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Article

A Study on the Current Situation and Influencing Factors of College Students' Use of AI Tools for Entrepreneurial Learning

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Abstract: The rapid proliferation of generative artificial intelligence tools has transformed learning practices in higher education, yet their application in entrepreneurship education remains underexplored. This study examined the current situation and influencing factors of college students' use of AI tools for entrepreneurial learning. Grounded in the Technology Acceptance Model, an extended framework incorporating perceived usefulness, perceived ease of use, technology self-efficacy, university support, and peer influence was developed. Data were collected from 200 undergraduate and graduate students across Chinese universities through an online questionnaire survey. Descriptive statistics, independent samples t-tests, one-way ANOVA, and multiple linear regression were employed for data analysis. The results indicated that 85.0% of respondents had used AI tools for entrepreneurial learning; however, deep engagement involving systematic design and iterative optimization

characterized only 21.8% of users. Multiple regression analysis revealed that perceived usefulness (β=.34), technology self-efficacy (β=.23), and university support (β=.19) were the primary drivers of usage behavior, while perceived ease of use exerted a weaker effect (β=.10). Students majoring in business and those with prior entrepreneurial experience demonstrated higher usage levels. These findings extend the Technology Acceptance Model to the entrepreneurial learning context and highlight the importance of institutional support in shaping AI tool adoption. Practical implications include integrating AI tools into entrepreneurship curricula and providing structured training to deepen student engagement.

Keywords: AI tools; entrepreneurial learning; technology acceptance model; college students; influencing factors

1. Introduction

The rapid advancement of generative artificial intelligence technologies, exemplified by ChatGPT, has profoundly transformed the landscape of higher education worldwide. These AI-powered tools have demonstrated remarkable capabilities in assisting students with various academic tasks, including information retrieval, content generation, and problem-solving (Strzelecki, 2023). Research has shown that students increasingly adopt AI chatbots to support their learning processes, with perceived usefulness and self-efficacy emerging as significant predictors of acceptance and continued usage (Dahri et al., 2024). This technological revolution presents unprecedented opportunities for educational innovation, particularly in domains that emphasize practical skill development and real -world application.

Entrepreneurship education, as a critical component of contemporary higher education, aims to cultivate students' innovative thinking, opportunity recognition, and venture creation capabilities. The integration of AI tools into entrepreneurial learning processes offers promising possibilities for enhancing market analysis, business plan development, and creative ideation (Chen et al., 2024). Scholars have argued that generative AI has the potential to augment entrepreneurs' creativity and decision-making abilities, making it an essential competency for future business leaders (Bell & Bell, 2023). Recent empirical studies have begun to explore how AI technologies influence students' entrepreneurial competencies and learning outcomes,

revealing both benefits and challenges associated with their implementation (Somià & Vecchiarini, 2024).

Despite the growing body of literature on AI adoption in education, there remains a notable research gap concerning the specific application of AI tools in entrepreneurship learning contexts. Previous studies have primarily examined students' acceptance of AI chatbots in general academic settings (Bilquise et al., 2024) and investigated factors influencing technology adoption among graduate students (Tian et al., 2024), yet limited empirical research has systematically explored the current status and determinants of AI tool usage for entrepreneurial learning purposes. To address this gap, the present study investigates the current situation of college students' use of AI tools for entrepreneurial learning, identifies the key factors influencing their usage behavior, and examines whether significant differences exist among student groups with different demographic backgrounds. The findings are expected to contribute to both theoretical understanding and practical guidance for integrating AI technologies into entrepreneurship education effectively.

2. Research Design

2.1. Research Subjects and Sampling

The target population of this research consisted of undergraduate and graduate students from Chinese universities. A stratified convenience sampling strategy was employed to recruit participants from institutions located in eastern, central, and western China—covering both top-tier and regular universities. Students majored in business, STEM, and humanities were all included to ensure disciplinary diversity. The online questionnaire was distributed through Wenjuanxing platform in spring 2024. Out of 218 collected responses, 200 valid questionnaires remained after removing incomplete submissions. The effective response rate reached 91.7%.

2.2. Research Model and Hypotheses

The Technology Acceptance Model provided the theoretical foundation for this research. According to TAM, perceived usefulness and perceived ease of use shape individuals' technology adoption decisions. Given the distinct nature of

entrepreneurial learning—which demands practical application and creative problem-solving—three additional variables were incorporated: technology self-efficacy, university support, and peer influence. Five hypotheses emerged from this extended framework. H1 posits that perceived usefulness positively affects AI tool usage behavior; H2 links perceived ease of use to usage behavior; H3 connects technology self-efficacy with usage behavior; H4 relates university support to usage behavior; H5 associates peer influence with usage behavior.

2.3. Variable Measurement

Established scales were adapted to measure the constructs under investigation. The dependent variable—AI tool usage behavior—captured three dimensions: frequency, depth, and scope of usage (six items, self-developed). Independent variables included perceived usefulness (four items from Davis's TAM scale), perceived ease of use (four items from the same source), technology self-efficacy (three items derived from Compeau's scale), university support (three self-developed items addressing institutional resources and training), and peer influence (three items adapted from UTAUT). A five-point Likert scale anchored responses from "strongly disagree" to "strongly agree." Four control variables were recorded: gender, academic year, major category, and prior entrepreneurial experience.

2.4. Data Collection and Analysis

SPSS 26.0 was used for all statistical procedures. Descriptive statistics depicted the current state of AI tool usage among respondents. Group comparisons were conducted through independent samples t-tests and one-way ANOVA based on demographic characteristics. Multiple linear regression identified the factors that shape usage behavior and quantified their relative contributions. The measurement scales demonstrated sound psychometric properties: Cronbach's alpha values for all constructs surpassed the 0.70 threshold, the KMO index was 0.84, and Bartlett's test yielded statistical significance.

3. Results

3.1. Sample Characteristics

The demographic profile of 200 valid respondents is displayed in **Table 1**. Male and female participants were nearly balanced at 48.0% and 52.0% respectively. Juniors formed the largest academic year group (27.5%), followed by sophomores (23.5%), seniors (19.0%), freshmen (18.5%), and graduate students (11.5%). Three major categories were represented: STEM students (39.5%), business and economics majors (34.0%), and humanities and social science students (26.5%). About one quarter of respondents (25.5%) had participated in entrepreneurial activities or competitions; the remaining 74.5% reported no such experience.

Table 1

Demographic characteristics of respondents (N=200)

Characteristic	Category	n	%
Gender	Male	96	48.0
	Female	104	52.0
Academic Year	Freshman	37	18.5
	Sophomore	47	23.5
	Junior	55	27.5
	Senior	38	19.0
	Graduate	23	11.5
Major	Business/Economics	68	34.0
	STEM	79	39.5
	Humanities/Social Science	53	26.5
Entrepreneurial Experience	Yes	51	25.5
	No	149	74.5

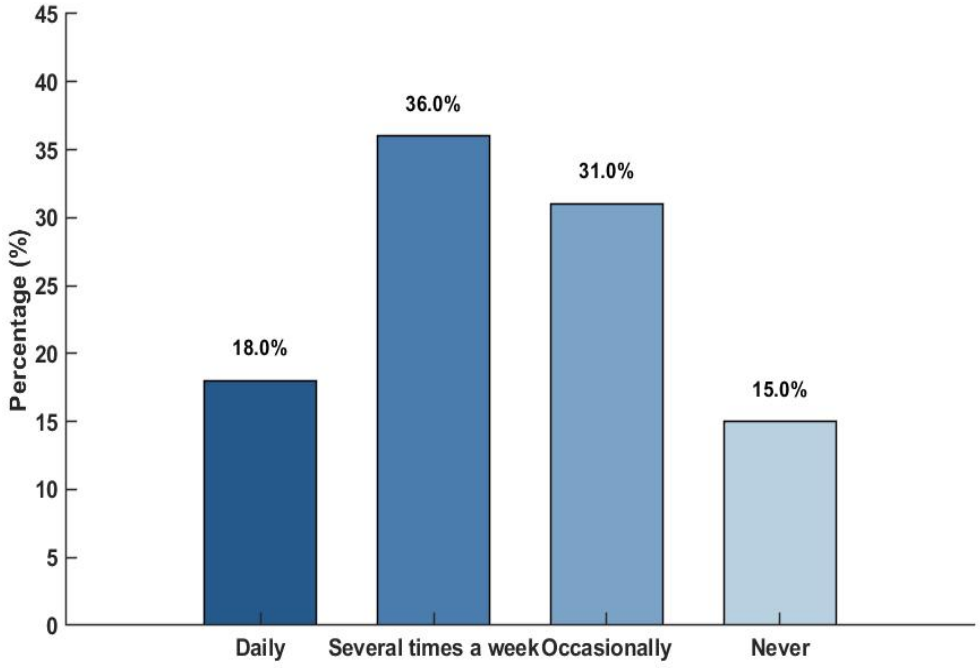
3.2. Current Situation of AI Tools Usage

The survey data indicated that 85.0% of respondents had experience using AI tools for entrepreneurial learning—a high adoption rate reflecting the rapid penetration of generative AI in higher education settings. As shown in **Figure 1**, frequency patterns varied considerably among users: 18.0% reported daily usage,

36.0% engaged with AI tools several times per week, 31.0% used them occasionally, and 15.0% had never tried these technologies for entrepreneurial learning purposes. ChatGPT dominated the tool landscape with a 71.5% usage rate; ERNIE Bot followed at 46.0%, and Microsoft Copilot at 29.5%.

Figure 1

Frequency distribution of AI tools usage for entrepreneurial learning (N=200)



Students applied AI tools across multiple entrepreneurial learning activities. Information retrieval and knowledge acquisition ranked first (82.4%), with creative idea generation second (57.6%). Business plan writing and optimization attracted 55.3% of users, market analysis and competitor research engaged 50.6%, and financial planning drew 34.7%. These patterns reveal a concentration on foundational tasks—information gathering and brainstorming—rather than advanced analytical functions.

A gap between adoption breadth and usage depth emerged from the data. Although most students had tried AI tools, only 21.8% reported engaging in systematic solution design and iterative optimization. The majority remained at surface-level interactions: asking simple questions, retrieving basic information, or generating initial drafts without critical evaluation. This shallow engagement pattern suggests untapped potential for deeper integration of AI tools into entrepreneurial learning processes.

3.3. Group Differences Analysis

Independent samples t-tests and one-way ANOVA were conducted to examine whether AI tool usage behavior differed across demographic groups. Gender produced no statistically detectable difference ($t=1.18$, $p=.239$)—male students ($M=3.38$, $SD=0.76$) and female students ($M=3.28$, $SD=0.81$) showed similar usage levels. Academic year also failed to reach statistical thresholds ($F=2.21$, $p=.068$), though a modest upward trend appeared from freshmen to graduate students.

Two variables yielded clear group distinctions. Major category shaped usage behavior at a statistically detectable level ($F=4.32$, $p=.015$). Business and economics students reported the highest usage scores ($M=3.54$, $SD=0.73$), followed by STEM students ($M=3.36$, $SD=0.77$), with humanities and social science students lowest ($M=3.08$, $SD=0.82$). Post-hoc Tukey tests confirmed that business students differed from humanities students ($p=.011$), while other pairwise comparisons did not reach the .05 threshold.

Entrepreneurial experience produced the most pronounced contrast ($t=3.76$, $p<.001$). Students with prior entrepreneurial involvement scored markedly higher ($M=3.68$, $SD=0.69$) than those without such background ($M=3.21$, $SD=0.79$). The effect size (Cohen's $d=0.62$) fell in the medium-to-large range, indicating practical as well as statistical relevance. These students likely recognize AI tools' practical value for venture-related tasks—market research, pitch deck preparation, financial modeling—based on firsthand experience.

3.4. Influencing Factors Analysis

Multiple linear regression was performed with AI tool usage behavior as the dependent variable. Demographic variables were entered as controls in the first step; the five hypothesized predictors followed in the second step. The full model achieved statistical detectability ($F=28.46$, $p<.001$) and explained 46% of variance in usage behavior ($R^2=.46$, adjusted $R^2=.44$).

Table 2

Multiple regression analysis of influencing factors on AI tools usage behavior

Variable	B	SE	β	t	p

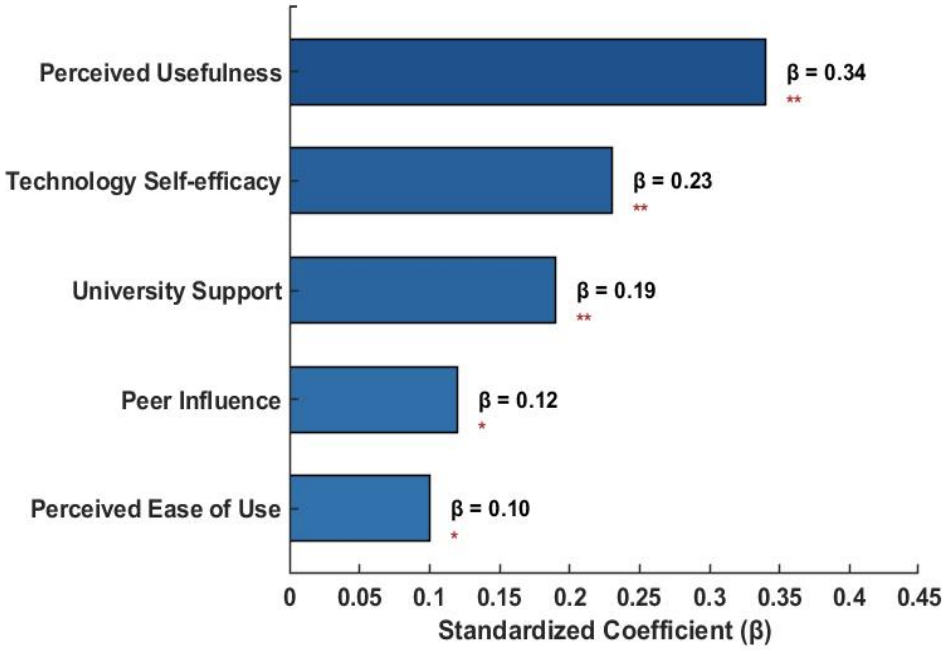
(Constant)	0.48	0.22	—	2.18	.031
Perceived Usefulness	0.36	0.06	.34	6.00	<.001
Perceived Ease of Use	0.11	0.05	.10	2.20	.029
Technology Self-efficacy	0.24	0.05	.23	4.80	<.001
University Support	0.20	0.05	.19	4.00	<.001
Peer Influence	0.13	0.05	.12	2.60	.010

Note. R^2=.46, Adjusted R^2=.44, F=28.46, p<.001

As displayed in **Table 2**, all five hypotheses received empirical support. Perceived usefulness exerted the strongest influence (β=.34, p<.001), followed by technology self-efficacy (β=.23, p<.001), university support (β=.19, p<.001), peer influence (β=.12, p=.010), and perceived ease of use (β=.10, p=.029). The standardized coefficients presented in **Figure 2** visualize these relative contributions. Perceived usefulness—students' belief that AI tools enhance their entrepreneurial learning outcomes—emerged as the dominant driver. Technology self-efficacy ranked second; students confident in their ability to navigate AI interfaces and craft effective prompts engaged more frequently and deeply. University support occupied third position, underscoring institutional factors: training workshops, curriculum integration, and resource provision all shape students' tool adoption. Peer influence and perceived ease of use, while statistically detectable, contributed more modestly. The relatively weak effect of ease of use may reflect generational familiarity with digital interfaces—most university students encounter few technical barriers when using conversational AI platforms.

Figure 2

Standardized regression coefficients (β) of influencing factors on AI tools usage behavior



4. Discussion

The empirical findings of this study reveal several noteworthy patterns regarding AI tool usage in entrepreneurial learning contexts. The 85.0% adoption rate indicates that generative AI has permeated university students' learning practices; yet the depth of engagement remains shallow—only 21.8% of users reported systematic application and iterative optimization. This gap between adoption breadth and usage depth aligns with observations from recent studies on ChatGPT acceptance in higher education, where habit and performance expectancy emerged as dominant predictors of continued usage (Grassini, 2024).

Perceived usefulness exerted the strongest influence on usage behavior (β=.34), confirming the core premise of the Technology Acceptance Model. Students who believe AI tools enhance their entrepreneurial learning outcomes—through faster information retrieval, improved business plan quality, or enriched creative ideation—engage more frequently and deeply. This finding resonates with research demonstrating that trust mediates the relationship between perceived usefulness and adoption intention among Chinese university students (Shahzad et al., 2024). The practical orientation inherent in entrepreneurship education amplifies this effect: students prioritize tools that deliver tangible benefits for venture-related tasks.

Technology self-efficacy ranked second among predictors (β=.23), highlighting the role of confidence in navigating AI interfaces and crafting effective prompts. Students who doubt their technical capabilities tend to avoid advanced functions, limiting themselves to basic queries. University support also shaped usage behavior substantially (β=.19). Institutions that integrate AI tools into entrepreneurship curricula, offer training workshops, and provide accessible resources cultivate higher adoption rates. This institutional dimension echoes policy recommendations for developing comprehensive AI education frameworks that address pedagogical, governance, and operational considerations simultaneously (Chan, 2023).

The relatively weak effect of perceived ease of use (β=.10) likely reflects generational characteristics—contemporary university students encounter minimal technical barriers when interacting with conversational AI platforms. Group differences associated with major and entrepreneurial experience suggest that domain relevance and practical exposure sensitize students to AI tools' value in entrepreneurial contexts.

Several limitations warrant acknowledgment. The cross-sectional design precludes causal inference; longitudinal tracking would clarify whether early adoption patterns predict sustained engagement. Self-reported data may introduce social desirability bias. The sample, drawn exclusively from Chinese universities, limits generalizability to other cultural and educational contexts.

5. Conclusion

This study investigated the current situation and influencing factors of college students' use of AI tools for entrepreneurial learning through a survey of 200 university students in China. The analysis yielded three core findings. AI tool adoption has become widespread among university students—85.0% reported usage experience—yet most remain at surface-level engagement; deep application involving systematic design and iterative optimization characterized only about one-fifth of users. Perceived usefulness, technology self-efficacy, and university support function as the primary drivers of usage behavior, while perceived ease of use exerts a weaker effect. Students majoring in business and those with prior entrepreneurial experience demonstrate higher usage levels than their counterparts.

These findings carry both theoretical and practical implications. The study extends the Technology Acceptance Model to the entrepreneurial learning context and confirms the salience of institutional support in shaping technology adoption. For universities, the results suggest integrating AI tools into entrepreneurship curricula through structured training programs that build students' confidence and deepen their engagement beyond basic queries. For AI developers, designing features tailored to entrepreneurial tasks—market analysis templates, business model generators, pitch deck assistants—could enhance perceived usefulness and attract student users.

Future research should address the limitations of this cross-sectional design through longitudinal tracking of usage patterns. Comparative studies across different countries would test the generalizability of these findings. Exploring how AI tool usage affects actual entrepreneurial learning outcomes and venture creation intentions also merits scholarly attention.

Conflict of interest: The authors declare no conflict of interest.

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