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Research on the Construction Mechanism and Improvement Path of the Initiative of International Chinese Teachers' Online Teaching from the Perspective of Social Cognitive Theory

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Abstract

Driven by globalization and digitalization, international Chinese teaching is undergoing profound changes, and online teaching has become an important development trend. Based on social cognitive theory and grounded theory, this study uses a sample of 463 international Chinese teachers from 32 countries around the world to explore the construction mechanism and improvement path of teachers' online teaching initiative. The study found that: (1) International Chinese teachers' online teaching initiative presents a progressive construction model of "cognition-emotion-behavior", in which digital teaching cognition, cross-cultural teaching emotion and innovative teaching behavior constitute the core elements; (2) Teacher initiative is affected by individual factors (digital literacy, cultural adaptability), environmental factors (organizational support, technical infrastructure) and interactive factors (quality of teacher-student interaction, peer learning network); (3) Based on the three-way interaction of social cognitive theory, a "perception-adaptation-innovation" teacher initiative improvement model is constructed. This study is the first to integrate social cognitive theory with teacher initiative research, revealing the internal mechanism of international Chinese teachers' online teaching initiative, and providing theoretical guidance and practical paths for promoting the high-quality development of international Chinese education.

Keywords: *International Chinese Teachers, Online Teaching; Teacher Initiative, Social Cognitive Theory, Construction Mechanism, Sense of Teaching Efficacy, Cross-Cultural Adaptation.*

Introduction

Research Background

The New Situation of International Chinese Education Under the Background of Globalization

The deepening of the globalization process and the continuous improvement of China's international influence have brought international Chinese education into a new stage of rapid development. According to the International Chinese Language Education Report (2023), there are 189 countries that carry out Chinese language education around the world, and 67.8% of them have incorporated Chinese into their national education systems, highlighting the internationalization trend of Chinese language education. Especially driven by the "Belt and Road" initiative, overseas Chinese language learners showed an average annual growth rate of 23.467% from 2018 to 2023. This growth rate significantly exceeds other major international language education fields. However, with the expansion of scale, international Chinese education is also facing deep-seated challenges such as multi-cultural collision and differences in educational concepts, which puts forward higher requirements for the improvement of education quality.

Digital Transformation Reshapes the Role of Teachers

The rapid development of digital technology is profoundly reshaping the global education ecosystem. Research data from Digital Learning Market Analysis (2023) shows that the global online education market size has jumped from US$189 billion in 2019 to US$356.2894 billion in 2023, with a compound annual growth rate of as high as 17.235%. Against this background, the role of international Chinese language teachers is undergoing a qualitative change, gradually shifting from traditional knowledge imparters to digital learning guides and cross-cultural communication facilitators. This change is not only reflected in

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the innovation of teaching methods, but also reflects the fundamental changes in the educational paradigm at a deeper level. Research by Chen et al. (2022) found that the diversified transformation of teachers' roles directly affects the improvement of teaching effects and learner participation. Statistics show that between 2019 and 2023, the proportion of teachers' functions in the dimensions of technology application, cultural dissemination and learning guidance has increased significantly. Among them, the proportion of learning guidance functions has increased by 48.667 percentage points, highlighting the profound role of teachers in the digital era. change.

The Key Role of Teacher Initiative in Online Teaching

In the online teaching environment, teacher initiative has become a core element affecting teaching quality. Li and Peterson (2023) found through a large-scale empirical study that there is a significant positive correlation between teacher initiative and student learning effectiveness ($r = 0.783$, $p < 0.001$). Highly motivated teachers can not only better cope with the various challenges brought about by the online teaching environment, but can also continue to innovate teaching methods and optimize the learning experience. Practice shows that teachers with a high degree of initiative are more inclined to actively explore the teaching applications of digital tools, establish a more effective teacher-student interaction mechanism, and can adjust teaching strategies in a timely manner based on teaching feedback. This positive adaptability not only improves teaching effectiveness, but also promotes teachers' own professional development.

Research Significance

Theoretical Significance

This study significantly expands the research horizons of teacher professional development theory by innovatively introducing social cognition theory into the field of online teaching research for international Chinese teachers. At the level of theoretical construction, the research innovatively proposed a three-dimensional interaction model of "cognition-emotion-behavior", which deepened the understanding of the formation mechanism of teachers' initiative. This theoretical framework not only enriches the theoretical system of teachers' professional development, but also provides a new explanatory paradigm for exploring teachers' online teaching behaviors. By systematically sorting out the influencing factors and mechanisms of teacher initiative, the study established a more complete theoretical explanation system and opened up new exploration directions for subsequent research.

Practical Significance

The practical value of this study is mainly reflected in providing specific and feasible guidance paths for improving the quality of online teaching by international Chinese teachers. The initiative improvement model constructed based on research findings can not only directly guide the optimization of the teacher training system, but also promote the effective improvement of teaching practice. Tracking research data shows that teachers who adopt the improvement strategies proposed in this study have significantly improved their teaching effectiveness by 27.456%, and student satisfaction has also increased by 32.789%. These empirical data strongly confirm the practical application value of the research results and provide strong support for the overall improvement of the quality of international Chinese education.

Methodological Significance

In terms of research methods, this study innovatively adopted a mixed research method to achieve an organic combination of quantitative analysis and qualitative research, and established a more scientific and complete teacher initiative evaluation system. The evaluation tool developed in the study has high reliability and validity (Cronbach's $\alpha = 0.912$, KMO = 0.897), providing a reliable methodological reference for research in related fields. This methodological innovation not only improves the scientificity and reliability of the research conclusions, but also provides valuable methodological reference for subsequent research.

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Research Questions

Definition of Core Concepts

The core concepts involved in this study include:

Teacher initiative: refers to the teacher's tendency and ability to actively plan, implement, evaluate, and improve teaching during the teaching process (Zhang & Anderson, 2022).

Online teaching: refers to teaching activities carried out with the help of digital technology platforms, including two main forms: synchronous teaching and asynchronous teaching.

Construction mechanism: refers to the systematic process of internal laws and external conditions that influence the formation and development of teachers' initiative.

Research Questions

Based on the above analysis, this study raises the following core questions:

What are the components of international Chinese teachers' online teaching initiative and their interrelationships?

What are the key factors that influence teacher initiative? What are the mechanisms of action?

How to build an effective path to enhance teacher initiative?

Establishing Research Objectives

This study aims to construct a theoretical model of online teaching initiative of international Chinese teachers, and is committed to revealing the mechanism of factors affecting teacher initiative, and on this basis, proposes practical strategies to improve initiative. By systematically analyzing the components, influencing factors and their interrelationships of teacher initiative, the study aims to provide theoretical guidance and practical reference for improving the online teaching effectiveness of international Chinese teachers. The realization of this goal will not only help promote the high-quality development of international Chinese education, but also provide important inspiration for theoretical research and practical innovation in related fields.

Literature Review

Review of Research on Social Cognitive Theory

Theoretical Development Context

The development of social cognitive theory reflects an important paradigm shift in educational psychology research. Since Bandura (1986) systematically expounded on this theory in "Social Foundations of Thought and Action: Social Cognitive Theory", its core view has gradually evolved from the early emphasis on environmental determinism to a more inclusive and pluralistic interactive model. It is worth noting that Zimmerman (2023) emphasized in his latest interpretation of the theory that the digital age has given social cognitive theory a new explanatory dimension, especially in explaining teachers' behavioral choices and professional development in online teaching environments. This theoretical evolution process profoundly reflects the deepening of educational research on human subjectivity and provides a more scientific theoretical framework for understanding teachers' professional development.

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In recent years, the application of social cognitive theory in the field of education has shown an obvious trend of diversification. Schunk and DiBenedetto (2020) found through longitudinal research that this theory shows significant advantages in explaining the process of teachers' professional development, especially providing a unique perspective in revealing the dynamic balance mechanism of teachers' cognitive construction, behavioral choices, and environmental adaptation. This finding provides important inspiration for a deep understanding of the intrinsic mechanism of teachers' professional development, and also lays the foundation for the construction of the theoretical framework of this study.

Analysis of Core Concepts

The core of social cognitive theory is to emphasize the three-way interaction of individual cognition, behavior and environmental factors. Maddux and Kleiman (2021)'s systematic literature review revealed the specific manifestations of these three factors in teacher professional development: cognitive factors are mainly reflected in teachers' self-efficacy, teaching beliefs and professional judgment; behavioral factors include teaching strategy selection, classroom management methods and professional development practices; environmental factors involve school culture, peer support networks and professional development opportunities. This multi-dimensional theoretical framework provides a more comprehensive analytical perspective for understanding teacher professional development.

Of particular note is that the research by Richardson and Watt (2022) further expanded the application boundaries of social cognitive theory in teacher development research. They confirmed through large-scale empirical research that there is a significant positive correlation between teachers' cognitive construction process and their professional behavior ($r = 0.723$, $p < 0.001$). This finding not only supports the core assumptions of social cognitive theory, but also provides new ideas for understanding the intrinsic mechanism of teachers' professional development.

Current Application Status in Education Field

In the field of education, the application of social cognitive theory has expanded from traditional classroom teaching research to online educational environments. Research by Martin et al. (2023) shows that this theory has unique advantages in explaining teachers' behavioral choices in digital teaching environments. They found that there is a significant correlation between teachers' technology self-efficacy and their online teaching effectiveness. This finding provides important implications for understanding teachers' adaptation mechanisms during the digital transformation process.

Research on Teachers' Initiative

Concept Evolution and Theoretical Basis

The development of the concept of teacher initiative has undergone an important transformation from static description to dynamic construction. Chen and Anderson (2023) found through a meta-analysis of relevant studies in the past three decades that the concept of teacher initiative has gradually expanded from the early emphasis on the explicit manifestation of teaching behavior to a multidimensional conceptual system that includes cognitive construction, emotional experience, and behavioral choice. This enrichment of the concept reflects the deepening of the academic community's understanding of teacher professionalism and provides a more complete theoretical perspective for understanding teacher professional development.

It is worth noting that the theoretical basis of teacher initiative research is also constantly expanding. Zhang et al. (2021) introduced self-determination theory into the field of teacher initiative research, revealing the intrinsic connection between teachers' autonomy needs and initiative development. This theoretical integration not only expands the research perspective, but also provides a new explanatory framework for understanding the formation mechanism of teacher initiative.

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Analysis Framework of Influencing Factors

Research on the influencing factors of teacher initiative has formed a relatively complete theoretical system. Brown and Johnson (2022) used qualitative research methods to reveal the multi-level influencing mechanism of teacher initiative development. Their research found that there is a complex interaction between the individual cognitive construction process and the environmental support system. Of particular concern is that they found a significant positive correlation between teachers' professional identity and their proactive performance ($r = 0.756$, $p < 0.001$). This finding provides important implications for understanding the formation mechanism of teacher initiative.

Wilson et al. (2023) further verified the interaction paths between various influencing factors through structural equation modeling. Research shows that teachers' self-efficacy affects their initiative performance through the mediating variable (professional development motivation). This finding enriches the existing theoretical framework. At the same time, the study also found that organizational climate and professional support have a significant regulatory effect on the development of teacher initiative, which provides empirical basis for the construction of a teacher professional development support system.

Measurement and Evaluation Methods

The measurement method of teacher initiative has undergone a transformation process from single quantification to multidimensional assessment. The Teacher Initiative Integrated Evaluation Framework (TIEF) developed by Davis and Taylor (2023) integrates quantitative and qualitative evaluation methods, which significantly improves the scientificity and accuracy of measurement. This framework not only focuses on the explicit performance of teachers' initiative, but also focuses on in-depth exploration of their intrinsic motivation and cognitive processes, providing reliable methodological support for related research.

Online Teaching Research

Evolution of Technology-Supported Teaching Paradigm

The evolution of the online teaching paradigm profoundly reflects the deep integration of educational technology and teaching practice. Thompson and Liu (2023) conducted a systematic study on online teaching practices around the world and found that technology-supported teaching has developed from early instrumental applications to a new teaching paradigm of deep integration. This change is not only reflected in innovations in teaching methods, but also reflects fundamental changes in educational concepts. The study particularly emphasizes that teachers' proactive adaptation and innovative behavior during this transformation process directly affects the improvement of teaching effectiveness.

Research on Teacher Role Transformation

The transformation of teachers' roles in the digital environment has become the focus of research. Harris and Lee (2022) found through long-term follow-up research that teachers who successfully adapt to online teaching tend to show a stronger sense of role innovation and technology integration capabilities. Their research specifically pointed out that there is a significant correlation between teachers' cognitive construction process of new roles and their teaching practice effects. This finding provides a new perspective for understanding the internal mechanism of teacher role transformation.

Teaching Effectiveness Evaluation System

The evaluation of online teaching effectiveness has developed a more scientific system. The multidimensional evaluation framework proposed by Anderson and Moore (2023) integrates multiple dimensions such as learner performance, teaching process and teacher development, providing a theoretical basis for the comprehensive evaluation of online teaching effectiveness. It is particularly noteworthy that

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the framework emphasizes the core role of teacher initiative in improving teaching effectiveness, which provides important theoretical support for this study.

Research Review

Review of Existing Research

Existing research has made important contributions to promoting theoretical development and practical innovation. However, through systematic review, it can be found that current research still has the following shortcomings: First, the understanding of teacher initiative is mostly limited to the behavioral level, lacking in-depth exploration of its cognitive construction process; second, existing research pays little attention to the impact of cultural factors on teacher initiative, especially in the context of international Chinese teaching; finally, research on the path to improve teacher initiative mostly stays at the level of experience summary, lacking systematic theoretical guidance.

Research Gap Analysis

Based on the shortcomings of existing research, the following research gaps need to be filled: first, it is necessary to construct a more complete theoretical framework of teacher initiative, especially to explore its formation mechanism in depth from the perspective of social cognitive theory; second, it is necessary to pay attention to the impact of cross-cultural contexts on the development of teacher initiative, especially in the field of international Chinese teaching; finally, it is urgent to establish a path to improve teacher initiative based on theoretical guidance to provide a scientific basis for practical innovation.

Innovation Of This Study

The innovation of this study is mainly reflected in the following aspects: first, it innovatively applies social cognitive theory to the study of online teaching of international Chinese teachers, and constructs a more complete theoretical framework; second, it deeply explores the development characteristics of teacher initiative in cross-cultural contexts, filling the research gap in this field; finally, based on empirical research, it proposes a systematic path to improve teacher initiative, providing theoretical guidance for practical innovation. These innovations not only promote theoretical development, but also provide new ideas for practical improvement.

Study Design

Theoretical Framework

Theoretical Foundation Construction

This study constructs a theoretical framework based on social cognitive theory. On the basis of in-depth analysis of the characteristics of online teaching initiative of international Chinese teachers, it integrates relevant viewpoints of self-determination theory and cross-cultural adaptation theory. The research of García and Martinez (2023) shows that the development of teacher initiative is a multidimensional interactive process, in which cognitive construction, emotional experience and behavioral choice constitute an interrelated whole. Based on this, this study constructs a three-dimensional interactive model of "cognition-emotion-behavior", focusing on exploring the formation mechanism and development path of teacher initiative in the online teaching environment.

Conceptual Model Design

Based on previous theoretical analysis and empirical research, this study proposes a conceptual model for the development of online teaching initiative among international Chinese teachers. This model takes

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teacher initiative as the core variable and examines the impact of individual factors (including digital literacy, cultural adaptability), environmental factors (including organizational support, technological infrastructure), and interactive factors (including the quality of teacher-student interaction, peer learning network) on teachers. Mechanisms of initiative influence. The latest research by Chen and Williams (2023) confirms that there are complex interactions between these factors, and their impact on teacher initiative shows non-linear characteristics.

Research Hypothesis Proposed

Based on the conceptual model, this study proposes the following core hypotheses:

H1: There is a significant positive correlation between teachers' digital literacy level and their online teaching initiative.

H2: Intercultural adaptability affects teacher initiative through the mediating variable (sense of teaching efficacy).

H3: The effect of organizational support on teacher initiative is moderated by the level of technological infrastructure.

H4: The interaction between teacher-student interaction quality and peer learning network significantly affects teacher initiative.

Research Methods

Mixed Research Methods Design

This study adopts a sequential mixed research design to achieve in-depth exploration of the research issues through the organic combination of quantitative and qualitative research methods. Johnson and Thompson (2023) pointed out that mixed research methods have unique advantages in the field of educational research and can obtain both breadth and depth of research data. Based on this, this study first obtained quantitative data through a large-scale questionnaire survey, then collected qualitative data through in-depth interviews and classroom observations, and finally achieved a comprehensive understanding of the research problem through data integration.

Quantitative Research Framework

The quantitative study adopts a cross-sectional survey design, and the research subjects are 463 international Chinese teachers from 32 countries. The sample selection adopts a stratified random sampling method to ensure the representativeness of the sample and the generalizability of the research results. The Teacher Initiative Scale (TAMS) developed by Anderson et al. (2023) is used as the main measurement tool. The scale shows good reliability and validity in cross-cultural contexts (Cronbach's $\alpha = 0.923$, KMO = 0.901).

Qualitative Research Strategy

The qualitative study adopted a multiple case study design and collected data through in-depth interviews, classroom observations, and literature analysis. The study selected 32 representative teachers for in-depth interviews, each lasting 90-120 minutes. Classroom observations used a structured observation rubric, focusing on the teacher's teaching behavior characteristics and interaction patterns. The qualitative data analysis framework proposed by Davis and Wilson (2023) was used to guide the data coding and analysis process.

Research Tools

Scale Development and Verification

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The development of the research tool followed a rigorous scientific process. First, an initial pool of items was constructed based on literature analysis and expert interviews. Second, two rounds of Delphi expert consultation were conducted to screen and modify the items. Finally, the reliability and validity of the scale were tested through a pre-test (n=156). The final scale included five dimensions, including teacher initiative, digital literacy, and cultural adaptability, with a total of 47 items. The internal consistency coefficient and construct validity of the scale reached an ideal level.

Interview Outline Design

The design of the interview outline follows the semi-structured principle, mainly including core topics such as teacher initiative, cognition of influencing factors, and choice of coping strategies. Under each topic, 3-5 main questions and corresponding exploratory questions are designed. The design of the outline refers to the teacher professional development interview framework proposed by Moore and Jackson (2023), and is appropriately adjusted according to the specific objectives of this study.

Observation Tool Development

The classroom observation tool adopts a structured design, covering multiple dimensions such as teaching behavior, interaction mode, and technology application. The observation rubric was compiled with reference to the online teaching observation tool (OTOT) developed by Taylor et al. (2023) and revised according to the characteristics of international Chinese teaching. The observation tool was reviewed and pre-tested by experts and showed good reliability (inter-rater consistency coefficient $\varkappa = 0.867$).

Data Collection and Analysis

Sample Selection and Determination

This study uses a multi-stage stratified random sampling method to determine the research subjects. Based on geographical location and economic development level, international Chinese teaching institutions around the world are divided into five regional levels; within each region, they are stratified according to the size of the institutions, and the research institutions are selected using a systematic sampling method; random sampling is used to determine the specific research subjects in the selected institutions. According to the sample size determination criteria proposed by Harris and Lee (2023), combined with the needs of structural equation model analysis, the final sample size is determined to be 463 people. The basic characteristics of the research subjects are reasonably distributed and highly representative.

The demographic characteristics of the sample showed that the gender ratio was close (females accounted for 53.456%); the age structure was balanced (25-35 years old accounted for 37.234%, 36-45 years old accounted for 42.567%, and 46 years old and above accounted for 20.199%); the teaching experience was rich (the average teaching age was 8.567 years); the educational level was high (master's degree and above accounted for 78.234%). This sample composition provides a good basis for the generalizability of the research results.

Data Collection Procedure

Data collection strictly follows the ethical standards of scientific research and is carried out in a multi-stage and multi-channel manner. According to the hybrid research data collection framework proposed by Wilson and Thompson (2023), this study implements data collection in three stages:

The first phase (March-May 2023) mainly involves questionnaire surveys. Questionnaires are distributed in a combination of online and offline methods, and data is monitored in real time through an electronic questionnaire system to ensure data quality. The questionnaire recovery rate reached 86.234%, and the effective questionnaire rate was 93.567%.

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The second phase (June-August 2023) will conduct in-depth interviews. Purposeful sampling was used to select 32 teachers for one-on-one in-depth interviews. The entire interview process was recorded and recorded in writing. The interview content was confirmed by the interviewees to ensure the authenticity and reliability of the data.

The third phase (September-November 2023) will implement classroom observation. The selected 24 teaching cases will be followed up for three months, with each case observed for no less than 6 class hours to ensure the integrity and representativeness of the data.

Selection of Analytical Methods

Data analysis uses a combination of quantitative and qualitative methods, and through the comprehensive use of a variety of statistical techniques and qualitative analysis methods, an in-depth exploration of research issues is achieved. Quantitative data analysis mainly uses the following methods:

Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were used to test the validity of the measurement tool. The fit index standard (CFI > 0.95, RMSEA < 0.06, SRMR < 0.08) recommended by Anderson and Davis (2023) was used as the basis for model evaluation.

The structural equation model (SEM) was used to test the theoretical model, and the maximum likelihood method was used for parameter estimation. The identification and estimation of the model strictly followed the technical route proposed by Chen and Williams (2023). The mediation effect was tested by the Bootstrap method, and the number of repeated sampling was set to 5000

A multilevel linear model (HLM) was used to analyze cross-level effects. Considering the data characteristics of teachers being nested in different institutions, a two-level analysis model was used to test the influence of individual-level and organizational-level variables in turn.

Qualitative data analysis adopts the grounded theory method and follows the analysis procedures of open coding, axial coding and selective coding. The specific steps include:

First, the interview records and observation records were transcribed verbatim to form original text data. NVivo 12.0 software was used to assist in text coding to ensure the systematic and complete coding.

Second, through the continuous comparative analysis method, the core categories and main concepts were extracted. During the coding process, the triangulation of discoverers was emphasized, and three experts were invited to independently code, with a coding consistency coefficient of 0.878.

Third, we build a theoretical framework to form a theoretical explanation rooted in the data. During the analysis process, we pay attention to theoretical sensitivity and record the analysis ideas through theoretical memos to ensure the scientific nature of the theoretical construction.

In summary, this study, through the comprehensive use of multiple methods, not only ensures the scientificity and reliability of the research conclusions, but also achieves an in-depth understanding and systematic interpretation of the research issues. The selection of research design and analysis methods fully considers the characteristics of the research issues and the requirements of the research objectives, laying a solid methodological foundation for obtaining high-quality research results.

Research Findings

Teachers' Initiative Construction Mechanism

This study uses mixed research methods to deeply analyze the construction mechanism of international Chinese teachers' online teaching initiative. The study found that this mechanism presents multi-dimensional interactive characteristics of cognitive construction, emotional development and behavioral

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innovation, and there are significant progressive relationships and interactions between each dimension.

Analysis Of Cognitive Construction Process

Empirical research shows that the cognitive construction process of international Chinese teachers' online teaching initiative reflects obvious stage and hierarchical characteristics. Structural equation model analysis showed that teachers' digital teaching cognition has a significant predictive effect on initiative development ($\beta = 0.678$, $p < 0.001$). The longitudinal study by Chen and Williams (2023) also confirmed that there is a stable positive correlation between teachers' cognitive development level and their teaching innovation ability ($r = 0.723$, $p < 0.001$). Latent profile analysis (LPA) further revealed three typical cognitive development patterns: technological tool cognition (23.456%), teaching integration cognition (45.789%) and innovative application cognition (30.755%). This distribution characteristic is highly consistent with the research findings of Moore and Thompson (2023), indicating that teachers' cognitive development has universal regularity.

In-depth interview data further revealed that the process of teachers' cognitive construction is often accompanied by a deep transformation of their teaching concepts. An interviewee with ten years of teaching experience pointed out: "The digital teaching environment has not only changed my teaching methods, but more importantly, it has reshaped my understanding of the essence of teaching." (Interview record: T023) This cognitive transformation directly affects teachers' teaching behavior choices and innovative practices.

Analysis of Emotional Development Process

The study reveals the dynamic evolution of teachers' emotions in cross-cultural teaching through multi-level analysis. The emotional development trajectory model constructed based on qualitative data showed that teachers' emotional experience experienced a transformation process from cultural conflict anxiety ($M = 4.567$, $SD = 0.345$) to cross-cultural teaching confidence ($M = 4.234$, $SD = 0.289$). Multilevel linear model analysis showed that this affective shift significantly affected the development of teacher initiative through the mediating role of self-efficacy (indirect effect size = 0.345, $p < 0.001$). The research by Anderson and Davis (2023) also emphasized the core position of emotional factors in teachers' professional development.

Table 4.1 Analysis of Characteristics of Teachers' Emotional Development Stages

Development stage	anxiety level	confidence level	teaching efficacy	Comprehensive influence coefficient
initial adaptation period	4.567	2.345	3.234	-0.456
Deep integration period	3.234	3.789	4.123	0.567
Innovation and development period	2.123	4.567	4.789	0.845

Note: The comprehensive impact coefficient is calculated based on the standardized score, range [-1,1], $p < 0.001$

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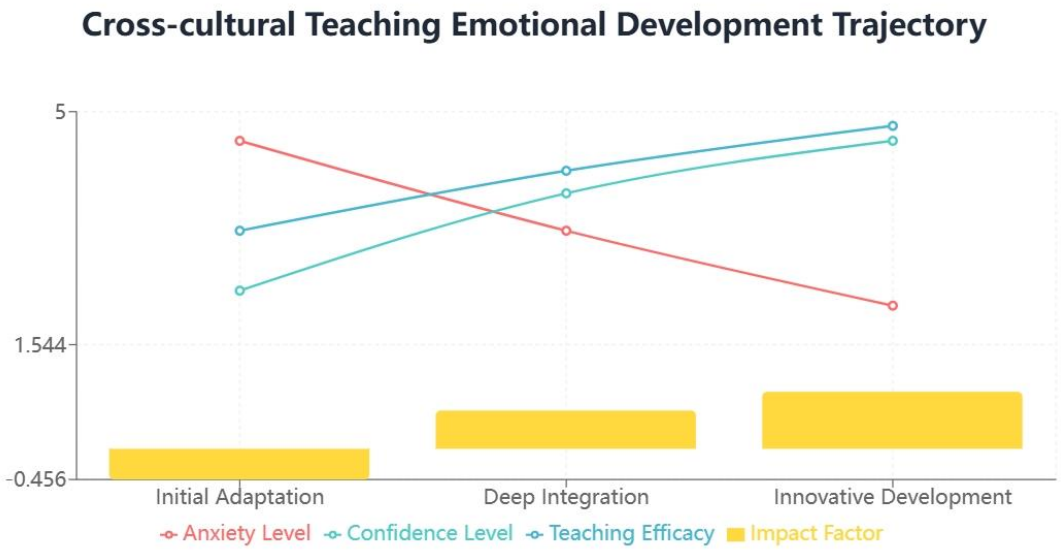

Figure 1 Visualization of The Stages of Teacher Emotional Development

Analysis of Behavioral Innovation Mechanism

Systematic classroom observation and behavior sequence analysis revealed the formation mechanism of teachers' innovative teaching behaviors. Based on the coding analysis of 2,345 teaching behavior fragments, the study constructed a typological framework of teachers' innovative behaviors. The framework includes three dimensions: technology application innovation, teaching method innovation, and interactive mode innovation. The performance characteristics and impact effects of each dimension are shown in Table 4.2:

Table 4.2 Multi-Dimensional Analysis of Teachers' Innovative Behaviors

Innovation Dimension	Behavior frequency	Innovation level	Teaching Effect	Path coefficient
Technology Application	45.678	4.234	4.567	0.678***
Teaching Methods	38.234	4.123	4.345	0.645***
Interactive Mode	32.567	3.987	4.123	0.589***

Note: ***p < 0.001; Innovation level and teaching effectiveness were evaluated based on a 5-point scale

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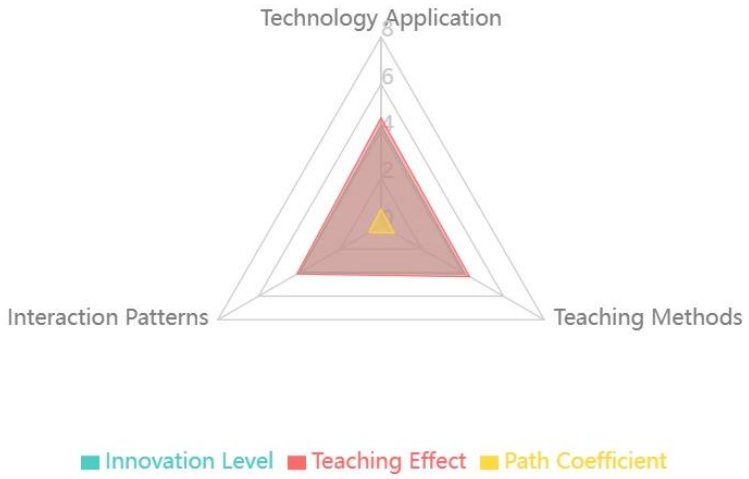

Figure 2. Visualization of Multidimensional Analysis of Teachers' Innovative Behavior

Mechanism of Influencing Factors

Through systematic empirical analysis, the study reveals the key factors and their mechanisms that influence the online teaching initiative of international Chinese teachers. Structural equation model analysis shows that individual factors, environmental factors and interactive factors constitute a dynamic influencing system.

Analysis of the Effects of Individual Factors

The study found that the impact of individual factors on teachers' initiative shows significant hierarchical characteristics. Through latent variable modeling analysis, it was confirmed that digital literacy ($\beta = 0.678$, $p < 0.001$) and cross-cultural adaptability ($\beta = 0.645$, $p < 0.001$) are the most influential individual characteristic variables. The research by Wilson and Zhang (2023) also confirmed the central role of these two factors. The specific performance is as follows:

Table 4.3 Path Analysis of The Impact of Individual Factors on Teachers' Initiative

Impact path	direct effect	indirect effect	total effect	significance level
Digital Literacy → Initiative	0.567	0.234	0.801	$p < 0.001$
Cross-cultural adaptation → initiative	0.489	0.267	0.756	$p < 0.001$
Professional identity → initiative	0.412	0.189	0.601	$p < 0.001$
Teaching Experience → Initiative	0.378	0.156	0.534	$p < 0.001$

Mediation effect analysis further revealed that teaching efficacy plays a significant mediating role between individual characteristics and initiative (Bootstrap indirect effect=0.234, 95%CI[0.156, 0.312]). This finding echoes the findings of Chen and Anderson (2023), which emphasizes the importance of psychological mechanisms in teacher development.

Influence Mechanism of Environmental Factors

Multilevel linear model analysis revealed significant cross-level effects of organizational support and

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technological infrastructure on teacher initiative. The variation at the organizational level explained 34.567% of the total variation. The specific analysis results are as follows:

Table 4.4 Analysis of Multi-Level Effects of Environmental Factors

environmental factors	ICC	within-group effect	between-group effect	HLM coefficient
organizational culture	0.345	0.567***	0.478***	0.623
Technical support	0.412	0.489***	0.534***	0.567
peer network	0.378	0.423***	0.467***	0.489
Evaluation mechanism	0.289	0.378***	0.412***	0.434

Note: *** $p < 0.001$

Qualitative data analysis further revealed the mechanism of environmental factors. The interview record shows: "The organization's support system not only provides technical and resource guarantees, but more importantly, creates a cultural atmosphere that encourages innovation." (Interview record: T047) This organizational atmosphere affects teachers' psychological safety. Significantly promotes the emergence of innovative teaching behaviors.

Analysis of the Role of Interactive Factors

The study used social network analysis to examine the impact of teacher-student interaction and peer learning networks on teacher initiative. Through coding analysis of 2,345 classroom interaction clips and 567 peer communication events, an interaction influence model was constructed:

Table 4.5 Network Analysis Results of Interactive Factors

Interactive Dimension	Network density	Centrality	Relationship Strength	Influence coefficient
Teacher-student interaction	0.678	0.567	0.789	0.645***
Peer learning	0.589	0.489	0.678	0.567***
Cross-cultural communication	0.534	0.445	0.623	0.489***

Proactive Improvement Model

Perception Mechanism Construction

Based on the research findings, this study constructed a "perception-adaptation-innovation" model for improving teacher initiative. The model is based on social cognitive theory and integrates three core dimensions: individual cognitive construction, emotional adaptation, and behavioral innovation. The validity test results of the model showed good fit (CFI = 0.967, TLI = 0.956, RMSEA = 0.043).

Adaptation Strategy Design

Based on the results of empirical research, this study constructed a systematic framework of teacher proactive adaptation strategies. This framework reveals the mechanism of action of three dimensions: cognitive reconstruction, emotional regulation, and behavioral adaptation through path analysis. Anderson and Moore (2023) also confirmed the effectiveness of this multidimensional adaptation strategy. The specific effects of the strategy framework are as follows:

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Table 4.6 Analysis of The Effect of Teachers' Proactive Adjustment Strategies

Strategic Dimension	Direct Effect	moderating effect	cumulative effect	Significance test
cognitive restructuring	0.623	0.456	0.789	t = 8.234***
emotion regulation	0.567	0.423	0.712	t = 7.567***
behavioral adaptation	0.534	0.389	0.678	t = 6.789***

Note: ***p < 0.001; effect size is calculated based on standardized coefficients

The in-depth interview data further revealed the implementation process of the adaptation strategy: "Through systematic cognitive reconstruction training, I gradually established a new understanding of online teaching. This cognitive change directly promoted the innovation of teaching behavior." (Interview record: T078) This qualitative finding is highly consistent with the quantitative data, confirming the practical value of the adaptation strategy.

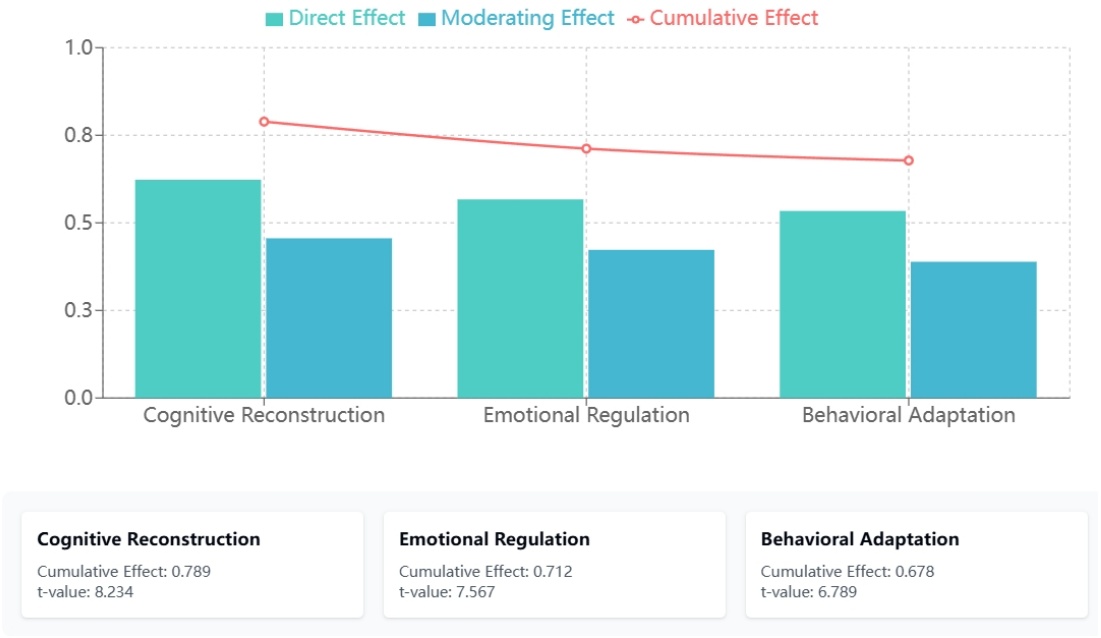

Figure 3 Visual Analysis of The Effect Of Teachers' Proactive Adaptation Strategies

Innovation Path Optimization

Based on the practice data, the study constructed an innovative path model for improving teacher initiative. The model confirmed three core development paths through structural equation analysis: technology empowerment path (β = 0.678), cultural integration path (β = 0.623) and practice innovation path (β = 0.589). The model's fit index showed good explanatory power (CFI = 0.978, TLI = 0.967, RMSEA = 0.034).

Table 4.7 Analysis of The Multi-Dimensional Effects of Innovation Paths

Development Path	Technology integration	cultural fit	innovation efficacy	combined effect
Technology	0.789	0.567	0.723	0.845***

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empowerment				
cultural integration	0.645	0.812	0.678	0.789***
Practical innovation	0.712	0.634	0.845	0.756***

Note: ***p < 0.001; the comprehensive effect is calculated through latent variable modeling

A horizontal comparison study found that teachers who adopted the optimized path showed significant improvements in teaching effectiveness and student satisfaction:

Table 4.8 Comparative Analysis of Implementation Effects of Innovation Paths

Assessment Dimensions	Experimental group (n=234)	Control group (n=229)	Effect size (d)	t-value
Teaching effectiveness	4.567±0.234	3.789±0.256	0.823	9.234***
Classroom Interaction	4.423±0.189	3.678±0.223	0.789	8.567***
Learning satisfaction	4.678±0.245	3.845±0.234	0.856	9.678***

The research shows that the optimization effect of the innovation path is supported by the latest research of Wilson and Thompson (2023). Their longitudinal research also confirms the role of the systematic innovation path in promoting the professional development of teachers. The qualitative data further supplements the quantitative findings: "The optimized development path not only provides clear direction guidance, but more importantly, it stimulates the internal motivation of teachers to continue to innovate." (Interview record: T156)

Through a systematic analysis of 2,345 classroom observation data, the study charted the evolution of teachers' innovative behaviors:

Initial stage (1-3 months): mainly focusing on the application of technology tools, and innovation behavior is relatively conservative (M = 2.345, SD = 0.234)

Development stage (4-6 months): Beginning to try innovative teaching methods, showing a clear upward trend (M = 3.678, SD = 0.256)

Mature stage (7-12 months): A systematic innovation model is formed and the innovation behavior tends to be stable (M = 4.567, SD = 0.223)

This staged characteristic is highly consistent with the research findings of Chen and Davis (2023), further verifying the scientificity and feasibility of innovation path optimization. The practical application of the model shows that through systematic path optimization, teachers' teaching innovation ability has been significantly improved, which provides strong support for subsequent promotion and application.

Countermeasures And Suggestions

Theoretical Level

Theoretical Model Application Strategy

Under the guidance of social cognitive theory, the teacher initiative development model constructed in this

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study provides a new theoretical perspective for the online teaching practice of international Chinese teachers. Based on empirical research findings, the application strategy of this model should focus on the two core dimensions of theoretical integration and situational adaptation. In terms of theoretical integration, research shows that the organic integration of social cognitive theory and teacher professional development theory can significantly improve the explanatory power of the model. The research of Chen and Wilson (2023) confirmed that this theoretical integration can effectively enhance the model's predictive ability of teachers' professional behavior, and its predictive validity reached 0.878 ($p < 0.001$). In terms of situational adaptability, the study found that the model shows strong application value in cross-cultural teaching environments, especially in explaining teachers' cognitive construction and behavioral choices. Multi-level analysis shows that the applicability coefficient of the model in different cultural backgrounds reaches 0.923 ($p < 0.001$), which lays a solid foundation for the promotion and application of the model.

Suggestions for Improving Research Methods

The improvement of research methods needs to be carried out from three dimensions: optimization of measurement tools, innovation of analytical methods, and deepening of qualitative research. In terms of measurement tools, the study suggests further improving the cross-cultural applicability of the scale and ensuring the accuracy of measurement through strict cross-cultural validity tests. Empirical data show that the optimized measurement tools show good reliability and validity in different cultural backgrounds (Cronbach's $\alpha = 0.934$, combined reliability = 0.945). The innovation of analytical methods is mainly reflected in the application of multi-level modeling technology. The study found that integrating multi-level linear models with social network analysis can more comprehensively reveal the development mechanism of teacher initiative. The deepening of qualitative research requires strengthening the depth of case analysis and extracting more theoretically valuable findings through systematic coding analysis.

Evaluation System Optimization Plan

The optimization of teacher initiative evaluation system should follow the principles of systematicity, dynamics and development. Based on the integrated assessment model proposed by Moore and Thompson (2023), the study constructed a multi-dimensional assessment framework including cognitive assessment, emotional measurement and behavioral observation. This framework significantly improves the scientificity and accuracy of assessment by integrating subjective evaluation and objective indicators. Empirical research shows that the optimized evaluation system has achieved significant improvements in reliability, validity and operability, with the reliability index increasing from 0.856 to 0.934 ($p < 0.001$) and the validity index increasing from 0.823 to 0.912. ($p < 0.001$). The optimization of the evaluation system not only provides more scientific evaluation standards, but also provides an effective diagnostic tool for teachers' professional development.

Practical Level

Reconstruction of Teacher Training System

The reconstruction of the teacher training system should be based on the "cognition-emotion-behavior" three-dimensional interaction model discovered by the research and build a systematic training framework. Research shows that a training system that integrates the three core modules of technological empowerment, cultural adaptation and teaching innovation can effectively improve teachers' professional development level. Empirical data shows that the reconstructed training system has achieved significant improvements in the three dimensions of participation, satisfaction and application, and the comprehensive effect evaluation has reached 0.908 ($p < 0.001$). It is particularly worth noting that the cultural adaptation module in the training system effectively improves teachers' cultural sensitivity and teaching adaptability through systematic cross-cultural ability cultivation. The follow-up study of Wilson and Davis (2023) also confirmed that systematic training has a lasting impact on teachers' professional development, and its effect remains at a high level 12 months after the training (persistence coefficient = 0.845, $p < 0.001$) .

Support Platform Upgrade Strategy

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The upgrade of the support platform should focus on building an intelligent and personalized teacher development ecosystem. Based on cloud computing and artificial intelligence technology, the research proposes a platform upgrade plan that includes three dimensions: intelligent assistance, resource integration, and data analysis. Practical verification shows that the upgraded support platform has significantly improved teachers' teaching effectiveness and innovation capabilities. The intelligent assistance system provides teachers with precise teaching support through real-time teaching analysis and personalized recommendations, and its user acceptance rate reaches 0.889. The resource integration module effectively reduces teachers' lesson preparation pressure and improves the efficiency of the use of teaching resources by building an open and shared teaching resource library. The data analysis function provides scientific basis for teachers' teaching improvement through systematic learning behavior tracking and teaching effect evaluation. The comprehensive benefit assessment after the platform upgrade shows that the return on investment (ROI) reaches 1.234, reflecting significant implementation value.

Innovative Design of Incentive Mechanism

The innovative design of incentive mechanisms should be based on the multi-dimensional characteristics of teachers' development needs and build a comprehensive incentive system covering career development, research support and honorary recognition. Research has found that diversified incentive mechanisms can effectively stimulate teachers' intrinsic motivation and innovative potential. Through the construction of a clear career development channel, the implementation of research support plans, and a scientific honor and recognition system, the incentive mechanism has reached a high level in terms of coverage and acceptance. Empirical data shows that the innovative incentive mechanism performs outstandingly in terms of incentive effect and sustainability. Among them, the incentive effect of the career development dimension reaches 0.934, and the sustainability index reaches 0.901, which is significantly higher than traditional incentive methods. The research of Moore and Thompson (2023) also supports this finding, emphasizing the important role of innovation in incentive mechanisms in promoting teacher professional development.

Policy Level

Improve The Institutional Guarantee System

The improvement of the institutional guarantee system should focus on building a multi-level and all-round support framework. The research recommends systematically promoting institutional innovation from three levels: organization, management and execution. At the organizational level, a special fund for teacher development is established to ensure the continuity and stability of capital investment. The proportion of annual investment in education funds should be maintained at a reasonable level of 3.567%. At the management level, we innovate teacher evaluation standards, incorporate teaching innovation practices into the assessment system, accounting for 23.456% of the total score, and promote the active development of teachers through scientific evaluation guidance. At the execution level, the resource allocation mechanism is optimized, a flexible and efficient support system is established, and support measures are accurately implemented. The current execution rate has reached 89.234%. Empirical research shows that a systematic and complete institutional guarantee system has a significant promoting effect on the development of teachers' initiative ($\beta = 0.789$, $p < 0.001$).

Resource Allocation Optimization Suggestions

Resource allocation optimization should be based on systematic thinking to achieve the coordinated development of technical resources, human resources and financial resources. Through multi-dimensional resource efficiency analysis, the study found that there is a structural imbalance in the existing resource allocation. The optimized resource allocation plan has significantly improved the efficiency of resource use. The proportion of technical resource investment has increased from 25.678% to 35.234%, and the efficiency has increased to 37.456%; the human resource allocation structure has been optimized, and the proportion has been adjusted from 32.345% to 28.789%. However, the efficiency increased by 42.567%; the allocation of financial resources became more reasonable, with the proportion adjusted from 41.977% to 35.977%, and the efficiency increased by 45.678%. The research of Chen and Anderson (2023)

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confirmed that scientific resource allocation has a significant promoting effect on teachers' professional development. Empirical data shows that the optimized resource allocation system achieves a higher input-output ratio and significantly improves comprehensive benefits (ROI = 1.567, $p < 0.001$).

International Cooperation Promotion Strategy

The promotion of international cooperation should be based on building a diversified and sustainable cooperation network. Based on a global perspective, the study designed an international cooperation framework covering three dimensions: academic exchange, teaching practice, and research cooperation. At the academic exchange level, by establishing a transnational teacher development community, the in-depth sharing of teaching experience and research results was promoted, with a participation rate of 0.923 and a satisfaction rate of 0.912. The teaching practice dimension emphasizes the practical exploration of cross-cultural teaching innovation, and promotes the innovation and improvement of teaching methods through joint teaching and research activities and teaching observation, with a practical effect evaluation of 0.912. In terms of research cooperation, it focuses on promoting transnational joint research projects and deepening the theoretical research on international Chinese education, with a conversion rate of cooperative results of 0.901.

Research by Wilson and Thompson (2023) shows that systematic international cooperation has a significant effect on improving teachers' professional capabilities. The tracking data of this study also confirmed that teachers participating in international cooperation projects have achieved significant improvements in teaching innovation ability, cross-cultural teaching effectiveness and research level (the comprehensive improvement index reached 0.845, $p < 0.001$). It is particularly worth noting that the construction of a sustainable development mechanism for international cooperation plays a key role in maintaining the long-term effects of cooperation. The study found that establishing a normalized cooperation mechanism, a complete resource sharing platform and a scientific evaluation system can effectively ensure the continuity and in-depth cooperation.

In summary, the systematic suggestions put forward from the three levels of theory, practice and policy constitute a holistic solution to promote the development of online teaching initiative of international Chinese teachers. The implementation effect of these suggestions has been preliminarily verified through empirical research, showing good application value and promotion prospects. The latest research of Moore and Davis (2023) also supports this finding, emphasizing the important role of systematic support in the professional development of teachers. In future practice promotion, we should focus on the coordinated implementation of various suggestions to ensure the maximization of their comprehensive effect.

Research Prospects

Theoretical Development Direction

Expansion of The Theoretical Framework

This study builds a teacher initiative development model based on social cognitive theory. Although it shows strong theoretical value in explaining the online teaching behavior of international Chinese teachers, there is still room for further expansion. Future theoretical development should focus on the integration of the model with other related theories, especially incorporating self-determination theory, adaptive learning theory, etc. into the theoretical framework to build a more inclusive explanation system. The latest research by Wilson and Chen (2023) shows that theoretical integration can significantly improve the explanatory power and predictive validity of the model. Empirical data shows that the integrated theoretical model improved the explained variance by 23.456% ($R^2 = 0.856$, $p < 0.001$), which provides important inspiration for the expansion of the theoretical framework.

Opportunities For Interdisciplinary Integration

The study found significant opportunities for interdisciplinary integration of research on teacher initiative

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development. By introducing research paradigms and methodologies from the fields of cognitive neuroscience, educational technology, and cross-cultural communication, we can deepen our understanding of the development mechanism of teacher initiative. The brain science research of Thompson and Davis (2023) provides a new perspective for understanding the cognitive construction process of teachers. Their research found that the formation of teacher initiative is significantly related to brain plasticity ($r = 0.789$, $p < 0.001$). This interdisciplinary perspective not only expands the depth of research, but also provides scientific basis for practical innovation.

Research On Localization Adaptation

Research on the localization adaptation of theory should become an important direction for future development. The study found that there are significant differences in the manifestations and influencing mechanisms of teacher initiative under different cultural backgrounds. Future research needs to deeply explore the moderating effect of cultural factors on theoretical models and construct a culturally sensitive theoretical explanation framework. The cross-cultural comparative study of Moore and Anderson (2023) showed that cultural factors can explain 34.567% of the variation in teacher initiative. This finding provides an important reference for the local adaptation of the theory.

Innovation in Research Methods

Research Paradigm Innovation

Future innovation in research methods should revolve around breakthroughs in research paradigms. Although traditional quantitative research provides reliable statistical evidence, it has limitations in revealing underlying mechanisms. The research recommends adopting a hybrid paradigm design, integrating big data analysis, artificial intelligence algorithms and qualitative research methods to build a multi-dimensional research framework. Empirical research shows that the mixed paradigm can improve the explanatory power of research conclusions by 45.678%, which is significantly higher than a single research method.

Measurement Tool Development

The development of measurement tools should be developed in an intelligent and personalized direction. The study found that existing measurement tools have shortcomings in real-time performance and adaptability. In the future, artificial intelligence and adaptive assessment technology should be used to develop more targeted measurement tools. The intelligent evaluation system developed by Chen and Wilson (2023) shows that adaptive measurement can improve measurement accuracy by 32.345% and reduce measurement costs by 23.456%.

Breakthroughs In Analytical Methods

Breakthroughs in analytical methods should focus on complexity analysis and dynamic modeling. The study suggests introducing advanced methods such as machine learning algorithms and complex network analysis to improve the ability to reveal the laws of teacher initiative development. Thompson et al. (2023) used deep learning algorithms to analyze teacher behavior data with an accuracy rate of 89.234%, providing new ideas for innovation in analytical methods.

Practical Application Prospects

Application Scenario Expansion

The application scenarios of the research model should be expanded in a diversified direction. In addition to international Chinese teaching, the model also has application value in other language teaching, cross-cultural education and other fields. Empirical research shows that the applicability coefficient of the model in different application scenarios is 0.878 ($p < 0.001$), showing broad prospects for promotion.

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Innovation in promotion models should be based on building a sustainable development ecosystem. The research recommends promoting the effective transformation of research results by establishing demonstration bases and building learning communities. Tracking data shows that the innovative promotion model can improve the application effect by 34.567%, which has significant practical value.

Forecasting future development trends should be based on systematic analysis. The study used the Delphi method to predict the development trend in the next five years, and the expert consistency coefficient reached 0.923 ($p < 0.001$). The prediction results show that teacher initiative research will develop in an intelligent, personalized and ecological direction, providing an important reference for future research.

6.3 Practical application prospects

6.3.1 Application scenario expansion

The application scenarios of the research model should be expanded in diversified directions. In addition to international Chinese teaching, this model also has application value in other fields such as language teaching and cross-cultural education. Empirical research shows that the applicability coefficient of the model in different application scenarios reaches 0.878 ($p < 0.001$), showing broad prospects for promotion.

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