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Analysis of University English Teachers' Willingness to Use Artificial Intelligence and Its Influencing Factors: Based on Grounded Theory

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Abstract: With the rapid development of artificial intelligence (AI) technology, its application in the education field is becoming increasingly widespread. This study aims to analyze university English teachers' willingness to use AI and its influencing factors. By exploring university English teachers' willingness to use AI through the qualitative research method of grounded theory, we analyze the underlying influencing factors. The analysis reveals that university English teachers' willingness to use AI tools is influenced by risk perception, external factors, and personal factors. Risk perception includes perceived technological anxiety, information quality perception, self-risk perception, and information security perception, which are negatively correlated with teachers' willingness to use AI; external factors include school training, AI development trends, and community influence, which indirectly affect teachers' willingness to use AI; while personal factors, including risk concerns, personal biases, and individual abilities, have a decisive impact on their willingness to use AI in the classroom.

Keywords: Artificial Intelligence; University English Teachers; Willingness to Use; Influencing Factors; Grounded Theory.

1. Introduction

With the rapid development and continuous updating of artificial intelligence technology, it not only impacts various aspects of daily life but is also deeply penetrating the educational environment, transforming traditional teaching models with its powerful content generation capabilities. The State Council's 2017 "New Generation Artificial Intelligence Development Plan" [1] strongly proposed encouraging AI to promote educational innovation in higher education institutions. The Ministry of Education's 2018 "Action Plan for Artificial Intelligence Innovation in Higher Education Institutions" [2] also emphasized the importance of guiding and encouraging higher education institutions in the field of AI. English, as one of the key global languages, holds a core position in university disciplines.

Although introducing AI in education brings many opportunities for teachers and students, current research mainly focuses on the application and challenges of AI, with insufficient clarity on university English teachers' willingness to use AI and its influencing factors. Existing studies have shown that the key to the successful empowerment of AI in teaching lies in whether educators have the willingness and acceptance to use it [3]. Therefore, exploring university English teachers' willingness to use AI and its influencing factors is significant for the future improvement of AI and the professional development of university English teachers.

2. Literature Review

As a major trend in the future development of teaching, both domestic and international scholars have conducted in-depth analyses of the influencing factors on teachers' willingness to use AI based on different theories, concluding that the factors include: self-efficacy, perceived usefulness, negative emotions, technology use anxiety, task fit, social influence, and teachers' perceptions of AI's ease of use and usefulness [4] [5] [6]. Azawi et al. identified that external factors affecting teachers' use of AI platforms include inadequate financial and policy support, lack of teacher training programs, and lack of technical support [7]. Gupta et al. found that institutional barriers play a major inhibitory role in teachers' willingness to use AI platforms, while recognition plays a major motivational role [8]. Giacalone et al. suggested that perceived ease of use and usefulness during AI use increase user acceptance [9]. Wang Shanyong et al. identified that relative advantage, compatibility, perceived trust, and experience factors determine teachers' willingness to use intelligent systems [10]. Li Jing et al. found that perceived value, technological factors, individual factors, risk factors, and external environmental influences affect the willingness of higher vocational college teachers to use AI technology [5].

3. Model Construction and Explanation of Function

Using grounded theory, in-depth interviews, and three-level coding analysis, the study identified three core categories and nine major categories regarding university English teachers' willingness to use AI technology and its influencing factors from the original text. Based on the relationships and dimensions of these factors, a model of university English teachers' willingness to use AI and its influencing factors was constructed, as shown in Table 1

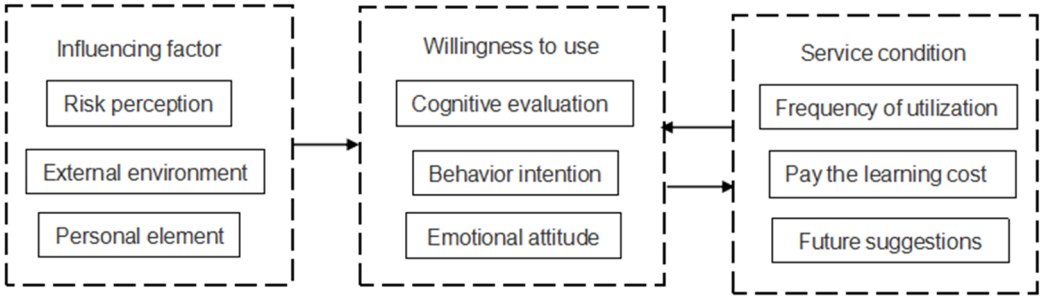
4. Research Design

4.1. Research Method and Sample Selection

Grounded theory, as a major sociological research method, is centered on collecting and analyzing data to abstract new concepts and ideas, developing new theories through an inductive approach. This study uses grounded theory and adopts semi-structured interviews to obtain raw data. In selecting research subjects, efforts were made to choose English teachers with varying background information to gather more effective information. This study selected 12 English teachers from universities in different regions of Guangdong Province as research subjects, differentiated by

nationality, education level, teaching experience, study abroad experience, and academic title. Teachers were invited for semi-structured interviews. To ensure the validity of the interview samples, both face-to-face and online interviews were conducted over a 30-day period. A total of 12 interview data were collected, with an average interview duration of approximately 31 minutes. Using Nvivo12Plus software to transcribe the recorded files, the final text data amounted to 56,531 words.

Table 1. Model of University English Teachers' Willingness to Use AI and Influencing Factors



4.2. Interview Results

After converting the interview audio to text, Nvivo12Plus software was used for qualitative analysis of the interview content. Following preliminary analysis and sorting of the interview materials, the grounded theory method was used for coding. This involved open coding, axial coding, and selective coding to establish categories and their relationships, exploring university English teachers' willingness to use AI and the factors influencing it.

4.3. Coding Process

4.3.1. Open Coding

Initially, to preserve the meaning of the original data as much as possible, interview texts were distilled into more concise concepts, resulting in 68 concepts. These concepts were then categorized. By analyzing and comparing concepts, similar or related concepts were grouped into corresponding categories, resulting in 29 categories, which were numbered A1-A29. The results of open coding are shown in Table 2.

Table 2. Open Coding Table

Category	Concept
A1	Frequently used: Collecting materials before class / Creating classroom quizzes / Preparing class materials / Summarizing learning outcomes / Conducting post-class exercises
A2	Rarely used: Occasionally used for collecting materials before class
A3	Not used: Not used
A4	Cost situation: Certain self-learning costs / No learning costs / Small monetary costs / No monetary costs / Privacy costs
A5	Teacher training: More use of AI / Improving teacher professional skills / Organizing systematic training
A6	AI development: Developing AI based on subjects / Standardizing AI usage scenarios
A7	Balancing with AI: Avoid over-reliance on AI / Enhancing teacher core skills
A8	Assisting teaching: Saving time / Improving preparation efficiency / Inadequate development / Simplifying teacher work / Enhancing other teacher abilities / Developing student abilities / Able to grade assignments / Reducing time-space constraints
A9	Providing learning resources: Providing more resources / Expanding teachers' knowledge / Narrowing resource gaps
A10	Information quality: High information quality / Repetitive information / Inadequate to meet needs
A11	Understanding level: Surface-level understanding
A12	High intention to use: Very willing to use / Want to try in class
A13	Low intention to use: Unwilling to use / No need to learn
A14	Moderate intention to use: AI is optional
A15	Positive attitude: Good usage experience / Fast information search / Convenient for roll call / Optimizing traditional teaching
A16	Negative attitude: Distrust of AI
A17	Technology anxiety perception: No replacement crisis / No usage anxiety / Crisis of being replaced by AI
A18	Information quality perception: Some information is inaccurate / Information not personalized / Concerns about information sources / Mechanical and rigid information / Mismatch with subject
A19	Self-risk perception: Anxiety about learning new technology / Decline in teacher prestige / Weakening teacher-student relationship / Crisis of falling behind others
A20	Information security perception: Privacy leakage risk / Use of foreign engines / Risk of academic idea leakage
A21	School training: Few school training sessions / Poor quality of training / School-organized lectures
A22	AI development trends: AI as a trend / Low popularity level
A23	Community influence: Sharing usage experiences among teachers / Student recommendations
A24	Risk concerns: Concerns about information quality / Privacy leakage concerns
A25	Personal biases: Traditional teaching methods are better / AI development is incomplete

4.3.2. Axial Coding

Axial coding is a secondary analysis based on open coding. By integrating independent and dispersed concepts with unclear relationships from open coding, it further analyzes the

internal connections at the initial category level. Categories are then abstracted into higher-level main categories based on class relations and relevant relationships. The categories generated from open coding were grouped and summarized into 9 main categories, numbered B1-B9. The results of axial coding are shown in Table 3.

Table 3. Axial Coding Table

Main Category	Category	Frequency	Reference Points
B1 Usage Frequency	A1 Frequent Use	7	14
	A2 Rarely Use	2	3
	A3 Not Used	2	2
B2 Cost Situation	A4 Cost Situation	6	7
B3 Future Suggestions	A5 Teacher Skills Training	9	20
	A6 AI Development	4	6
	A7 Balancing with AI	3	5
B4 Cognitive Evaluation	A8 Assisting Teaching	9	20
	A9 Providing Learning Resources	4	6
	A10 Information Quality Level	3	5
	A11 Understanding Level	1	1
B5 Behavioral Intention	A12 High Usage Intention	3	3
	A13 Low Usage Intention	1	2
	A14 Moderate Usage Intention	8	13
B6 Emotional Attitude	A15 Positive Attitude	6	6
	A16 Negative Attitude	2	2
B7 Risk Perception	A17 Technology Anxiety	8	10
	A18 Information Quality Perception	6	9
	A19 Self-Risk Perception	4	10
	A20 Information Security Perception	4	6
B8 External Environment	A21 School Training	2	5
	A22 AI Development Trend	3	4
	A23 Community Influence	4	4
B9 Personal Factors	A24 Risk Concerns	6	6
	A25 Personal Biases	2	2
	A26 Personal Ability	3	4

4.3.3. Selective Coding

Table 4. Core Coding Table

Core Category	Main Categories
Usage Situation	Usage Frequency, Cost Situation, Future Suggestions
Willingness to Use	Cognitive Evaluation, Behavioral Intention, Emotional Attitude
Influencing Factors	Risk Perception, External Environment, Personal Factors

Selective coding involves choosing a "core category" from all discovered concept categories after systematic analysis. It aims to systemically explain and verify the relationships between primary and secondary categories by continuously analyzing and consolidating related secondary categories into the core category. This process also fills in future needs for refining or developing category concepts, ultimately clarifying the connections between main categories [12]. Through clustering coding nodes, three core categories were identified in the interview content: "Usage Situation," "Willingness to Use," and "Influencing Factors." The coding table is shown in Table 4.

4.4. Saturation Check

Table 5. Saturation Check Table

Interview Participant	Number of Codes	Number of Core Categories	Common Core Categories with Previous Participants	Newly Emerged Core Categories	Emerged Core Categories
T1-T9	228	3	-	3	-
T10	31	3	3	0	3
T11	30	3	3	0	3
T12	16	3	3	0	4

To ensure the reliability and validity of the study, a saturation check of the interview data was performed [13]. Theoretical saturation is achieved when new data no longer generates new concepts or categories. After completing selective coding, the reserved data was used for saturation testing, following the grounded theory method's procedures and principles with three-level coding. The results showed no new themes emerged during the coding process, indicating that valuable data from interviews had been thoroughly mined. The coding and model construction regarding university English teachers' willingness to use AI and influencing factors have reached theoretical saturation. The results are shown in Table 5.

5. Model Interpretation

5.1. Analysis of Teachers' Usage Situation and Willingness to Use

The study reveals that teachers' usage frequency of AI varies; most use it frequently, while some use it rarely or not

at all. Regarding cost situation, some teachers have invested time in self-learning and attending public lectures on AI, while others have not invested in learning AI. Consequently, their willingness to use AI differs. In terms of willingness, teachers' cognitive evaluation includes AI's advantages like saving time and improving lesson preparation efficiency, but also its disadvantages like insufficient development and providing repetitive or inaccurate information. AI-provided learning resources also affect teachers' perceptions. Most teachers show high intent to use AI to enhance teaching efficiency, while others show low or moderate intent. Furthermore, teachers' willingness is mainly influenced by risk perception, external environment, and personal factors.

5.2. Factors Influencing Teachers' Willingness to Use

5.2.1. Personal Factors

Personal factors determine whether teachers use AI, including risk concerns, personal biases, and personal abilities. Some teachers prefer traditional methods and see no need for AI, resulting in biases against it. AI, as a future trend, will significantly impact higher education institutions [14]. Teachers should overcome biases and embrace AI's potential. AI can enrich teaching methods and reduce workload, helping teachers design diverse courses.

5.2.2. External Environment

External factors indirectly influence teachers' willingness to use AI, including school training, AI development trends, and community influence. Many teachers find that while schools organize related lectures, the lack of systematic training and rapid AI updates mean that their abilities haven't significantly improved despite investing time. Positive community influence promotes AI use willingness. Many teachers learned about AI through colleagues or students and gradually began using it. School training quality, AI popularity, and community sharing of usage experiences and student feedback all impact teachers' willingness.

5.2.3. Risk Perception

Risk perception negatively correlates with willingness to use AI. The higher the perceived risk, the weaker the willingness to use AI. The study shows that nearly all teachers mentioned concerns about AI risks during interviews, including technology anxiety, information quality, self-risk, and information security. With AI development, new risks emerge, such as fears of replacement, weakened teacher-student relationships, incorrect information, privacy breaches, and academic idea leaks. In other words, teachers have trust issues with AI platforms.

6. Conclusion

This study, based on grounded theory and interviews with university English teachers, constructs a model of willingness to use AI and influencing factors. It finds that willingness is affected by various factors, including risk perception, external environment, and personal factors, with risk perception being the primary factor. The study provides theoretical and practical insights for improving AI educational tools and offers data support for the professional development and training of university English teachers.

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