

Demand Analysis for Developing Decision-Making Skills Among Chinese International Students Using the ChatGPT-Enhanced Decision Tree Learning Model

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The Asian Conference on Education 2024
Official Conference Proceedings

Abstract

This study evaluates the demand among Chinese international students for using the ChatGPT-enhanced Decision Tree Learning Model to improve decision-making skills. A survey of 101 students revealed key needs in decision analysis, cultural sensitivity, adaptability, and self-confidence. The results show a strong demand for cultural sensitivity training and integrating cultural perspectives, but weaker interest in understanding diverse values. Students showed a lower demand for problem breakdown and tool usage in systematic analysis skills. In adaptability, students focused more on adjusting communication and flexibility in dynamic environments. The greatest need for autonomy and self-confidence was for confidence-building and training for independent decision-making under pressure. Additionally, students expressed strong interest in using AI tools and decision tree frameworks, particularly for solving complex problems and improving decision efficiency. Based on these findings, the study recommends targeted educational approaches: customized cultural sensitivity training, systematic decision analysis tools, integration of AI and decision tree methods, adaptability training, and confidence-building programs. These elements provide valuable insights for developing effective educational methods to help students make better decisions in diverse and dynamic environments.

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Introduction

Chinese international students play an important role in the global education system. When adapting to the complex academic, social, and cultural environments abroad, decision-making skills are crucial. Strong decision-making abilities not only enhance academic performance and career development, improving critical thinking and strategic problem-solving skills (Chang et al., 2020; Plummer et al., 2022), but also strengthen cross-cultural communication and social interactions, supporting the establishment of meaningful relationships and thriving in diverse environments (Shanshan et al., 2023; Xi, 2020). Chinese international students face multiple challenges in decision-making, mainly including cultural conflicts, information overload, and the lack of effective decision-support systems. First, Chinese students come from a collectivist culture, which significantly differs from the individualistic culture of the West. When making decisions, they are often influenced by family expectations and struggle to balance personal needs with family desires (J. Chang et al., 2020). Additionally, these students are faced with an overwhelming amount of information related to academic choices, career planning, and living expenses, leading to decision fatigue (J. Chang et al., 2020; Hari et al., 2023). Furthermore, the existing counseling and advisory systems often fail to provide practical and effective decision-support tools, resulting in a lack of sufficient structural guidance when making important decisions (Ran et al., 2022).

A decision tree is a tool that visualizes decision-making through a tree structure, where nodes represent choices, branches show paths and leaf nodes indicate outcomes (Maimon & Rokach, 2014a; Priyanka & Kumar, 2020). By supporting multi-factor analysis, including academic, economic, and cultural aspects, decision trees help students identify key factors and avoid emotional or externally influenced decisions, thereby enhancing decision transparency and interpretability. They also reduce information overload by breaking down complex decisions and focusing on critical factors. For Chinese international students, facing unique challenges like family expectations and cultural conflicts, decision trees offer a structured solution. While research on decision tree-based support for Chinese students is still emerging, some studies highlight their benefits in education and career planning. However, more research is needed to address the specific cultural, academic, and social adaptation challenges faced by these students (Costa & Pedreira, 2023).

Decision trees have theoretical advantages but present significant limitations in practical applications (Maimon & Rokach, 2014b; Priyanka & Kumar, 2020). They are prone to overfitting, especially with small or noisy datasets, which affects their performance on new data. The simple structure of decision trees also struggles to capture complex nonlinear relationships, making them less effective in dynamic decision contexts like study abroad decisions. Furthermore, decision trees can be biased in imbalanced datasets, favoring larger categories, and their rigid structure lacks flexibility, limiting their adaptability to evolving decision problems.

AI-based tools like ChatGPT can address the limitations of decision trees by reducing overfitting through dynamic adjustments based on user feedback, handling complex nonlinear relationships with deep learning, and offering more flexibility and adaptability in decision support. Unlike decision trees, ChatGPT provides real-time, personalized recommendations and explanations, enhancing interactivity, transparency, and trust, especially for students facing complex decisions.

Decision trees are valuable tools for helping Chinese international students make complex decisions, but they have limitations in handling nonlinear relationships, overfitting, and providing flexible support. As an AI-driven interactive tool, ChatGPT can effectively overcome these shortcomings by offering personalized, precise, and flexible decision support. Future research should explore combining decision trees with intelligent tools like ChatGPT to optimize decision support systems for international students, helping them make more informed choices in the complex context of studying abroad.

Problem Statement

To address the unique challenges faced by Chinese international students in their decision-making processes, it is crucial to understand their specific needs and how technology can support them. By focusing on personalized, flexible decision-making tools, we can better assist them in navigating complex academic, cultural, and personal decisions. In this context, the following questions need to be explored:

- 1) What are the specific needs of Chinese international students in enhancing their decision-making skills?
- 2) What key elements should the ChatGPT-enhanced Decision Tree Interactive Learning Model include to effectively meet the needs of Chinese international students?

Literature Review

Demand analysis is a systematic process for evaluating the needs and preferences of a target group, helping to identify the group's characteristics, prioritize needs, and design solutions (Sleezer et al., 2014). Chinese international students face a series of unique challenges while studying abroad, which impact their decision-making abilities. These challenges primarily include language barriers, cultural differences, differences in educational systems, and a lack of emotional regulation skills. Students with weaker language skills often feel insecure in both academic and daily life, which leads to greater caution or hesitation in decision-making, and cultural adaptation issues further limit their ability to make independent decisions (Klein, 2011). The traditional Chinese education model emphasizes memorization and authority, lacking training in independent thinking and decision-making (Liu et al., 2023). When Chinese students encounter Western educational systems, they often rely on external guidance rather than self-analysis, limiting their decision-making independence, while improving emotional regulation and resilience is crucial for enhancing their decision-making skills, as students with strong emotional resilience can remain calm and make rational decisions under academic and life pressures (Bechara, 2000).

The integration of ChatGPT and decision trees demonstrates significant potential in fields such as education, law, and medicine. ChatGPT enhances the decision tree algorithm in complex decision-making processes by providing personalized feedback and decision support through its natural language processing capabilities (Chiesa-Estomba et al., 2024; Hariri, 2024). While decision trees simplify the decision-making process by identifying key factors and optimizing decision paths, ChatGPT boosts decision-makers' sensitivity to outcomes through real-time feedback. Moreover, ChatGPT's generative capabilities make decision trees more interactive and transparent, helping users avoid emotional biases and external influences, particularly in multi-faceted decision-making scenarios (Guo & Wang, 2024). This combination improves the accuracy and adaptability of decisions, offering new perspectives and applications for decision support systems across various fields.

Methods

This study investigated the learning needs of Southeast Asian Chinese international students. Through questionnaires collected from 101 participants, the study identified key priorities for enhancing decision-making skills and developing a ChatGPT-augmented decision tree learning model.

Participants

This study employed a stratified random sampling method to recruit 101 participants, ensuring diversity in gender, age, academic level, and geographic location. The sample included a balanced gender distribution, with the majority aged 26–35 years, most of whom were master’s students in management and STEM fields. Participants were primarily based in Thailand, with additional representation from Malaysia and the Philippines. Regarding familiarity with AI tools, most participants reported being familiar. This diverse sample provides comprehensive support for the research focus.

Participants Information.

Table 1: Participants Information

Category	Subcategory	Frequency	Percentage
Gender	Male	58	57.4
	Female	43	42.6
Age Group	18–25	13	12.9
	26–30	56	55.4
	31	32	31.6
Geographic Location	Thailand	66	65.3
	Malaysia	25	24.8
	Philippines	10	9.9
Academic Level	Undergraduate	13	12.9
	Master's	50	49.5%
	PhD	38	37.6%
Familiarity with AI Tools	Familiar	85	84.2
	Unfamiliar	16	15.8

Instruments

The instrument assesses participants' decision-making skills and learning tools needs, focusing on the integration of AI tools like ChatGPT and decision tree frameworks. It comprises 18 items divided into two dimensions: Decision-Making Skills and Learning Tools Needs. The Decision-Making Skills dimension evaluates cultural sensitivity, systematic analysis, adaptability, and confidence, essential for navigating complex and dynamic scenarios. Sub-dimensions include awareness of cultural diversity, systematic evaluation of options, adaptability to change, and confidence in independent decision-making, each measured with three targeted items. The Learning Tools Needs dimension examines participants' preferences for using AI tools like ChatGPT and decision tree frameworks in decision-making and learning. It evaluates the perceived utility of AI tools for problem-solving and efficiency and the need for decision tree tools to organize information

and access integrated learning resources. The instrument, developed through a comprehensive review of literature and theoretical frameworks, ensures content validity and reliability. Using a 5-point Likert scale, it evaluates decision-making skills and learning tool needs, focusing on cross-cultural and complex problem-solving contexts. Expert reviews, pilot testing, and Cronbach's alpha confirmed its reliability and construct validity. This tool provides actionable insights to guide the development of adaptive, culturally sensitive, AI-integrated learning models for education and professional training.

Data Collection and Analysis

This study distributed questionnaires to Southeast Asian international students through the WeChat-based Wenjuanxing platform, collecting 101 valid responses. The data were automatically processed by Wenjuanxing and manually screened to eliminate invalid responses, ensuring data quality and diversity. Strict adherence to privacy protection principles provided high-quality and reliable data support for the research.

This study employed descriptive statistical analysis to calculate the mean and standard deviation of questionnaire items, assessing participants' need levels and response consistency. Items were categorized based on their mean values into high demand (≥ 4.0), moderate demand (3.5–4.0), and low demand (< 3.5). Trends within and across dimensions (decision-making skills and learning tool needs) were compared, and individual differences were evaluated through standard deviations. This approach identified key needs and weaknesses in areas such as cultural sensitivity, systematic analysis skills, and AI tool utilization, providing quantitative support for optimizing learning models.

Result

Table 2 presents the descriptive statistics of decision-making skills.

Table 2: Descriptive Statistics of Decision-Making Skills

Items	Mean	SD	Level
Decision-making skills			
Cultural Sensitivity			
1. understand the values and behaviors of people from different cultural backgrounds.	3.99	0.6	Moderate
2. I consider the cultural perspectives of others when making decisions.	4.74	0.5	High
3. I want more training or resources on cultural customs and communication styles.	4.45	0.73	High
Systematic Analysis Skills			
4. I evaluate all possible options and outcomes in decision-making.	4.28	0.4	High
5. I break down complex problems into manageable steps.	3.7	0.5	Moderate
6. I need tools like models or frameworks for rational decisions.	3.7	0.56	Moderate

Adaptability and Flexibility			
7. I adjust decision-making methods when conditions change.	3.58	0.62	Moderate
8. I adapt communication and behavior in unfamiliar environments.	4.63	0.85	High
9. Adaptability is important to me in dynamic environments.	4.28	0.44	High
Autonomy and Confidence			
10. I make independent decisions under external pressure.	4.42	0.66	High
11. I am confident in my decisions despite differing opinions.	3.53	0.71	Moderate
12. I want training to boost confidence in decision-making.	4.76	0.33	High
Learning Tools Needs			
AI Tools Utilization			
13. I need AI tools like ChatGPT to solve complex problems.	4.58	0.73	High
14. I am willing to use online platforms to improve AI tool skills.	3.78	0.42	Moderate
15. AI tools can greatly enhance decision-making efficiency.	3.74	0.35	Moderate
Decision Tree Tools and Learning Resources			
16. Decision trees help organize information and select the best options.	3.74	0.96	Moderate
17. I want more resources combining AI and decision-making frameworks.	3.9	0.98	Moderate
18. I need practical cases to learn AI and decision tree tools.	4.18	0.87	High

Participants demonstrated a high overall demand for both decision-making skills and learning tools integration, particularly in incorporating AI tools like ChatGPT and decision tree frameworks. The overall mean for decision-making skills was 4.13 (SD=0.57), reflecting a strong focus on capacity building across various dimensions. Similarly, the mean demand for AI tools and decision tree learning resources was also notable, indicating a clear interest in leveraging advanced tools for problem-solving and decision-making.

Decision-Making Skills

Participants demonstrated varied needs across four dimensions of decision-making skills. Cultural Sensitivity showed a high demand for integrating cultural perspectives (mean 4.74) and training resources (mean 4.45), with a moderate demand for understanding diverse values (mean 3.99). Systematic Analysis Skills prioritized evaluating options (mean 4.28), while breaking down problems and using tools had moderate demand (mean 3.7). Adaptability and Flexibility highlighted adjusting communication in unfamiliar settings (mean 4.63) and adaptability in dynamic contexts (mean 4.28), with less emphasis on decision-making

flexibility (mean 3.58). Autonomy and Confidence ranked highest for confidence-boosting training (mean 4.76) and independent decisions under pressure (mean 4.42), with moderate demand for managing differing opinions (mean 3.53).

AI and Decision Tree Tools

Participants expressed strong interest in integrating AI tools and decision tree frameworks into learning processes. AI Tools Utilization showed high demand for using AI tools like ChatGPT to solve complex problems (mean 4.58), while willingness to use online platforms (mean 3.78) and recognition of AI's efficiency potential (mean 3.74) were moderately rated. For Decision Tree Tools and Learning Resources, practical cases combining AI and decision trees (mean 4.18) and AI-integrated decision-making frameworks (mean 3.9) were prioritized, with moderate demand for decision trees' organizational benefits (mean 3.74).

Key Elements Identified

The analysis identified key elements to address participants' needs effectively: tailored cultural training to enhance sensitivity, structured tools for rational decision-making, integration of AI and decision tree methods for improved accuracy and efficiency, adaptability training for dynamic and cross-cultural environments, and targeted programs to build decision-making confidence across diverse scenarios.

In summary, the findings highlight the participants' significant demand for decision-making skills and AI-integrated tools. While cultural sensitivity and confidence emerged as the most critical areas, systematic analysis and adaptability were also emphasized. Addressing these needs through innovative, culturally sensitive, and AI-enhanced learning frameworks will be crucial for fostering effective decision-making in diverse and complex contexts.

Discussion

In a multicultural educational environment, Chinese international students often face challenges related to differences in academic standards, cultural norms, and societal expectations. These challenges not only impact academic performance but can also affect mental health and social interactions (Zhou, 2023). Therefore, improving the decision-making ability, cultural adaptability, and critical thinking of international students has become an urgent issue that needs to be addressed. AI-driven personalized learning tools, such as ChatGPT, can help students enhance their sensitivity to the consequences of decisions through real-time feedback and contextual simulations, enabling them to make more informed decisions in a cross-cultural environment (Kaur et al., 2024). By incorporating decision tree models, students can systematically analyze the risks and benefits of different decisions, thereby cultivating critical thinking and effective decision-making skill (Bogdanov et al., 2024). Moreover, integrating cultural contexts into AI tools' learning frameworks helps improve students' cultural sensitivity, assisting them in better addressing academic and social challenges across cultures (Salas-Pilco et al., 2022). Therefore, combining ChatGPT with decision tree models provides Chinese international students with a comprehensive decision-support system that helps improve their academic decision-making abilities and cross-cultural adaptability, leading to better academic performance and mental well-being. As technology continues to advance, AI tools will offer more personalized support to help international students better adapt to the challenges of studying abroad.

Conclusions

This study examined the needs of Chinese international students to improve decision-making skills and proposed a ChatGPT-based decision tree interactive learning model to address these challenges. The findings emphasized the importance of cultural sensitivity, systematic decision-making, and confidence-building. By integrating AI tools, structured frameworks, and cultural adaptability training, the proposed model enhances decision-making accuracy and cross-cultural competence. Future research should focus on optimizing the model's design and evaluating its effectiveness in practical teaching contexts. A well-implemented model will equip educators to better support Chinese international students, enabling them to navigate complex learning and career challenges and enhancing their global competitiveness.

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