Investigation and Strategic Recommendations on AIGC Awareness and Usage Among Geography Students in Local Undergraduate Institutions: A Case Study of Chuxiong Normal University

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Abstract. With the rapid advancement of AI-Generated Content (AIGC) technology, its potential applications in education have become increasingly prominent. This study investigates geography students at Chuxiong Normal University through questionnaires, interviews, and SWOT analysis to systematically examine their awareness of AIGC, current usage patterns, and existing challenges. The findings reveal that while most students hold a generally positive attitude toward AIGC, their understanding and application of this technology remain at initial stages, with significant disparities between perceived awareness and practical utilization. Based on SWOT matrix analysis, this paper proposes targeted strategies from four dimensions: leveraging strengths, seizing opportunities, addressing weaknesses, and mitigating threats. Specifically, Schoolsintegrate AIGC into discipline-specific curricula, establish data security and ethical education frameworks, enhance technical promotion and training programs, and increase investments in software/hardware infrastructure. Concurrently, students are advised to actively embrace industry opportunities through skill specialization, balance traditional and technology-enhanced learning approaches, adapt proactively to pedagogical reforms and industry trends, and strengthen information literacy while upholding academic integrity.

Keywords: Geographical Science; AIGC; Awareness and Usage; Countermeasure research

1 Introduction

In recent years, Artificial Intelligence-Generated Content (AIGC) has emerged as a pivotal innovation driver across multiple sectors, with particularly significant potential in education. AIGC not only revolutionizes traditional pedagogical models but also enriches educational resources, enhancing instructional quality and efficiency. Geography—as a highly interdisciplinary field spanning natural and human dimensions with

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A. Y. M. A. Islam et al. (eds.), *Proceedings of the 2025 4th International Conference on Science Education and Art Appreciation (SEAA 2025)*, Advances in Social Science, Education and Humanities Research 952,
https://doi.org/10.2991/978-2-38476-452-5_55

substantial data dependencies—renders AIGC applications particularly salient in this discipline.

Despite AIGC's promising geographical applications, a dearth of rigorous investigation persists regarding geography students' cognition, utilization patterns, and implementation challenges concerning AIGC. Understanding these dimensions is critical for strategically advancing AIGC integration. Among China's regional universities, Chuxiong Normal University (Yunnan Province) serves as a representative case for institutions in non-metropolitan locations with constrained educational resources. Such institutions encounter comparable challenges when adopting emerging technologies like AIGC while simultaneously sharing analogous developmental opportunities.

2 Research Status

In recent years, initial achievements have been made in the application of AIGC technology in education. Exemplifying this trend, the Institute of Geographic Sciences and Natural Resources Research (CAS) et al. (2024) co-developed Kunyuan—the first multimodal large language model for geographical sciences—significantly advancing domain-specific AI integration [1]. Concurrently, Huang et al.'s (2024) survey of 3,800 Chinese undergraduates quantified concerning patterns: 34% admitted academic misuse cases, with 29% reporting task dependency[2]. Mycos (2024) corroborated high adoption rates, identifying 18.7% of faculty/students as high-frequency users [3]. Region-specific studies reveal similar complexities; Patil and Sharma (2024) documented 62% ChatGPT adoption among Mumbai geography students, yet 78% cited accuracy and bias concerns despite recognizing pedagogical value [4]. These implementation risks prompted concrete institutional responses, notably the NYC Department of Education's 2023 ChatGPT ban [5], while Science's editor-in-chief cautioned about its 'uneven efficacy in scholarly composition' (Thorp, 2024, p. 12) [6].

As an emerging technology, AIGC is significantly impacting education, including geography teaching. Current research spans theoretical exploration, practical applications, ethical considerations, and risk assessment. However, balancing the benefits of this technology with its potential risks requires further investigation within the Chinese context. Currently, empirical research specifically examining the awareness and use of AIGC among Geography students in China is limited. Consequently, the level of students' understanding and their actual utilization patterns are not well documented. Understanding these aspects is essential for effectively supporting Geography students and informing the discipline's adaptation to this evolving technological landscape.

3 Research Subjects and Methods

3.1 Research Subjects

The research object of this paper is all the students majoring in Geography Science at Chuxiong Normal University. An online questionnaire was distributed to all participants, yielding 533 valid responses from 544 distributed, representing a response rate

of 98%.This recovery rate is quite ideal, ensuring high data quality and making the research conclusions more persuasive.

3.2 Research Method

3.2.1 Methods for Determining the Sample Size of a Questionnaire.

Minimum sample size was calculated using Cochran's formula for proportions:

$$n = \frac{z^2 \cdot (1-p)}{e^2} \quad (1)$$

Where:
Z = 1.96 (95% CI)
p = 0.5 (maximum variance assumption; Kish, 1965)
e = 5% (margin of error)

$$n_0 = \frac{(1.96)^2 \times 0.5 \times 0.5}{(0.05)^2} = 384.16$$

3.2.2 Questionnaire Survey.

This paper distributed questionnaires to all Geography students via Wenjuanxing (an online survey platform) and collected responses through the same platform. Following data collation, analyses including reliability and validity testing, descriptive statistics, and differential analyses across various dimensions were performed.

The questionnaire utilized a binary skip logic (branching) design [7], dividing respondents into two groups: those aware of AIGC and those unaware. Based on respondents' answers, the content and order of subsequent questions were dynamically adjusted. This design enhances the questionnaire's relevance and effectiveness, reduces answer time, and improves response rates and data quality .

3.2.3 Interviewing Method.

The interview method, with its high flexibility and adaptability, makes the process of information collection and data organization more efficient and precise . Through direct conversations with eight Geography students at Chuxiong Normal University, this study obtained detailed information and personal views on their cognition and current usage of AIGC.

3.2.4 SWOT Analyse.

Strengths, Weaknesses, Opportunities, Threats (SWOT) analysis is a widely used strategic planning tool [8]. This paper employs SWOT analysis to conduct an in-depth assessment of AIGC adoption among Geography students at Chuxiong Normal University. The analysis examines the internal environment (identifying strengths and weaknesses) and the external environment (identifying opportunities and threats) related to

AIGC use. This structured approach facilitates a systematic understanding of the current state of AIGC awareness and use, providing a foundation for developing effective countermeasures.

4 Data Results and Analysis on the Current Situation of Cognition and Use of AIGC by Students Majoring in Geographical Science

4.1 Reliability and Validity Analysis

This study used SPSS 27.0 to conduct reliability and validity analyses for each dimension. The results showed that the Cronbach's alpha coefficients for all dimensions were greater than 0.8, indicating very high internal consistency reliability of the scale. For validity analysis, the KMO values for all dimensions were greater than 0.75, and the Bartlett's test of sphericity yielded significant results ($p < 0.05$), suggesting that the design of the questionnaire scale was reasonable.

4.2 Descriptive Statistical Analysis

This study assessed the level of familiarity with AIGC concepts and various AIGC technology scenarios among students aware of AIGC. The results show that the majority of students (64.65%) could only define the AIGC concept. Approximately one-third (32.93%) were aware of some common AIGC applications, while only 2.42% demonstrated familiarity with its underlying principles, diverse applications, and development trends. This distribution suggests that most students' understanding of AIGC is primarily conceptual and that deeper knowledge of its technical logic and broader applications is limited among this group.

Survey findings indicate that a majority of students hold an open attitude towards the introduction of AIGC tools in geography learning and teaching. These students expressed optimism about the future prospects of AIGC within the discipline. Furthermore, they articulated specific expectations regarding the functional capabilities and practical utility of these tools.

4.3 Analysis of Differences in Different Dimensions

4.3.1 Analysis of the Differences in Cognition and Use of AIGC among Students of Different Genders, Grades and Classes.

Using SPSS 27.0, the normality of AIGC cognitive situation and usage status variables was assessed tests. Since the data violated normality assumptions, non-parametric tests were employed:

Mann-Whitney U tests for gender (binary grouping variable)

Kruskal-Wallis H tests for grade and class (multicategorical grouping variables)

These analyses determined whether significant differences existed in AIGC cognition and usage patterns across demographic groups, with effect sizes reported where applicable.

The analyses revealed no statistically significant differences in AIGC knowledge levels or usage frequency across gender, grade, or class groups (all $p > .05$). Corresponding effect sizes were negligible , indicating the absence of meaningful group differences. These results suggest that demographic characteristics were not significantly associated with variations in students' engagement with, understanding of, or application of AIGC within geographic education. No systematic advantages related to these demographic factors were observed in AIGC-related competencies.

4.3.2 Analysis of the Differences in the Cognition and Use of AIGC among Students from Different Hometowns.

Table 1. Analysis of differences.

		Cognitive status	Current use status
Home town	P	0.015**	0.236
	Cohen'sd	0.248	0.125

Using students' geographic origin (urban/rural) as the grouping variable, Mann-Whitney U tests were conducted to compare AIGC cognition and usage status. As presented in Table 1, the analysis of current usage status yielded a non-significant result ($P = 0.236$) with a negligible effect size (Cohen's $d = 0.125$).

However, for AIGC cognitive situation, a statistically significant difference was observed between students from different places of origin ($P < .05$). Students in urban areas demonstrated higher levels of AIGC-specific knowledge compared to those in rural areas, suggesting an association between urban-rural environments and AIGC cognition. This disparity may be attributable to differential exposure to digital environments. Urban students' greater access to information-rich settings could facilitate adaptation to emerging technologies like AIGC. Conversely, rural students' relatively limited exposure to such environments might constrain their opportunities to develop AIGC-related competencies.

4.3.3 Analysis of the Difference between AIGC Cognition and Usage Status.

Table 2. Paired samples Wilcoxon signed-rank test results

Pairing variables	Median ± standard deviation			Z	df	P	Cohen'sd
	Pair 1	Pair 2	Pairwise differences (Pair 1-Pair 2)				
Cognition is paired with use status	2.3±1.026	1.5±0.97	0±0.746	9.673	532	0.000***	0.336

Using survey data on geography major students' cognition and application of AIGC, a paired-samples Wilcoxon signed-rank test was conducted to assess the difference between students' cognitive levelsand their actual use of AIGC. As presented in Table 2, the test revealed a statistically significant difference ($p < 0.05$), with cognitive levels significantly higher than actual use levels. This indicates a gap between students' perceived knowledge of AIGC and their practical application skills: understanding exceeds practical utilization. Although students demonstrate some understanding and awareness of AIGC, this has not been fully translated into practical operational skills in real-world applications.

4.4 Students Majoring in Geographical Sciences Use AIGC SWOT Analysis

Table 3. SWOT Analysis of AIGC Use Among Geography Major Students

Strengths	Weaknesses	Opportunities	Threats
Solid disciplinary knowledge	Deficiency in technical literacy and application skills	Policy impetus for teaching reform	Challenges in data security and accuracy
Ability to integrate across disciplines	Overreliance impedes the development of practical skills	Popularization and widespread application of AIGC	The traditional teaching methods have been challenged
Extensive geographical field experience	AIGC's high hardware demands	Growth in industry demand	Proliferation of low-quality academic papers

5 Conclusion and Countermeasures

5.1 Conclusion

Based on questionnaire data and analysis, this study found that over 30% of geography majors were unaware of AIGC. Among those aware of it, both their perceived knowledge and practical application of the technology remained superficial. These findings highlight a need for greater dissemination and integration of AIGC within geography education. Furthermore, the analysis revealed no significant differences in AIGC awareness or use based on gender, grade level, or class type. This suggests that subsequent course development need not tailor content specifically to these demographic factors. However, a significant gap was identified between students' awareness of AIGC and their actual usage, with awareness substantially exceeding application. This indicates considerable scope for enhancing students' understanding and practical competence with AIGC. To address this, educational institutions should intensify efforts to raise awareness and demonstrate the technology's relevance to geography. This will improve students' acceptance and application of new technologies, thereby strengthening their overall disciplinary competence. Concurrently, geography students are encouraged to actively develop their practical AIGC skills.

5.2 Countermeasures

Building on the SWOT analysis of AIGC usage among geography majors (Table 3), this paper proposes strategic recommendations at the school and individual levels, categorized according to the SWOT framework [9]: Strength-Opportunity (S-O), Strength-Threat (S-T), Weakness-Opportunity (W-O), and Weakness-Threat (W-T) strategies. This culminates in the development of a SWOT matrix for AIGC adoption in geography (Table 4).

Table 4. SWOT Matrix

<table>
<tr><td colspan="4">Strengths
S1:Solid disciplinary knowledge
S2:Ability to integrate across disciplines
S3:Extensive geographical field experience</td></tr>
<tr><td rowspan="2">Opportunities
O1:Policy impetus for teaching reform
O2:Popularization and widespread application of AIGC
O3:Growth in industry demand</td><td>S-O
1.Educational institutions should enhance the integration of AIGC technology into geography curricula.
2.Students should leverage their strengths to pursue relevant industry opportunities.</td><td>S-T
1.Educational institutions should integrate data ethics and security awareness into their curricula.
2.Students should effectively combine conventional and digital learning strategies.</td><td rowspan="2">Threats
T1:Challenges in data security and accuracy
T2:The traditional teaching methods have been challenged
T3:Proliferation of low-quality academic papers</td></tr>
<tr><td>W-O
1.Educational institutions should enhance AIGC awareness initiatives and provide relevant training for faculty and students. 2.Students should engage with innovative teaching methods and prepare for evolving industry requirements.</td><td>W-T
1.Educational institutions should allocate sufficient funding to acquire necessary hardware and software for AIGC applications.
2.Students must strengthen their digital literacy and adhere strictly to ethical guidelines in academic work.</td></tr>
<tr><td colspan="4">Weaknesses
W1:Deficiency in technical literacy and application skills
W2:Overreliance impedes the development of practical skills
W3:AIGC's high hardware demands</td></tr>
</table>

Acknowledgment

This paper is an outcome of the Yunnan Provincial First-Class Undergraduate Major Construction Site Project in Geography at Chuxiong Normal University.

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