Analysis of Differences in AI Usage across Academic Disciplines and Their Causes: Taking DeepSeek as an Example

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Abstract: The widespread adoption of generative AI is reshaping the way college students learn, and the relationship between AI and college students has sparked increasing discussion. However, there has been a lack of in-depth research into whether there are significant differences in how students from different disciplinary backgrounds utilize these tools. Based on in-depth interviews with 60 junior and senior students from science and engineering, humanities and social sciences, and applied social sciences disciplines at universities in Jiangxi, this paper examines disciplinary differences in the use of AI tools such as DeepSeek and explores the reasons behind these differences in usage behavior shaped by disciplinary contexts from multiple perspectives. The study found that different disciplines possess unique ways of thinking and underlying logic, and students' priorities when using DeepSeek also vary. Through summarization and analysis, this paper proposes discipline-specific teaching strategies and advocates for students to develop a discipline-oriented awareness of usage, providing a reference for AI education in higher education.

Keywords: Disciplinary Context; Generative AI; Deepseek; Disciplinary Differences

1. Introduction

In early 2025, the explosive popularity of DeepSeek deeply embedded generative AI into college students' learning environments. A survey conducted by China Youth Campus Media in collaboration with Soul App surveyed 3,129 college students. The results revealed an extremely high adoption rate of AI tools among students: 99.2% of respondents were currently using them, with 11.7% being heavy users who accessed them multiple times daily. Broader research indicates that 65.9% of college students' first instinct when encountering a problem is to seek help from AI [1]. This proportion surpasses that of traditional search engines, indicating that AI is integrating into students' daily cognitive frameworks through a "conditioned reflex"-like mode of use, with their reliance on AI tools such as DeepSeek significantly increasing. Against the backdrop of rapid technological penetration, whether there are significant differences in how students from different disciplinary backgrounds use generative AI tools like DeepSeek—and what factors shape these differences—has become a topic worthy of attention.

Existing research has begun to examine disciplinary differences in AI usage. Based on a study of large-scale semantic recognition using 230,000 master's theses, scholars found that the frequency of generative AI use in management studies increased significantly, rising from 1.48% in 2022 to 9.05% in 2024; the arts also showed a similar trend, growing from 1.04% to 8.58% over the same period. In contrast, the usage rate in the natural sciences was 1.22% in 2022 and increased only to 3.39% by 2024; in history, it rose from 0.58% to 2.51% [2]. This indicates that the adoption rate is growing rapidly in applied disciplines, while in theoretical disciplines such as history, the frequency of AI use is increasing more slowly. This disparity stems largely from the distinct characteristics of the disciplines themselves. Individual use of AIGC is deeply constrained by these disciplinary traits, directly reflecting the internal operating rules of different fields. Overall, students in science and engineering disciplines focus more on the accuracy of code debugging and the practicality of technology, while students in the humanities and social sciences prioritize intellectual inspiration and novel perspectives. Students in social application disciplines, meanwhile, emphasize the relevance of case scenarios and the soundness of analysis.

Although these studies provide evidence for understanding macro-level trends, at the micro-level, there remains a lack of concrete insights into how students within the same discipline use AI and why they use it in such ways. Against the backdrop of the explosive popularity of generative AI, particularly Deepseek, analyzing disciplinary differences in AI usage is of great significance—it not only concerns the precise application of AI tools but also the adaptive adjustments needed for future disciplinary teaching.

2. Manifestations of Differences in AI Usage Across Disciplines

This project is based on in-depth interviews with 60 junior and senior students from science and engineering, humanities and social sciences, and social applications disciplines at universities in Jiangxi Province—including 24 from science and engineering, 18 from humanities and social sciences, and 18 from social applications—to analyze the specific patterns of AI usage, particularly with generative AI tools like Deepseek, among these three groups.

2.1 STEM Disciplines (Mathematics, Physics, Engineering, etc.)

International research indicates that students in STEM disciplines significantly outpace other academic groups in terms of tool adoption speed, usage frequency, and scenario penetration. They are not only early adopters and frequent users of generative AI but have also developed routine and in-depth AI application habits centered on professional scenarios such as code generation, algorithm debugging, and project development. A synthesis of relevant domestic and international survey results reveals that undergraduate students in computing and engineering fields generally view generative AI as a vital support for their academic studies. They place greater emphasis on the practical value of AI in areas such as data analysis, logical reasoning, and programming, demonstrating distinct characteristics of technology-oriented, application-focused usage.

The interviews revealed that over 80% of STEM students use generative AI for coding, algorithm debugging, and project development, with usage frequency concentrated at five or more times per week. In terms of use cases, 21 students (87.5%) used it for coding and debugging, 16 students (66.7%) used it for algorithm design and optimization, and 12 students (50%) used it for project development and architectural design. In terms of usage frequency, 17 students (70.8%) use AI five or more times per week, indicating high-frequency usage. Over 60% of students stated that AI tools such as Deepseek have become one of their preferred methods for solving technical challenges. It is worth noting that STEM students do not blindly accept AI-generated content. They indicated that code requires testing and verification, algorithms require an understanding of their underlying principles, and mathematical derivations need to be re-calculated by themselves.

2.2 Humanities and Social Sciences (Philosophy, History, etc.)

Amid the wave of generative AI, the humanities have ushered in new opportunities for development. Some scholars believe that AI technology is profoundly driving the formation and development of new modes of knowledge production in the humanities and social sciences. AI's capabilities in quantitative analysis and data processing provide entirely new research dimensions and technical pathways for traditional humanities research topics, such as the analysis of literary styles and the tracing of the history of the dissemination of ideas [3]. AI injects new methodological support into humanities research and has become a significant force in restructuring research approaches and broadening research horizons. This aligns closely with the current reality that students in the humanities and social sciences increasingly rely on AI to aid in understanding knowledge and to spark creative and research inspiration.

Interview data indicates that humanities and social sciences students primarily use generative AI in text-processing scenarios. Five students (27.8%) use it for literature retrieval and organization, 13 students (72.2%) for thesis editing, and 10 students (55.6%) for generating ideas. Usage frequency was primarily 2–4 times per week (11 students, 61.1%), with only 3 students (10.7%) using it more frequently (5 or more times per week). Most students view AI as a supplementary writing tool, believing it to be "convenient but unable to replace professional judgment."

In their interactions with AI, students typically do not seek standard answers but rather hope to

use AI's perspective to open up new dimensions of understanding or clarify their own thoughts through repeated questioning.

2.3 Social Sciences (Law, Education, etc.)

Social application disciplines encompass a wide range of fields and are characterized by a combination of theoretical analysis and practical problem-solving. Consequently, students primarily focus on case studies and strategic discussions, and their use of AI tends to center on literature reviews, case scenario design, and analysis. Whether it is case analysis in law or lesson plan design in education, both involve extensive text processing and information integration. Students in both categories use AI for tasks such as information retrieval, framework generation, and text refinement, but there are differences in the depth of their usage.

Interview data also shows that law students primarily use DeepSeek for tasks such as searching for legal provisions, comparing case law, and reviewing academic literature. Compared to students in other disciplines, law students are highly sensitive to the accuracy of AI outputs, and verification has become an essential step in their workflow. According to the seven law students surveyed, they frequently use AI to search for legal provisions and relevant cases, but almost always cross-check the results against authoritative databases. This is because AI sometimes fabricates cases or confuses factual details, and the legal provisions it provides may be outdated or even incorrect. Although the content provided by AI in these areas may contain errors, its rapid response speed and unique advantages in knowledge comparison and linking mean that students still use it frequently. Law students use DeepSeek for comparative case analysis to summarize similarities between cases and assess the rationality of judgments, which significantly reduces the time spent searching for and analyzing cases.

Interviews revealed that, compared to students in other disciplines, education majors place greater emphasis on the "adaptability" of AI-generated content, stressing the integration of generated content with specific teaching contexts. The five education students interviewed indicated that they typically use AI to generate lesson plan frameworks or activity proposals first, then make specific adjustments based on the students' foundational knowledge and curriculum continuity in their practicum classes. According to the survey results, the focus of education programs lies in practical components such as instructional design, classroom simulations, and teaching practicums. Students repeatedly practice "how to translate theory into actionable lesson plans" and "how to adjust teaching strategies based on feedback". Consequently, when using DeepSeek, education students tend to focus on two practical applications: first, leveraging AI to complete hands-on tasks such as lesson plan design and instructional optimization; and second, utilizing intelligent tools to interpret and analyze student performance data reports to identify students' learning characteristics and developmental needs—approaches that are inextricably linked to the nature of the education discipline.

3. Analysis of the Reasons behind Disciplinary Context Shaping Usage Behavior

Existing research indicates that the widespread adoption of generative AI tools such as DeepSeek has further driven frequent use of AI technology among college students. However, due to differences in disciplinary culture, the manner and extent to which AI technology influences knowledge production vary significantly across disciplines [4].

The interviewees in this study were all third- and fourth-year students at universities in Jiangxi. This group is currently in a "transitional phase" of their undergraduate studies: having completed foundational training in their majors, they are undergoing a critical transition from "knowledge recipients" to "aspiring researchers" or "aspiring professionals". As intensive users of AI tools, college students' usage behaviors are deeply influenced by their disciplinary contexts, and the shaping effect of disciplinary contexts on AI usage is particularly evident in this group. The findings from this interview study, which focused on "AI usage differences and their causes within disciplinary contexts—taking DeepSeek as an example", also support the above argument.

3.1 Disciplinary Knowledge Attributes Determine Basic Usage Postures

The attributes of disciplinary knowledge are the underlying factors shaping students' AI usage behavior. Differences in disciplinary knowledge across dimensions of precision, openness, and practicality determine the fundamental cognitive

attitudes and behavioral orientations of upper-level students when interacting with AI tools.

Knowledge in STEM disciplines (such as engineering and natural sciences) possesses the dual characteristics of "precision" and "verifiability". Whether it involves mathematical derivations, algorithm implementation, or experimental data, STEM disciplines require results to be precise and error-free, and conclusions must be reproducible through experiments or testing. This knowledge attribute dictates that students must treat AI outputs as hypotheses to be verified, rather than answers that can be directly adopted. Interview data shows that 75% of STEM students believe the knowledge they learn has a "single correct answer," and 87.5% of students choose to "verify before using" AI outputs. Among them, 15 students emphasized that "verification must be done through code execution or mathematical derivation".

Knowledge in the humanities and social sciences (such as philosophy and history) is characterized by its "openness" and "critical thinking." The nature of knowledge in the humanities is rarely confined to a single, definitive answer; rather, it consists of open-ended texts and questions that invite diverse interpretations. These disciplines require students to possess a broad perspective and rich imagination, enabling them to examine issues from multiple angles and form their own insights through critical thinking. Course objectives are typically highly open-ended—they do not seek a single correct answer, but rather encourage diverse thinking and the ability to apply knowledge to new contexts. For this reason, students in the humanities view AI as a dialogue partner and an object of critical inquiry. Interview data also shows that students in the humanities and social sciences are relatively positive about AI's ability to support core academic tasks, with 88.9% agreeing that "AI can assist in the critical thinking process and broaden the horizons of theoretical construction."

In contrast, disciplines focused on social applications (such as law and education) exhibit internal differentiation in their knowledge structures. Legal knowledge possesses dual attributes of "normativity" and "authority"; legal provisions are definitive, and judicial interpretations must strictly adhere to the original intent of the legislation. Consequently, these disciplines require students to cite precise legal provisions and case law, making them highly sensitive to the accuracy of AI outputs. As a result, they view AI as a retrieval tool that requires verification, adopting the role of verifiers. In contrast, knowledge in educational studies emphasizes "practicality" and "contextuality." Students must translate theory into actionable plans based on specific conditions; consequently, they view AI as a malleable, semi-finished product, adopting the role of a processor.

3.2 Disciplinary Training Models Reinforce Specific Usage Habits

Differences in disciplinary training models further solidify students' AI usage behaviors into stable cognitive habits and operational patterns. By their junior and senior years, after three years of systematic professional training, these habits have become deeply ingrained in their daily learning behaviors.

"Problem-solving" training in STEM disciplines—from exercise drills in lower grades to course projects and graduation projects in higher grades—consistently subjects STEM students to systematic training in "problem decomposition, path exploration, and result verification." When this cognitive habit is transferred to AI usage, they immediately verify the accuracy of AI-generated answers and use AI to refine their logical reasoning and code debugging skills. Interview data reveals that 91.7% of STEM students believe their professional training "often requires starting from a problem, seeking solutions, and verifying results"; 79.2% of students indicate that their professional training has cultivated a habit of "tracing things back to their roots"; and 95.8% of students apply the thinking habits developed in their professional training to the process of using AI.

For students in the humanities and social sciences, training in "text analysis and theoretical critical thinking"—through teaching methods such as close reading of literature, academic reviews, and classroom debates—reinforces thinking habits centered on "conceptual analysis, logical deduction, and the exchange of viewpoints." By their junior and senior years, this training deepens further as they are required to generate new ideas and academic concepts and write an innovative

academic paper. While the formation of new ideas is not an overnight process, AI can help students spark inspiration and engage in critical thinking exercises. 66.7% of humanities and social sciences students surveyed indicated that they would transfer the thinking habits cultivated in their professional training to their use of AI, stating that they would "use AI for the exchange of viewpoints and critical dialogue".

The "case analysis and normative application" training in social application disciplines—and the "case analysis and source tracing" training in law—has made students highly sensitive to information sources. As seen in law school preparation and the handling of legal cases, they must ensure the accuracy of every legal provision. With today's complex legal regulations, finding the appropriate laws for a specific case is no easy task for college students about to enter the workforce.AI can help students quickly pinpoint legal provisions, yet they remain highly vigilant regarding the sources of information. The "context-focused" training in education enhances the knowledge transfer capabilities of senior students who are about to become educators. They consider in which contexts AI-generated information is appropriate, which in turn further reinforces this habit.

4. Conclusion

Through in-depth interviews with junior and senior students at universities in Jiangxi, this paper draws the following core conclusions:

First, disciplinary background significantly shapes senior students' perceptions of and usage behaviors toward AI. Students in science and engineering view AI as a "problem-solving accelerator"; those in the humanities and social sciences see it as a "critical thinking partner"; law students regard it as a "search tool requiring verification"; and education students position it as a "modifiable work-in-progress."This indicates that students assign AI distinct roles based on disciplinary characteristics rather than treating it as a universal tool. Therefore, the definition of appropriate AI use should fully consider professional competency requirements and industry-specific traits; it should not be treated solely as plagiarism. Concurrently, professional ethics education must be strengthened to enhance students' value awareness and fundamentally prevent inappropriate usage [5].

Second, students from different disciplines exhibit distinct patterns of dependence on AI. Students in science and engineering disciplines demonstrate a tool-based integration of AI; while they rely on it to enhance problem-solving efficiency, they still need to cultivate core competencies independently. Students in the humanities and social sciences demonstrate a dialectical and inspirational reliance on AI; while they rely on the diverse perspectives it provides, the final integration of ideas must be completed independently; Law students' reliance is effectively constrained by a sense of vigilance; while they rely on search efficiency, they consistently maintain cognitive autonomy; Education students' reliance exhibits a processing-oriented characteristic; they rely on AI to generate foundational materials, but their purpose is to adapt rather than directly adopt them. These differences remind us that when discussing the issue of "AI dependence" among upper-level students, it must be carefully considered within the specific disciplinary context.

Third, the "disciplinary context" serves as the key analytical framework for understanding senior students' AI usage behaviors. The two analytical dimensions proposed in this study—disciplinary knowledge attributes and training models—collectively shape the ways in which students interact with AI tools. This analytical framework is particularly applicable to senior students because, after three years of systematic professional training, the disciplinary context has been internalized as a stable mode of thinking and behavioral habit.

5. Recommendations

5.1 Recommendations for Faculty: Discipline-Specific Teaching Strategies

Given the instructional characteristics of junior and senior undergraduates, instructors should provide targeted guidance on the appropriate use of AI tools in course design, graduation advising, and career counseling, deeply integrating disciplinary characteristics into the process of cultivating AI literacy.

In science and engineering courses, an "AI-assisted + human-optimized" assignment model can be implemented. For course projects and capstone projects, students are required to first use AI to generate basic code or a framework for their solutions, and then complete

their final submissions through debugging and optimization, testing and validation, and writing documentation. The debugging process logs and explanations of solution optimizations are incorporated into the grading criteria. Guide students to actively question, after receiving AI-generated code, "Why was it designed this way?" and "Are there better implementation paths?", ensuring that core professional competencies are substantially enhanced through the process of application.

In humanities and social sciences courses, a discussion model featuring AI-generated debates or clashing viewpoints can be implemented. During the guidance of term papers and theses, students should be guided to first use AI to generate viewpoints that contradict or complement their own arguments. They must then analyze, refute, or incorporate these opposing viewpoints to ultimately develop a more robust argumentative framework. Establishing the use of AI to expand intellectual horizons and cultivate critical thinking skills should be set as explicit teaching objectives. On this basis, we should actively build an interdisciplinary academic training model of "Humanities and Social Sciences + AI." Knowledge in the humanities and social sciences is often presented in the form of large-scale text data, a characteristic that offers vast opportunities for the application of natural language processing technologies [6].

In the teaching of social application courses, law courses should strengthen training in "AI retrieval + verification of original literature". In case analysis and thesis writing, verification reports should be made a mandatory component of assignments, guiding students to develop a consistent habit of "verify first, then use". In pedagogy courses, students should be guided to practice "AI-generated content + contextual adaptation." During teaching practicums and lesson plan design, students should be required to clearly articulate the rationale and basis for their adaptations, and the reflection on the adaptation process should be incorporated into the evaluation system. Relevant research indicates that AI-enabled student performance analysis can provide data support for teaching and learning; educators need to rely on AI reports to identify information about student development and implement precise, personalized instruction [7].

5.2 Recommendations for Students: Cultivating Discipline-Specific Awareness of AI Use

Students in their junior and senior years are in a critical transitional phase from "learners" to "professionals" and should consciously develop AI usage strategies aligned with the characteristics of their respective disciplines.

Students in science and engineering disciplines should view AI as a "collaborative developer," but must remain vigilant against the risk that the pursuit of efficiency may replace deep understanding. Students must cultivate a sense of self-awareness and integrity to avoid issues such as tool dependency and data fabrication. Such inappropriate use of AI will undermine students' creativity [8]. Therefore, students must also strengthen their learning of relevant AI usage guidelines and integrate integrity into their coursework [9].

Students in the humanities and social sciences should view AI as a "dialogic partner," but must be wary of the risk that an abundance of perspectives may obscure deep thinking. Students need to cultivate a spirit of innovation, avoid developing mental inertia, and exercise initiative and proactivity by engaging in independent critical thinking regarding AI-generated answers.

Among students in applied social sciences, law students must make verification a consistent habit. After each use, they should reflect on whether they have completed verification and what issues were discovered during the process. This directly relates to upholding the baseline of academic integrity when preparing for the National Legal Profession Qualification Examination and writing their theses. Education students, meanwhile, should continuously ask themselves during the adaptation process, "Why am I adapting this in this way?" and "Does the adaptation meet actual teaching needs?" to ensure that the adaptation process genuinely promotes a substantial improvement in their own instructional design capabilities.

References

[1] Wang Junli, Bi Ruoxu, He Ye, et al. When AI Becomes the "All-Round Partner" of University Students. China Youth Daily, 2025-09-22(006).

[2] Wang Chuanyi, Qiang Hao, Shen Dongling, et al. How Generative AI Assists Graduate Students in Knowledge Production: A

Study on Semantic Recognition by Large Models Based on 230,000 Master's Theses. Tsinghua University Journal of Education, 2025, 46(04): 71–80.

[3] Yang Sa, Yang Yuehan. Partnering with AI: New Development Opportunities for the Humanities. Guangming Daily, June 10, 2025 (014).

[4] Wang Zhanjun. The Formation of Disciplinary Culture Amid the Transformation of Academic Research Models: A Field Study at the University of Florida. Fudan Education Forum, 2020, 18(02): 5-11.

[5] Zhang Guifang. Group Differentiation in Undergraduates' Use of Generative AI and Its Potential Risks: A Survey Study Based on Journalism and Communication Majors. Research on Education and Media, 2026, (01): 82-88.

[6] Gao Yuan, Wang Xuechun, Liu Xu. Applications of Natural Language Processing in Higher Education Research. Fudan Education Forum, 2025, 23(01): 5–15.

[7] Weng Lin. Practical Pathways for the Professional Development of Preservice Teachers in the Age of Artificial Intelligence. Yunnan Daily, 2025-11-23 (007).

[8] Wang Siyao, Huang Yating. Facilitating or Inhibiting: The Impact of Generative Artificial Intelligence on College Students' Creativity. Chinese Higher Education Research, 2024, (11): 29-36.

[9] Cai Fen, Xie Xin. The Current Status of AI-Assisted Research among Doctoral Students and Disciplinary Differences in Its Impact: An Analysis Based on the 2024 National Survey of Doctoral Graduates. Research on Graduate Education, 2025, (06): 19-27+36.

