubao has achieved the highest adoption rate among students due to its user-friendly interface, easy operation, strong voice interaction capabilities, and emotional companionship features, which eliminate the need for manual navigation. DeepSeek and Wenxin Yiyang also enjoy significant popularity among students thanks to their free availability, minimal network requirements, and high response accuracy. These findings demonstrate that, in the eyes of students, a tool's "accessibility" is as important as—or even more critical than—its "functionality."

4.3 Analysis of Professional Applications

Based on students' academic disciplines, this section separately summarizes the primary learning tasks they complete using generative AI.

4.3.1 Analysis of Applications for Science and Engineering Students

The most frequently used professional tasks performed by science and engineering students with generative AI, in descending order of frequency, are: writing or debugging program code (79%), understanding mathematical formulas or concepts (68%), analyzing or visualizing experimental data (57%), translating English literature (46%), and designing technical solutions or flowcharts (36%), as shown in Figure 5.

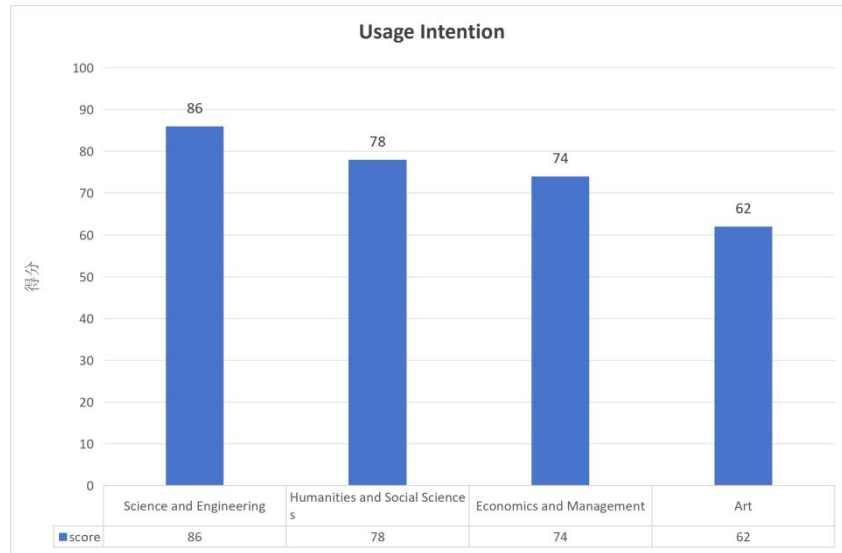


Figure 5. Analysis of Usage Patterns Among Engineering Students

Figure 5 data indicates that STEM students primarily utilize generative AI for programming and data processing tasks, with programming-related tasks accounting for nearly 80%. This demonstrates that students recognize AI's capabilities in code generation and debugging, acknowledging its potential to enhance programming efficiency. Additionally, over two-thirds of students employ AI to aid in understanding mathematical formulas and physical concepts, where AI serves as a "virtual teaching assistant" addressing comprehension challenges. Overall, STEM students' usage scenarios predominantly involve "technical" tasks, aligning well with the inherent emphasis on logical reasoning and hands-on practice characteristic of these disciplines.

4.3.2 Analysis of Application Scenarios for Students Majoring in Humanities and Social Sciences

The most frequently used professional tasks performed by humanities and social sciences students with generative AI, in descending order of frequency, are: refining academic language or optimizing logical expression (85%), analyzing literature perspectives or theoretical frameworks (77%), generating outlines for articles or reports (65%), obtaining multi-angle theoretical insights (54%), and conducting case analyses or perspective synthesis (38%), as shown in Figure 6.

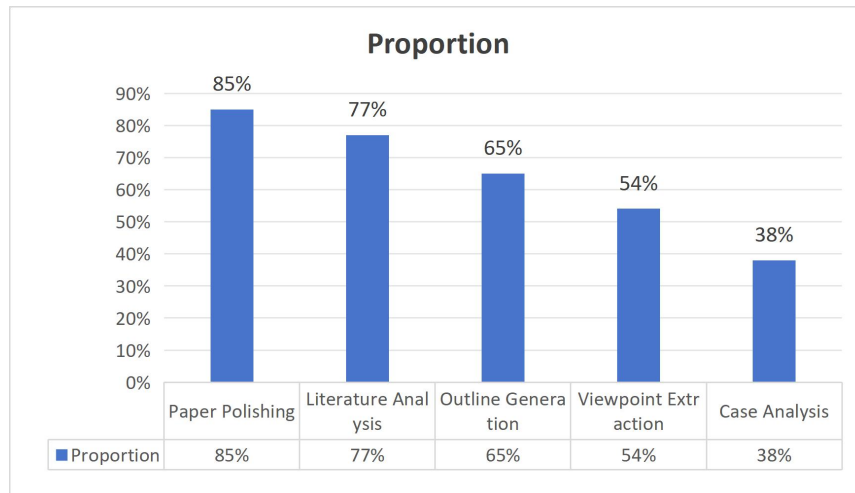


Figure 6. Analysis of Usage Among Students of Humanities and Social Sciences

Figure 6 data shows that humanities and social sciences students primarily use AI for text processing, with over 80% employing it to refine academic writing, as these disciplines demand high standards of textual expression—where AI indeed proves invaluable in language optimization.

4.3.3 Analysis of Applications for Management Students

The most frequently used professional tasks performed by business and management students with generative AI, in descending order of frequency, are: analyzing business cases or market data (83%), refining business documents (71%), generating business plans or report frameworks (67%), assisting with financial calculations or model interpretation (42%), and obtaining macroeconomic policy interpretations (29%), as shown in Figure 7.

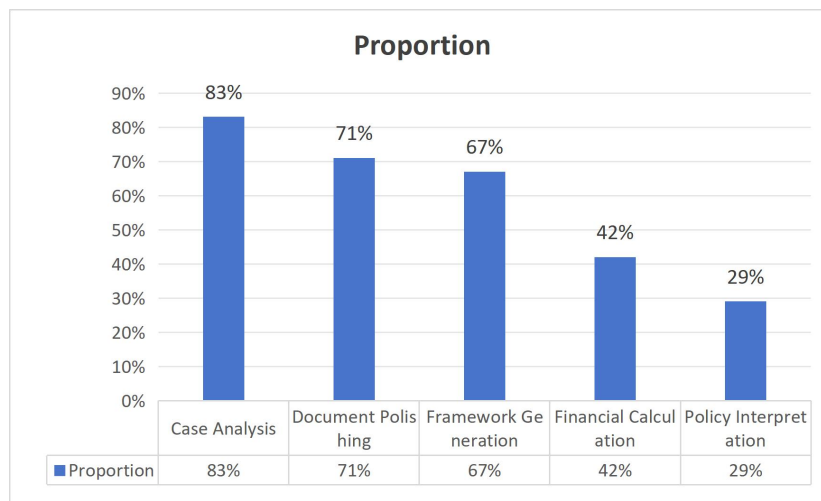


Figure 7. Analysis of Application Scenarios for Economics and Management Students

Figure 7 data shows that business and management students use AI in scenarios intermediate between those of science/engineering majors and humanities/social sciences majors. Over 80% of their usage

involves analyzing business cases or market data, demonstrating how AI enables students to swiftly grasp case contexts and identify market trends—a highly practical skill for course assignments and project-based learning.

4.3.4 Analysis of Applications for Art Students

The most frequently used professional tasks performed by art students with generative AI, in descending order of frequency, are: obtaining creative inspiration or conceptual ideas (91%), generating design sketches or visual materials (82%), assisting in creating work descriptions or copywriting (68%), conducting artistic analysis or interpretation (55%), and experimenting with new artistic styles or expressive forms (45%), as shown in Figure 8.

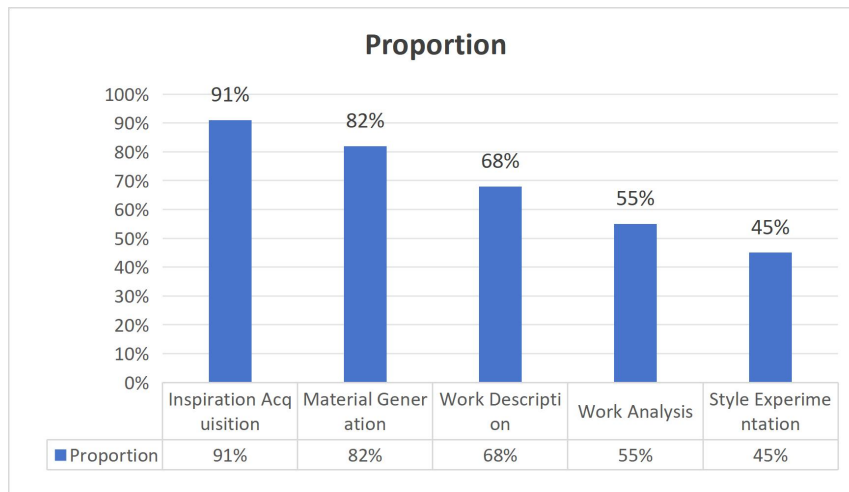


Figure 8. Analysis of Usage Patterns Among Art Students

The survey revealed that art students' use of AI is predominantly focused on creativity and design. Inspiration accounts for over 90% of their usage, the highest proportion among all disciplines, highlighting its pivotal role in artistic creation—where AI can provide extensive references and insights.

4.4 User Experience and Perception Analysis

The usage experiences of college students with generative AI are shown in Table 1.

Table 1. Analysis of User Experience and Perception

Variable	Category	Percentage
Main problems solved by AI during use	Saving time in finding materials	78.8%
	Understanding difficult concepts	74.2%
	Finding hard-to-access materials	67.8%
Difficulties encountered during use	Not knowing how to frame questions properly	52.1%
	Responses not meeting expectations	42.8%

Concerns about generative AI	Inaccurate information	60.2%
	Academic integrity issues	53%

As shown in Table 1, the two most prevalent challenges addressed by AI are "saving time spent searching for information" and "understanding complex concepts," indicating that students' primary motivation for using AI is to enhance learning efficiency and reduce comprehension difficulties. These two features represent the most direct and readily perceived benefits.

During actual use, more than half of students have encountered the difficulty of "not knowing how to formulate questions to obtain desired answers." This demonstrates that while AI tools are easy to use, obtaining high-quality responses requires mastering specific questioning techniques. Many students have not yet developed effective questioning habits, which poses a significant barrier in subsequent usage. Regarding concerns about risks, college students are most concerned about "inaccurate information" and "issues of academic integrity." These concerns reflect students' cautious attitude toward AI-generated content and indicate their strong awareness of proper usage practices.

4.5 Usage Intention Analysis

The usage intentions of college students toward generative artificial intelligence are shown in Table 2.

Table 2. Analysis of Usage Intention

Variable	Category	Percentage
Willingness to continue using in the future	Definitely will	30%
	Probably will	45%
	Not sure	15%
	Probably will not	5%
	Definitely will not	5%
Willingness to actively choose to use	Definitely will	25%
	Probably will	48%
	Not sure	15%
	Probably will not	7%
	Definitely will not	5%
Willingness to recommend to classmates	Definitely will recommend	18%
	Probably will recommend	44%
	Not sure	22%
	Probably will not recommend	11%
	Definitely will not recommend	5%
Willingness to participate in training	Definitely will participate	24%

Probably will participate	41%
Not sure	21%
Will not participate	14%

As shown in Table 2, 75% of students indicated they would "definitely use" or "might use" generative AI, demonstrating a high overall willingness to adopt it. Specifically, 30% said they would definitely use it and 45% said they might use it, indicating that the majority have developed a clear preference for its use. Only 10% stated they would "probably not use" or "definitely not use" it, likely due to concerns about risks or concerns regarding the user experience.

Regarding willingness to use AI proactively, 73% of students stated they would "definitely" or "possibly" choose to utilize it. This figure is slightly lower than their future usage intention, indicating that while some students do not oppose its use, they are unlikely to adopt it voluntarily—instead opting for passive acceptance rather than active choice. This may be related to their level of familiarity with or trust in AI.

Regarding willingness to recommend, 62% of students are willing to advise their peers on using AI. This willingness typically reflects users' genuine satisfaction, with a recommendation rate exceeding 60% indicating strong acceptance of AI among students. However, 22% expressed "uncertainty" and 11% stated they "may not recommend it," suggesting that while some students use AI themselves, they remain hesitant about recommending it to others, primarily concerned about potential misuse or dependency issues.

Regarding training participation, 65% of students stated they would "definitely attend" or "may attend" the school's relevant programs, reflecting a clear need to enhance their AI proficiency and demonstrating that such training has market viability. Meanwhile, 14% explicitly declined participation, likely due to lack of interest.

4.6 Analysis of Non-User Factors

The reasons why college students do not utilize generative artificial intelligence are shown in Table 3.

Table 3. Analysis of Reasons not Attributable to Users

Reason	Number of Respondents	Percentage
Worry about weakening independent thinking ability	32	50.0%
Concern about inaccurate information or academic integrity issues	26	40.6%
Perceived complicated operation and high learning cost	20	31.3%
No usage habit and no perceived demand	18	28.1%
No practical help found for professional learning	10	15.6%
Discouragement or prohibition from schools/teachers	6	9.4%

As shown in Table 3, the reasons why non-users do not employ AI are relatively concentrated. The primary reason is "fear of compromising independent thinking skills," selected by half of the students, indicating widespread concern about AI potentially impairing cognitive abilities. This concern is justified depending on usage: submitting AI-generated answers directly may foster dependency; however, using AI as a tool for research or organizing ideas can significantly enhance efficiency. The second reason is "concern about inaccurate information or potential academic integrity issues," reflecting non-users' distrust toward AI-generated content and worries about potential complications. These concerns align closely with those reported by actual users, demonstrating that college students share consistent apprehensions regarding AI regardless of its practical application.

Additionally, 31.3% of students found the operation complex and the learning cost too high—a relatively low percentage indicating that the barrier to using AI tools has decreased, with most users not considering them difficult to use. Another 28.1% reported having no usage experience or perceived no need for such tools; these students may simply have not yet tried them out, but their views could change once they do.

5. Conclusion

First, generative AI has a high adoption rate among college students, but its usage remains limited. Surveys show that 80% of students have used such tools, with occasional users (those using them 2–4 times per week) accounting for the largest share at 43.2%, while frequent users who employ them multiple times daily make up only 15.3%. This indicates that while most students have tried AI-assisted learning, they have not yet developed consistent usage habits.

Second, there are significant differences in the applications of AI among students across different disciplines. Science and engineering students primarily use AI to write code, understand formulas, and analyze data; humanities and social science students mainly employ it to refine papers, analyze literature, and organize ideas; economics and management students fall between these two extremes, utilizing AI for both data analysis and developing research proposals; art students primarily leverage AI to generate inspiration and creative materials. This demonstrates that AI usage scenarios are closely tied to the characteristics of specific academic tasks.

Third, students have a strong perception of AI's usefulness, but their application skills need improvement. Nearly 80% believe AI saves them time in research, while over 70% find it helpful in understanding complex concepts. However, more than half report struggling with "not knowing how to ask questions to get the desired answers," highlighting significant gaps in their questioning techniques.

Fourth, there is a contradiction between risk concerns and actual behavior. Approximately 60% of students express concerns about inaccurate information, over half worry about academic integrity issues, yet more than 40% admit to directly copying AI-generated answers. This indicates that while some students are aware of the risks, they still opt for shortcuts under time pressure or heavy workload demands, highlighting deficiencies in the institution's guidance mechanisms.

Fifth, students generally show high willingness to use AI; the main concern among non-users is its potential impact on critical thinking skills. 75% of students expressed readiness to continue using generative AI, with 30% explicitly stating they would "definitely use it." Among those who have not adopted AI, half cited concerns about impaired independent thinking as the reason—indicating that proper guidance could further enhance acceptance of AI.

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