AI Technology for Education Management in Guangdong University of Finance

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Abstract

The objectives of this research were: (1) to investigate the current level of AI technology proficiency among faculty at Guangdong University of Finance across five core dimensions; (2) to analyze internal and external factors influencing teachers' AI competency; and (3) to formulate targeted promotion pathways for improving faculty AI competence in teaching management. This study employed a mixed-methods design, using a questionnaire as the main instrument and semi-structured interviews as a supplementary source. The sample consisted of 248 valid full-time teachers and teaching administrators from seven disciplines. Quantitative data were analyzed through descriptive statistics, Pearson correlation, and multiple linear regression in SPSS 27.0, while interview data were analyzed thematically. The results showed that: (1) the overall AI proficiency of surveyed faculty was at a moderate level, ranked from high to low as AI practical application, AI cognition and attitude, AI tool selection and application, AI content design and production, and AI teaching evaluation and reflection; (2) school environment and national policies had significant positive effects on multiple dimensions of teachers' AI proficiency, while disciplinary perspective and peer demonstration also acted as positive factors in specific dimensions, and individual motivation had no statistically significant impact; (3) two sets of improvement paths were identified:

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external optimization measures and personal self-improvement paths. These results provide practical references for finance-oriented universities seeking to improve faculty AI competency through systematic management.

Keywords: artificial intelligence, AI competency, education management, faculty development

Introduction

The rapid spread of generative artificial intelligence (AI) has brought substantial changes to higher education. The release of ChatGPT by OpenAI in 2022 marked an important turning point in AI integration into education (Huang, 2025). In China, domestic large language models such as Baidu's Wenxin and DeepSeek have accelerated the intelligent transformation of teaching and learning (Sang & Wang, 2025). However, faculty adoption of AI technology remains a prominent issue in finance-oriented universities.

Guangdong University of Finance, a representative finance-oriented institution in South China, faces clear challenges in improving faculty AI competency. Its current management model often emphasizes "facility completion" while paying less attention to "competency development goals" (Li, 2023). Existing research has mainly focused on STEM disciplines and has not sufficiently addressed the distinctive characteristics of finance-oriented institutions (Duan, 2025; Dou, 2024). In addition, the questionnaire survey conducted for this study found that only 27.6% of the 248 valid respondents had received professional AI training, and the university still lacks a long-term mechanism for fostering AI competence. This finding forms part of the practical background of the present study and is reported in detail in the results section.

This study is significant for several reasons. It helps finance and economics faculty develop basic AI operation abilities and instructional design skills, and it assists Guangdong University of Finance in building a systematic management framework for AI competency development. It also provides evidence for similar finance-oriented universities that are developing AI-related training plans and resource support policies. Therefore, this study investigates the current level of AI technology

proficiency among faculty, analyzes its influencing factors, and develops management strategies for improving faculty AI competence.

Research Objectives

1. To investigate the current level of AI technology proficiency among faculty at Guangdong University of Finance across five core dimensions: AI cognition and attitude, AI tool selection and application, AI teaching content design and production, AI practical teaching application, and AI teaching evaluation and reflection.

2. To analyze internal and external factors influencing teachers' AI competency, covering individual motivation, disciplinary perspective, peer demonstration, campus environment, and national education policies.

3. To formulate targeted internal and external promotion pathways for improving faculty AI competence in finance and economics university teaching management.

Research Methods

1. Population and Sample

This study took Guangdong University of Finance as a case study. The core stakeholder groups included full-time teachers and teaching administrators from seven disciplines: economics, management, law, literature, engineering, science, and arts. According to faculty records provided by the Academic Affairs Office of Guangdong University of Finance, the total population of faculty members was approximately 1,000 during the academic year.

The sample size was calculated using the Yamane formula (Yamane, 1973) with a 95% confidence level and a 5% margin of error. The calculated required sample size was 286. To account for possible invalid responses, the target sample was set at 300, and simple random sampling was used. A total of 300 questionnaires were distributed, 280 were returned, and after screening, 248 valid responses were retained, giving a valid response rate of 82.6%.

For the qualitative part, six teachers were selected through purposive sampling. They came from literature, economics, management, Neo-Confucianism, arts, and engineering, and included professional course instructors and an information technology teacher from the Guangzhou and Qingyuan campuses. The selection considered disciplinary diversity, teaching experience, and practical experience with AI in teaching. Each interview lasted about 20 minutes, and the interview outline was provided in advance.

2. Research Instruments

The main data collection tool was a self-designed questionnaire titled "Survey on the Current Level and Influencing Factors of Artificial Intelligence Skills Among Faculty Members at Guangdong University of Finance." The questionnaire had three parts: personal background information, a five-dimensional AI proficiency scale with 17 items, and an influencing factors scale covering six constructs: individual motivation, disciplinary perspective, teaching practice engagement, peer demonstration, school environment, and national policy.

Three experts evaluated the questionnaire's content validity using the Index of Item-Objective Congruence (IOC). The IOC values of the items ranged from 0.67 to 1.00. Following the retention criterion adopted in this study, items with an IOC value of 0.67 or higher were retained. Reliability was assessed using Cronbach's alpha. The alpha values of all dimensions ranged from 0.816 to 0.937, and the overall scale reliability was 0.896. These values exceeded the commonly accepted threshold of 0.70 for internal consistency. The Kaiser-Meyer-Olkin (KMO) measure was 0.899, and Bartlett's test of sphericity was significant at $p < 0.001$, with a cumulative explained variance of 78.726%. These results indicate acceptable reliability and validity for the questionnaire.

Semi-structured interviews were used to obtain additional explanations of the quantitative findings. The interview guide covered teachers' AI cognition, tool use, content design, practical application, evaluation and reflection, influencing factors, and suggestions for improvement.

3. Data Collection and Analysis

Questionnaires were distributed both online via WeChat and offline in classrooms and offices. After obtaining informed consent, semi-structured interviews were conducted face-to-face or by video call. SPSS 27.0 was used for descriptive statistics, Pearson correlation analysis, and multiple linear regression analysis. A five-point Likert scale was used to assess proficiency levels. The interview data were analyzed thematically to identify core themes and categories.

This study used a quantitative-dominant mixed-methods design. The questionnaire provided the main evidence for the current status and influencing factors, while the interviews helped explain the quantitative results and supported the formulation of improvement pathways. The quantitative and qualitative findings were integrated in the results and discussion sections according to the three research objectives.

Research Results

Among the 248 valid respondents, 72.4% (180) had never received any form of AI-related training, while only 27.6% (68) had received such training or participated in relevant research. In addition, 62.4% (155) had never led or participated in AI-related research projects.

1. Current Status of Faculty AI Technology Proficiency

The results showed that the overall AI proficiency of surveyed faculty was at a moderate level, with a mean score of 3.34 out of 5. Across the five dimensions, mean scores ranked from high to low as follows: AI practical application (mean = 3.75), AI cognition and attitude (mean = 3.51), AI tool selection and application (mean = 3.23), AI content design and production (mean = 3.13), and AI evaluation and reflection (mean = 3.10).

Table 1 Current Status of AI Technology Proficiency Among Faculty

Dimension	Mean	SD	Level
Practical Application	3.75	1.273	High
Cognition and Attitude	3.51	1.391	High
Tool Selection and Application	3.23	1.207	Moderate
Content Design and Production	3.13	1.152	Moderate
Evaluation and Reflection	3.10	1.212	Moderate

Faculty performed relatively well in practical application and cognition, but their ability to select tools, design AI-supported content, and evaluate AI teaching effectiveness remained limited. Evaluation and reflection received the lowest score, indicating a clear weakness in critical assessment and data-driven reflection on AI applications.

2. Correlation Between Five Dimensions and Overall AI Competency

Pearson correlation analysis showed that all five dimensions were significantly and positively correlated with overall AI proficiency ($p < 0.01$). Practical application ($r = 0.665$), evaluation and reflection ($r = 0.552$), and content design and production ($r = 0.543$) showed strong correlations, while tool selection and application ($r = 0.410$) and cognition and attitude ($r = 0.405$) showed moderate correlations.

Table 2 Correlation Between Five Dimensions and Overall AI Competency

Dimension	Pearson r	Level of Correlation
Practical Application	0.665	Strong
Evaluation and Reflection	0.552	Strong
Content Design and Production	0.543	Strong
Tool Selection and Application	0.410	Moderate
Cognition and Attitude	0.405	Moderate

3. Regression Analysis of Influencing Factors

Before the regression analysis, the distributional properties of the variables were examined. All variables exhibited skewness absolute values below 3 and kurtosis values below 10, indicating approximately normal distributions and suitability

for parametric statistical analysis. Multiple linear regression analysis showed that campus environment and national policies were the most consistent predictors of faculty AI competency. The main results are summarized in Table 3.

Table 3 Summary of Multiple Linear Regression Analysis Results

Dependent Variable	Predictor	β	p-value	R^2
Cognition and Attitude	Campus Environment	0.146	0.007	0.058
Tool Selection and Application	Campus Environment	0.130	0.017	0.053
Tool Selection and Application	National Policy	0.139	0.011	0.053
Content Design and Production	Campus Environment	0.205	<0.001	0.084
Content Design and Production	Peer Demonstration	0.113	0.017	0.084
Practical Application	Disciplinary Perspective	0.172	0.001	0.114
Practical Application	National Policy	0.138	0.009	0.114
Evaluation and Reflection	Disciplinary Perspective	0.182	<0.001	0.155
Evaluation and Reflection	Campus Environment	0.205	<0.001	0.155
Evaluation and Reflection	Peer Demonstration	0.094	0.040	0.155
Evaluation and Reflection	National Policy	0.103	0.043	0.155

The results indicate that campus environment was the most broadly influential factor, with significant positive effects on four dimensions and marginal significance on practical application. National policy significantly affected tool selection, practical application, and evaluation and reflection. Disciplinary perspective significantly affected practical application and evaluation and reflection. Peer demonstration significantly affected content design and evaluation and reflection. Individual motivation and teaching practice engagement were not statistically significant across any dimension.

4. Key Findings from Interviews

The interview findings showed that teachers had strong interest and motivation in using AI for teaching assistance and educational data analysis. However, they also faced challenges such as technical proficiency gaps, difficulty understanding AI feedback mechanisms, and communication barriers. In professional skills, teachers lacked the ability to distinguish appropriate from inappropriate AI-generated content and lacked professional evaluation skills. Teaching administrators believed that the

core goals of AI competency management were clear, but implementation obstacles remained in teachers' professional capabilities, system resource support, and interdisciplinary collaboration.

Respondents generally agreed that their proficiency in using AI to support teaching needed improvement. They identified interdisciplinary teacher collaboration as the most beneficial factor, and noted that support from schools and AI platforms significantly enhanced their teaching capabilities. They also reported technical challenges such as unfamiliarity with software operations, inaccurate use of prompts, improper data processing, and concerns about data privacy and security.

5. Overview of the Management Guidance Plan

Based on the survey and interview results, a management guidance plan covering external environment optimization, teacher training, management system support, and personal self-improvement was developed.

Research Discussion

The results are discussed according to the three research objectives.

First, regarding the current level of AI competency, the finding that practical application ranked highest is consistent with the university's recent investment in digital infrastructure and teacher training. Zhang et al. (2022) also emphasized that practical operational skills are an important indicator of AI competency. However, the low score in evaluation and reflection suggests that teachers can use AI tools but lack the critical capacity to assess AI effectiveness and reflect on its pedagogical impact. This echoes concerns raised by Duan (2025) and Li et al. (2025) about the lack of systematic evaluation frameworks in existing research. The strong correlation between practical application and overall competency supports the view that experiential learning is important for AI proficiency, which is also consistent with constructivist learning theory (Jiang, 2025).

Second, regarding influencing factors, the significant influence of school environment and national policies on multiple dimensions reinforces the importance of institutional support and top-down guidance for AI adoption. This is consistent with

previous findings that campus intelligence and policy frameworks promote educational technology adoption. The non-significant effect of individual motivation suggests that awareness alone does not translate into action without external resources and training. The positive effect of peer demonstration on content design and evaluation indicates that collaborative learning among teachers is valuable, which supports the social constructivist perspective. When teachers observe colleagues using AI effectively, they are more likely to adopt similar practices.

Third, regarding improvement pathways, the proposed external and internal pathways align with the UNESCO AI Competency Framework for Teachers (UNESCO, 2024), which advocates both institutional capacity-building and individual professional development. The emphasis on intelligent campus construction and systematic training responds directly to the weaknesses found in content design and evaluation. It also matches interviewees' calls for ongoing structured training and dedicated technical support. The suggestion for personalized AI teaching resource libraries addresses teachers' practical need to accumulate and share effective use cases, which can help bridge the gap between knowledge and application. This integrated approach is consistent with the "Triple Impact–Collaborative Response" framework proposed in the literature review, ensuring a closed-loop process from assessment to implementation.

New Knowledge

This study contributes an empirically validated framework for enhancing faculty AI competency in finance and economics higher education. It identifies five observable competency dimensions, confirms that campus environment and national policies are the most consistent enablers, and shows that institutional scaffolding and peer modeling are more predictive of competency development than individual motivation alone. These findings provide a theoretical and methodological reference for future research on AI competency in specialized higher education institutions.

Conclusions and Recommendations

The conclusions follow the three research objectives. First, the overall AI proficiency of faculty was moderate (mean = 3.34), with practical application highest and evaluation and reflection lowest. Second, campus environment and national policies were the most consistent predictors of AI competency; disciplinary perspective and peer demonstration significantly affected specific dimensions, while individual motivation had no statistically significant effect. Third, two improvement paths were identified: external institutional measures and personal self-improvement. For institutional implementation, the university should incorporate basic AI theories and tools into disciplinary training, build intelligent teaching environments, strengthen data integration, establish continuous feedback mechanisms, and provide regular needs-based AI training rather than fixed requirements. For individual development, teachers should study AI materials, participate in specialized training, integrate AI into daily teaching, and build personal AI teaching resource libraries. Future research should expand the sample to other institutions, examine additional organizational and individual factors, and adopt longitudinal or comparative designs.

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