



Research on the Current Status and Innovative Pedagogical Models of the “Academic-Teaching-Instructing” Tripartite Teacher-Student Relationship from an AI-Enabled Perspective

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Abstract

Against the backdrop of deep integration between artificial intelligence and higher education, the traditional one-dimensional teaching model of teacher-student relationships at universities has struggled to meet the demands of nurturing talents in the new era. The “trinity” teacher-student relationship—encompassing academic research, classroom teaching, and growth instructing—has become a crucial vehicle for universities to fulfill the fundamental mission of fostering virtue and talent, as well as to establish a comprehensive education system. This study employs a mixed-methods approach combining questionnaire surveys and semi-structured interviews, targeting university students, frontline instructors, and academic advisors as research subjects. It systematically examines the evolving realities of the trinity teacher-student relationship following the integration of AI technologies into university education settings, identifies practical challenges in current educational practices, clarifies the genuine needs of both teachers and students regarding AI-enhanced education models, and explores feasible, scalable innovative pathways for collaborative teacher-student education. The findings provide practical references for universities to optimize teacher-student relationships and refine their integrated education systems through the assistance of artificial intelligence.

Subject Areas

Pedagogy

Keywords

AI Empowerment, Three-in-One Teacher-Student Relationship, Academic Teaching Guidance, Educational Model

1. Introduction

In order to better implement the spirit of the Ministry of Education's "Action Plan for Artificial Intelligence Innovation in Higher Education Institutions" (Teaching Techniques [2018] No. 3) [1], with the arrival of the digital intelligence era, AI intelligent technology has fully penetrated various educational scenarios such as classroom teaching, academic research, student management and growth at universities [2]. The traditional teacher-student relationship at universities, which focuses on imparting knowledge in the classroom, has the characteristics of emphasizing teaching, neglecting academia, and weak instructing, resulting in a single form of teacher-student interaction, narrow communication channels, and fragmented dimensions of education. With the continuous promotion of high-quality development of higher education, universities are increasingly emphasizing the construction of a comprehensive education system that integrates academic guidance, classroom teaching, ideological growth, and career planning. The "academic research-classroom teaching-growth instructing" three-in-one teacher-student relationship has emerged [3]. The three core components of this new teacher-student relationship are the dimensions of classroom teaching, academic research, and growth instructing. These three dimensions are interrelated and synergistically empower, collectively forming the core framework of teacher-student interaction and educational work in the digital era [4]. Among them, the classroom teaching dimension focuses on foundational educational behaviors such as knowledge transmission, homework assistance, and teaching interaction between teachers and students; the academic research dimension emphasizes academic empowerment behaviors, including fostering students' research thinking, guiding academic projects, assisting with thesis writing, and enhancing research capabilities; the growth instructing dimension encompasses comprehensive growth support behaviors, such as guiding students' ideological development, providing mental health counseling, offering assistance with campus life, and delivering career planning guidance.

The intervention of artificial intelligence has not only built a digital communication bridge for the new teacher-student relationship, broadened the boundaries of teacher-student interaction, and improved the efficiency of education work, but also brought about many practical problems such as the fragmentation of the education sector, lack of personalized guidance, weakened emotional connections, and improper use of technology. In this context, accurately understanding the current development status of the three-in-one teacher-student relationship empowered by AI, solving practical problems in education, and innovating collaborative education models have become important topics in current higher education research.

This study conducted dual-empirical research through distributing questionnaires and interviews to truly grasp the actual experience, existing pain points, and development demands of teachers and students in using AI for education. It clarified the functional positioning of AI and teachers in education work, and provided real data support and practical countermeasures for universities to build an integrated AI education platform, formulate AI campus application standards, optimize teacher-student interaction mechanisms, and create a three-in-one efficient education model [5]. At the same time, by sorting out the dimensions and operational logic of the three-in-one teacher-student relationship from the perspective of AI, this study aims to enrich the relevant research results of AI empowering the teacher-student relationship in higher education, and improve the theoretical system of collaborative education at universities in the digital age [6], and provide research ideas and paradigm references for similar academic research in the future.

2. Research Design

The purpose of this survey is to understand the current status of the “Academic-Teaching-Instructing” three-in-one teacher-student relationship from the perspective of AI empowerment, in the context of the deep integration of artificial intelligence and higher education. It aims to reflect the overall development trend of the AI empowered three-in-one teacher-student relationship, grasp common issues and mainstream needs, and grasp the overall research trend (Figure 1).

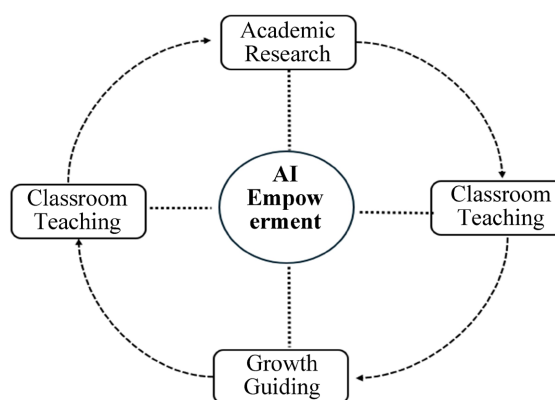


Figure 1. “Academic-Teaching-Instructing” three-in-one teacher student relationship empowered by AI.

2.1. Research Subject

The current survey strictly distinguishes between questionnaire respondents and interviewees, clearly defining the statistical subjects and applicable scopes for each type of data. among which the questionnaire survey mainly selected undergraduate students from Zhejiang Yuexiu University as the survey subjects. All questionnaire statistical data in the text are based on the 190 valid student questionnaires in this study, with all quantitative conclusions referring to the student population

and excluding teacher sample data. To ensure sample coverage and diversity, students are covered in different grades and disciplines, including college students in science and engineering, humanities and social sciences, and arts and sports. The structured interview mainly selects professional course teachers, instructors, teaching managers, and representatives of students at different levels from Zhejiang Yuexiu University to conduct one-on-one in-depth interviews, taking into account the dual perspectives of frontline educators and learners and realizing bidirectional data complementarity between teachers and students.

2.2. Research Methods and Content

This study adopts a research approach that combines empirical research and qualitative analysis, integrating quantitative data with qualitative perspectives to ensure comprehensive, objective, and truthful research results. The main research methods used are questionnaire surveys and structured interviews. At the same time, this study strictly adheres to academic research ethics standards, implements informed consent, privacy confidentiality, data storage, and ethical review requirements throughout the process, and ensures compliance, rigor, and standardization in the research process.

Firstly, questionnaire survey method. The questionnaire design mainly includes four core contents, namely basic information, the current development status of AI empowered teacher-student relationships, the existing educational difficulties in teacher-student relationships, and the demand for innovative AI education models. In addition to basic information, the other three core contents are designed around three dimensions: classroom teaching, academic research, and growth counseling. The questionnaire adopts the Likert five-level scale, with single-choice questions, multiple-choice questions, and subjective blank filling questions, and carries out quantitative research from multiple levels of use frequency, experience, problem cognition, and innovation demand. Have you ever used AI tools in learning, research, or Instructing scenarios? As the application of AI technology and the transformation mode of teacher-student relationship, whether AI has promoted the formation of a new teacher-student interaction system that integrates academic research, classroom teaching, and growth instructing at universities? What is the core dilemma of the current AI enabled three-in-one education model for teachers and students? How do you think AI technology can better empower the development of the three-in-one teacher-student relationship at universities? The above questions are the main content of this survey as shown in **Table 1**.

This questionnaire survey mainly relied on various forms such as Questionnaire Star, Class DingTalk Group, and offline campus distribution to distribute 200 questionnaires. After excluding invalid filling and regular answering, 190 valid questionnaires were collected, with a questionnaire collection effectiveness rate of 95%. Afterwards, the data will be organized and statistically analyzed to identify the differences in AI usage habits, teacher-student interaction experiences, and perceptions of educational difficulties among different groups.

Secondly, semi-structured interview method. In the design of interview research, differentiated interview outlines are developed for the two major groups of university teachers and students, and targeted interview questions are set around the three core elements. Targeting the teacher community, focus on interviewing them about their practical experience, work pain points, technological application challenges, and optimization needs in AI enabled classroom teaching, academic research guidance, and student growth counseling; Targeting the student community, we aim to gain a deep understanding of their real experiences, interactive shortcomings, and personalized needs in using AI tools to connect with teachers' educational work during classroom learning, academic research, and personal growth. Semi-structured interviews can compensate for the deep-seated shortcomings of questionnaire surveys, uncover the underlying reasons that questionnaire data cannot reflect, interpret the causes behind the data, understand the true inner feelings of teachers and students, and make research conclusions more profound and realistic [7].

Table 1. Research content.

Primary category A	Second level category B	Core category C
Personal basic characteristics	Basic information research	AI Empowered “Academic- Teaching- Instructing” Three-in-one Teacher Student Relationship and Education Model at universities
AI tool usage frequency		
Academic communication relationship	The current situation of the transformation of teacher-student relationships	
Classroom teaching relationship		
Growth coaching relationship		
Changes in teacher-student mode		
Disadvantages of academic communication	Current difficulties in teacher-student relationships	
Shortcomings in teaching adaptation		
Limitations of Humanities Instructing		
Defects in plate collaboration		
Institutional capacity issues		
Integrating technology into the education system	Innovative Path of Education Model	
Academic Collaboration and Innovation		
Classroom teaching innovation		
Growth coaching and innovation		
Human machine role positioning		

The content of the interview is mainly based on a semi-structured interview outline drafted around the core research questions, without a fixed rigid Q&A process. The core interview questions include: “The actual effectiveness and diffi-

culties of using AI tools for academic guidance, classroom teaching, and student instructing from the perspective of teachers”, “The specific manifestations of emotional alienation and fragmented education caused by AI applications in the eyes of teachers and students”, “The actual demands of teachers and students for the integrated development of the three-in-one collaborative education”, “Improvement suggestions for the construction of AI and teacher collaborative education models and campus AI education systems”, etc.

The interview sample was selected using non-probability sampling, taking into account both sample diversity and research specificity. A total of 10 teachers and students were selected as in-depth interviewees. The interview will be conducted through a combination of offline face-to-face interviews and online voice interviews. The entire interview process will be recorded and archived in a standardized manner, including recording and writing. After the interview, transcription, viewpoint classification, and core information extraction will be completed in a timely manner. The true expression and subjective thoughts of the interviewee will be respected throughout the process, ensuring the authenticity, completeness, and effectiveness of the interview materials. The basic information of the interviewees in this interview is shown in **Table 2**.

Table 2. Interviewee information.

Number	Gender	Grade/Teaching Experience	Discipline Categories	Interview Format
01	Female	Teaching Experience of 5 Years	Teacher of Liberal Arts Courses	Offline Interviews
02	Male	Teaching Experience of 3 Years	Teacher of Science and Engineering Professional Courses	Online Voice
03	Male	Teaching Experience of 8 Years	Public Course Teacher	Online Voice
04	Male	Teaching Experience of 10 Years	Instructor	Offline Interviews
05	Female	Teaching Experience of 8 Years	Head Teacher	Offline Interviews
06	Female	Senior Year	Literature Major Students	Offline Interviews
07	Male	Junior Year	Computer Major Students	Offline Interviews
08	Male	Freshman Year	Artificial Intelligence Students	Online Voice
09	Female	Sophomore Year	Management Major Students	Online Voice
10	Male	Freshman Year	Art Major Students	Online Voice

3. Research Analysis

Based on 190 valid student questionnaire data and 10 in-depth interviews with

teachers and students from Zhejiang Yuexiu University, this study found that the popularization and application of AI technology have a significant positive effect on the “Academic-Teaching-Instructing” teacher-student relationship at universities, promoting the transformation of traditional single teacher-student relationships into multi-dimensional collaborative education models, effectively activating the educational vitality of the three major scenarios of academic research, classroom teaching, and growth instructing. However, there are still prominent problems such as insufficient integration and uneven development of the three, and an integrated and systematic three-in-one teacher reproductive system has not yet been fully formed.

3.1. The Positive Development Trend of the Three-in-One Teacher-Student Relationship Empowered by AI

Firstly, AI technology broadens the boundaries of education and academic collaboration tends to become normalized. In terms of academic research, with the popularization of AI technology, it has gradually been applied to fields such as data processing, project assistance, literature analysis, and paper polishing, completely changing the traditional teacher-student academic communication mode and promoting the transformation of teacher-student academic collaboration from “phased guidance” to “normalized interaction”. Research data shows that 72.5% of senior students, students majoring in artificial intelligence and art at our school frequently use AI technology tools, mainly for academic viewpoint sorting, course paper writing, graduation thesis (design) creation and other scenarios. Compared to traditional academic guidance models, AI can provide students with round the clock and real-time academic assistance, solving the shortcomings of students’ accumulated academic questions and limited offline academic communication time between teachers and students in the past.

At the same time, AI effectively broadens the boundaries of academic education for teachers and students. Traditional academic interaction between teachers and students often focuses on key nodes such as graduation thesis (design) and project application, with less daily academic communication. Currently, 68.3% of students indicate that after relying on AI to complete basic academic work, their communication with teachers has shifted from “modifying basic formats and answering basic questions” to “innovating academic ideas, refining research depth, and optimizing project direction” and other high-level academic exchanges. The quality and depth of academic interaction between teachers and students have significantly improved. The interviewed professional course teachers also generally expressed that AI has shared the basic academic guidance work, allowing teachers to focus on cultivating students’ academic thinking, research ability, and innovation literacy. The professionalism and efficiency of academic collaboration between teachers and students have been greatly improved, and the teacher-student relationship in the academic education dimension has been effectively deepened.

Secondly, AI empowerment enhances quality and efficiency, making teacher-

student teaching interaction more efficient. Classroom teaching is the fundamental core scenario of the three-in-one teacher-student relationship, and it is also the field where AI technology is most deeply integrated and has the most significant empowerment effect. Research data shows that 86.7% of undergraduate students in our school use AI technology tools throughout the entire process of pre-class preparation, classroom learning, and post-class review. AI has been deeply embedded in daily classroom teaching and has become an important auxiliary carrier for teacher-student teaching interaction. In terms of teaching efficiency, 78.1% of students stated that with the help of AI intelligent Q&A, knowledge point sorting, courseware analysis and other functions, they can quickly solve basic classroom questions and reduce the cost of repeated consultations; 65.3% of the surveyed teachers explicitly stated that AI has effectively undertaken mechanical and repetitive teaching tasks such as homework correction, knowledge point review, and learning situation statistics, greatly reducing the basic teaching pressure of teachers.

From the perspective of teacher-student interaction mode, traditional classrooms mainly rely on one-way teaching by teachers and passive listening by students, with a single form of interaction and limited coverage. After the intervention of AI technology tools, classroom interaction has broken the temporal and spatial limitations of education, forming a new teaching model of “AI assisted preview, precise classroom interaction, and AI post class consolidation”. In the classroom, teachers do not need to spend a lot of time answering common basic questions. They can focus on explaining key and difficult points, expanding their thinking, and providing personalized Q&A. The interaction between teachers and students in the classroom is more targeted and in-depth. The interview results also confirmed that science and engineering teachers and public course teachers have a higher recognition of AI teaching empowerment. They can rely on big data learning platforms to grasp the overall learning situation of the class, achieve hierarchical teaching and precise teaching, effectively optimize the problems of inefficient teacher-student interaction and insufficient targeted education in traditional classrooms, and significantly improve the effectiveness of teacher-student education in the classroom teaching dimension.

3.2. The Core Dilemma of AI Empowering the Three-in-One Teacher-Student Relationship

Firstly, the cognitive positioning of education is vague, and there is an imbalance between technology and education priorities. According to the survey questionnaire statistics and interview results, the cognitive bias of educational positioning has led to the phenomenon of technology and education putting the cart before the horse. Research data shows that 47.8% of teachers overly rely on AI to complete tasks such as project guidance, after-school Q&A, and ideological instructing, simplifying AI technology tools as a means to replace manual education; Some teachers also reject intelligent technology, adhere to traditional educational models, refuse to use AI to improve educational efficiency, and fail to clarify the correct

educational positioning of “teacher centered, AI assisted, and collaborative complementary”. Some students overly rely on AI functions and regard AI as the main reliance for learning and growth, weakening their subjective learning thinking and face-to-face communication with teachers and students; 39.5% of the surveyed students prioritize seeking help from AI when encountering academic difficulties, and the frequency of actively discussing and exchanging growth issues with mentors offline has significantly decreased. These deviations deviate from the three-in-one educational construction logic that centers on teacher-student interaction and is assisted by technology.

Secondly, the three major education sectors are separated from each other, and the collaborative efforts for education are insufficient. At present, the application of AI education at universities is in a decentralized state, with academic research AI tools, classroom teaching AI systems, and growth instructing intelligent platforms operating independently without forming an integrated linkage mechanism. According to research data, 70.2% of teachers and students believe that there is a clear problem of scene fragmentation in current AI education, where teaching empowerment, academic empowerment, and Instructing empowerment are not interconnected, and there is a lack of unified educational carriers and linkage mechanisms. The learning situation data in teaching scenarios cannot empower academic guidance, academic growth cannot provide students with growth instructing, and the three dimensions of resources cannot be shared or complemented. Most students in the interview believed that academic guidance, classroom teaching, and daily growth instructing in schools are not interconnected, and teachers' education work is independent, making it difficult to achieve comprehensive and integrated education throughout the entire process. At the same time, the problem of unclear positioning of human-computer education has become prominent, with teaching and academic scenes overly relying on AI technology, weakening the instructing role of teachers, instructing scenes completely relying on teachers, lacking technical assistance, and the lack of unified standards for human-computer collaboration in three-dimensional education. Ultimately, this has led to a lack of synergy in the three-in-one teacher-student relationship and insufficient educational synergy, making it difficult to achieve comprehensive and integrated educational goals.

Thirdly, the adaptability of AI tools is insufficient, making it difficult to implement personalized education. The three major modules of academic research, classroom teaching, and growth instructing cannot rely on AI for precise stratification and personalized education, lacking intelligent implementation carriers. In the practice of the “Academic-Teaching-Instructing” three-in-one teacher-student relationship, the shortcomings of adapting existing AI tool scenarios are prominent. According to a survey questionnaire, 71.4% of teachers stated that existing AI tools mainly focus on standardized exercise evaluation and courseware generation functions, while only 18.3% of tools can provide guidance on scientific research topics, phased academic assistance, and personalized psychological and

career instructing. It is difficult for teachers to rely on AI to achieve personalized teaching, and there are still significant obstacles to targeted teaching and precise technical guidance for teachers and students; During the interview, 83.9% of the students also reported that the AI generated learning plans were heavily template based, unable to provide precise and personalized guidance based on their own research weaknesses, course learning situations, professional characteristics, learning abilities, and personality traits.

Fourthly, the offline deep interaction between teachers and students is weakened, and there is a lack of humanistic education emotions. AI can only provide knowledge-based and tool-based assistance, and cannot replace teachers' humanistic care, value guidance, and psychological instructing. This has led to a serious lag in the dimension of growth instructing in the three-in-one education system, forming an imbalanced pattern of "emphasizing academia, emphasizing teaching, neglecting instructing, and weak humanities", and a complete closed loop of teacher-student education has not yet been formed. From the current situation of education, growth instructing still heavily relies on offline manual work by teachers, and the integration of AI in the field of growth instructing is extremely low. AI has not yet formed an effective empowering role. Survey data shows that 62.8% of students have significantly reduced the frequency of actively communicating with teachers about learning, research, and ideological growth issues after relying on AI to solve learning and academic problems; The current teacher-student interaction is mostly limited to utilitarian scenarios such as learning and scientific research, lacking deep interaction in terms of ideological collision, emotional communication, and growth exchange. 58.5% of the surveyed teachers clearly feel that there is a lack of face-to-face emotional communication between teachers and students, and the interaction in education shows obvious instrumentalization and utilitarianism. During the interview, multiple instructors also mentioned that AI online communication has replaced a large number of offline heart-to-heart talks, and the sense of companionship, trust, and empathy between teachers and students continues to decline. AI can only solve rational academic problems and cannot replace teachers' warm ideological guidance and humanistic care, resulting in a serious lack of educational warmth.

Fifthly, the uneven application ability of AI between teachers and students, and the lack of unified educational standards on campus. On the one hand, the problem of hierarchical differentiation in AI application abilities between teachers and students is objectively highlighted: questionnaire data shows that 76.2% of young teachers under the age of 35 are proficient in using AI to conduct learning analysis and research assisted teaching, while only 23.5% of teachers over the age of 50 can use AI education tools on a regular basis; 69.7% of the student population are proficient in science and engineering, while only 31.2% are proficient in humanities and social sciences. During the interview, young teachers and students expressed that they accept AI technology quickly and proficiently. However, middle-aged and elderly teachers and some lower grade students have weak AI operation

abilities and are unable to proficiently use AI to complete collaborative education work. There is a significant gap in group application abilities [8]. On the other hand, most universities have not yet issued unified guidelines, management standards, and assessment criteria for the use of AI in campus education. The use of AI by teachers and students is unfounded and highly arbitrary, greatly reducing the actual effectiveness of AI empowerment in education. Over 83% of the interviewed teachers and students stated that there are currently no AI usage standards, tool admission criteria, and educational assessment criteria suitable for the three-in-one education model in our school. Without unified institutional constraints and overlapping capacity gaps, the application of AI by teachers and students is becoming increasingly casual. Some teachers blindly try various AI software, while students use intelligent tools without guidance, further widening the gap in the quality of childbirth among the three-in-one teachers.

4. Innovative Path of AI Empowering the “Academic-Teaching-Instructing” Three-in-One Education Model

Based on the quantitative data conclusions of the questionnaire survey and the qualitative and in-depth viewpoints of semi-structured interviews, and based on the current difficulties in educating students at universities, we innovatively construct a new AI empowered three-in-one collaborative education model for teachers and students from several dimensions, including concept positioning, platform construction, individual needs, emotional attachment, ability improvement, and mechanism improvement.

4.1. Clarifying the Core Positioning of Education and Establishing the Concept of Collaborative and Integrated Education

Research shows that most teachers and students have cognitive biases in the use of AI, with some students overly relying on AI leading to reduced offline academic communication. At the same time, some teachers and students are unable to accurately define the educational roles of AI and teachers, resulting in a bipolar cognitive bias of “technology replacing education” or “completely rejecting technology”. Regarding the current empirical situation. University teachers and students should establish a teacher-centered, AI-assisted, human-machine collaborative, and humanistic-oriented educational philosophy [9], clarify that artificial intelligence will always serve as an auxiliary educational tool, and undertake basic work such as data statistics, resource push, and shallow Q&A; University teachers adhere to the core responsibility of cultivating virtue and nurturing talents, focusing on in-depth academic discussions, Instructing ideological values, caring for humanistic emotions, Instructing career planning, and providing psychological Instructing. They eliminate the domination of technology over the essence of education and balance the relationship between intelligent technology and humanistic education, and correct the cognitive bias in the positioning of teacher and

student education from the root.

4.2. Building an Integrated AI Education Platform and Breaking down the Barriers between the Three Major Education Sectors

The questionnaire data shows that over 70% of teachers and students believe that there are prominent problems in the current AI education, such as the separation of academic, teaching, and tutoring scenarios, lack of resource sharing, and insufficient collaboration. In response to this practical dilemma, Universities should coordinate and integrate various intelligent systems for teaching, research, and student management, creating a comprehensive AI education platform that integrates academic research collaboration, intelligent classroom teaching, and all-round growth instructing. Connect the academic communication port between teachers and students, classroom teaching interaction port, and growth assistance warning port, realize the exchange and sharing of students' academic data, research progress, and growth status information, promote seamless connection between academic guidance, classroom teaching, and daily Instructing, eliminate the fragmentation problem of the education sector, and unite the collaborative efforts of education.

4.3. Accurately Matching Personalized Needs, Creating a Layered and Classified Precise Education Model

The questionnaire results show that the homogenization problem of existing AI tools is prominent, making it difficult to adapt to students' personalized learning, research, and growth counseling needs, and unable to achieve individualized teaching, which is the core weakness that restricts AI's precise education. Regarding this issue, relying on the AI learning big data analysis function, we should accurately analyze the learning shortcomings, research needs, and growth difficulties of students in different majors, grades, and learning levels [10]. Teachers combine AI data analysis results to develop personalized guidance plans, differentiated classroom teaching plans, and targeted growth coaching plans, empowering AI to truly meet students' personalized development needs, achieving precise teaching, precise coaching, and precise education, cracking the problem of mismatch between standardized intelligent education and differentiated development of students.

4.4. Adhering to the Offline Emotional Education Platform and Building an Integrated Online and Offline Interactive Model

Regarding the research on 62.8% of students who rely on AI, there is a decrease in offline communication and emotional connection between teachers and students, as well as an imbalance in educating students due to feedback from interview counselors regarding a decrease in teacher-student companionship and empathy. Based on this empirical finding, while relying on AI to expand online communi-

cation channels between teachers and students and improve educational efficiency, we must also adhere to the core position of offline teacher-student interaction. Regularly carry out offline academic discussions, class heart to heart talks, one-on-one growth exchanges, and themed education activities, retaining the emotional companionship, ideological exchange, and spiritual resonance in traditional teacher-student interactions, forming a dual line interactive mode of “AI efficient handling of affairs + offline deep emotional education”, which not only leverages the convenience of intelligent technology, but also maintains the humanistic temperature of university teacher-student education, and resolves the practical dilemma of emotional dilution between teachers and students and the lack of educational warmth.

4.5. Carrying Out Hierarchical AI Skills Training to Enhance the Intelligent Education Literacy of Teachers and Students

From the sample data, there is a significant difference in the stratification of AI application abilities between teachers and students. There is a large gap in AI usage frequency and operational ability among teachers of different age groups and students of different majors. Some teachers and students have insufficient AI application abilities and cannot effectively use AI to connect with multidimensional education work. In response to this differentiation issue, this study proposes to carry out AI teaching and lesson preparation, and conduct specialized training on AI teaching preparation, intelligent learning situation analysis, AI academic guidance, online Instructing skills, etc. for the teacher group, to help teachers proficiently use intelligent tools to simplify their education work; We offer courses for students on rational use of AI, compliant application of academic AI, and practical operation of intelligent learning tools, instructing them to use AI correctly to help their own learning and growth, narrowing the gap in AI application ability between teachers and students, and comprehensively improving the digital education and learning literacy of all teachers and students in the school.

4.6. Establishing a Sound Campus AI Education Management System and Standardizing the Use of Standards

During questionnaire surveys and interviews, teachers and students provided feedback that the school lacks AI usage norms, admission standards, and assessment criteria that are suitable for the three in one education model. The high degree of arbitrariness and lack of evidence in the use of AI by teachers and students is an important institutional cause of the chaos and uneven quality of AI education. Colleges and universities have formulated the “Campus Artificial Intelligence Education Application Management Standards” based on their own educational characteristics and practical needs, clarifying the scope, requirements, and bottom line of the use of AI tools in academic research, classroom teaching, and student Instructing. Define the boundaries of reasonable use of AI, strictly prohibit students from relying on AI to complete learning tasks such as thesis writing

and course assignments, and standardize the application process of AI teaching for teachers, so that AI empowerment and education work have a system and standards to follow, and standardize the disorderly application behavior of AI among teachers and students, and comprehensively enhance the standardization and institutionalization level of the AI empowerment three in one education model.

5. Conclusions

Through a dual investigation of questionnaire surveys and semi-structured interviews, it has been confirmed that AI technology has brought new opportunities for the development of the “Academic-Teaching-Instructing” three-in-one teacher-student relationship at universities, effectively expanding the channels of teacher-student interaction, improving the overall efficiency of scientific research teaching Instructing, and promoting the transformation of traditional teacher-student relationships into modern collaborative education relationships [11]. However, at present, there are still many practical problems that urgently need to be solved in the practice of AI empowerment and education, such as the weakening of teacher-student emotions, the fragmentation of the education sector, the insufficient adaptability of AI, uneven application capabilities, and the lack of management systems. To achieve innovative development of the education model, it is necessary to adhere to the core principle of humanistic education, reasonably utilize the value of AI technology tools, clarify the division of labor between teachers and students in education, open up the integration channels of the three major education sectors, rely on institutional norms, skill improvement, platform construction, and emotional attachment multiple measures, and build a modern three-in-one teacher-student collaborative education pattern with online and offline linkage and human-machine coordination complementarity.

In the future, with the continuous iteration and upgrading of artificial intelligence technology, the application scenarios of AI in the field of university education will become more diverse and abundant. Subsequent research can further expand the scope of the survey sample, conduct comparative studies in different types of universities, continuously deepen the depth of semi-structured interviews, combine long-term tracking research methods, continuously explore the dynamic changes in teacher-student relationships under the iteration of AI technology, continuously optimize and improve the three-in-one collaborative education model, and enable artificial intelligence to truly serve the fundamental goal of moral education and talent cultivation in higher education, and help promote the high-quality development of teacher-student relationships at universities in the new era.

Conflicts of Interest

The author declares no conflicts of interest.

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Appendix

Questionnaire and Measurement Specifications

Title: Survey on AI-Enabled “Academic-Teaching-Instructing” Tripartite Student-Faculty Relationships in Higher Education

1. Constructs and Item Mapping

The questionnaire consists of 25 items organized into four core constructs: Basic Information (Q1 - Q4), Current Status of AI Empowerment (Q5 - Q11), Perceptions of Existing Dilemmas (Q12 - Q19), and Optimization Needs and Cognition (Q20 - Q25).

2. Response Options

Two response formats were employed:

2.1 Likert Scale Items (Q5 - Q18): A 5-point scale was used, anchored by: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree.

2.2 Categorical Items (Q1 - Q4, Q19 - Q25): Single-choice (radio) and multiple-choice (checkbox) questions were used to collect demographic data and multidimensional preferences.

3. Scoring and Statistical Rules

3.1 Scoring: All scale items (Q5 - Q18) were positively worded with no reverse-coded items. Higher scores indicate a higher level of agreement or perceived intensity regarding the statement.

3.2 Statistical Analysis: Descriptive statistics (frequencies and percentages) were used for demographic and preference-based questions to analyze sample characteristics and trends.

4. Exclusion Criteria for Invalid Responses

To ensure data validity, questionnaires meeting any of the following criteria were excluded: patterned responding (e.g., straight-lining), excessive missing data in core items, logical inconsistencies, and insufficient completion time indicating careless responding.

5. Formal Survey Questionnaire

Dear Student:

Hello! This survey aims to investigate the current status, challenges, and optimization pathways of Artificial Intelligence (AI) in empowering the “Academic Research-Classroom Teaching-Growth Instructing” tripartite student-faculty relationship in universities. The questionnaire is anonymous; data will be used solely for academic research and kept strictly confidential. There are no right or wrong answers. Please respond truthfully based on your actual experiences. Thank you for your participation!

Part I: Basic Information

1. Gender:

A. Male B. Female

2. Grade:

A. Freshman B. Sophomore C. Junior D. Senior

3. Discipline Category:

A. Humanities & Social Sciences (Literature, Law, Management, Education, etc.)

B. Science & Engineering (Engineering, Physics, Computer Science, Mechanics, etc.)

C. Arts & Sports

D. Other

4. Have you used AI tools (e.g., intelligent Q&A, AI lesson prep, literature analysis, academic instructing, AI communication assistants) in learning, research, or Instructing contexts?A. Frequent use (≥ 5 times/week)

B. Occasional use (1 - 4 times/week)

C. Rare use (1 - 3 times/month)

D. Never used

Part II: Current Status of AI-Empowered Student-Faculty Relationships*(Please mark your response with a $\checkmark$: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)***5. AI tools have improved the efficiency of academic communication between my teachers and me.**☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5**6. AI technology encourages me to actively participate in online/offline academic exchanges.**☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5**7. AI makes classroom instruction more flexible and enhances in-class interaction.**☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5**8. AI teaching aids effectively strengthen the connection between teachers and students during class.**☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5**9. AI Instructing tools effectively supplement teachers' offline mentoring efforts.**☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5**10. AI applications facilitate a shift from one-way lecturing to two-way collaborative teacher-student relationships.**☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5**11. AI supports the formation of an integrated educational system covering academics, teaching, and instructing.**☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5**Part III: Existing Dilemmas in AI-Assisted Education***(Please mark your response with a $\checkmark$: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)***12. Over-reliance on AI has reduced my deep, in-person academic discussions**

with teachers.

☐1 ☐2 ☐3 ☐4 ☐5

13. Current AI teaching models are homogeneous and fail to meet my personalized learning needs.

☐1 ☐2 ☐3 ☐4 ☐5

14. AI can only address basic academic issues and cannot replace the humanistic care and deep counseling provided by teachers.

☐1 ☐2 ☐3 ☐4 ☐5

15. The university lacks unified AI governance standards, leading to ambiguous usage norms for teachers and students.

☐1 ☐2 ☐3 ☐4 ☐5

16. Excessive use of AI weakens emotional bonds and the overall educational atmosphere between teachers and students.

☐1 ☐2 ☐3 ☐4 ☐5

17. Current AI applications in academics, teaching, and Instructing are fragmented and lack synergy.

☐1 ☐2 ☐3 ☐4 ☐5

18. My limited AI literacy hinders efficient alignment with teachers' multi-dimensional educational efforts.

☐1 ☐2 ☐3 ☐4 ☐5

19. What do you consider the core dilemmas of current AI-assisted education? (Select all that apply)

A. Emotional detachment and lack of humanistic education

B. Fragmentation of the three educational domains (academics, teaching, Instructing)

C. Poor adaptability of AI tools to personalized education

D. Uneven AI literacy among teachers and students

E. Imperfect institutional management frameworks

F. Over-reliance on AI weakening subjective interaction

G. Other: _____

Part IV: Optimization Needs and Cognition

20. How necessary is it to deeply integrate AI into the tripartite student-faculty education system? (Single choice)

A. Highly necessary B. Somewhat necessary

C. Indifferent D. Unnecessary E. Completely unnecessary

21. In the academic research dimension, which AI collaboration models do you need? (Select all that apply)

A. AI-assisted literature review/data processing for joint projects

B. Intelligent academic Q&A linked to faculty supervision

C. AI-assisted paper revision/plagiarism checks supporting thesis guidance

D. Smart recommendation of academic resources matching research directions

E. Other: _____

22. In the classroom teaching dimension, which AI innovations do you support? (Select all that apply)

- A. AI learning analytics enabling personalized teaching
- B. Smart classroom tools improving interaction efficiency
- C. AI after-class Q&A addressing instructional gaps
- D. Co-built digital teaching resource repositories
- E. Other: _____

23. In the growth Instructing dimension, which AI-assisted models do you require? (Select all that apply)

- A. AI early warning systems assisting academic intervention
- B. Smart psychological assessment/counseling supporting mental health
- C. AI career planning aiding further study/employment guidance
- D. Smart portfolio tracking supporting holistic development
- E. Other: _____

24. What is the optimal positioning of AI and teachers in new educational models? (Single choice)

- A. AI-led, Teacher-supported
- B. Teacher-led, AI-supported
- C. Human-AI collaboration with complementary roles
- D. No integration; retain traditional models

25. What requires the most urgent improvement for optimizing AI education models? (Select all that apply)

- A. Conduct AI literacy training for teachers and students
- B. Build an integrated AI education platform
- C. Refine regulatory frameworks and standards
- D. Uphold offline emotional engagement balancing tech and humanity
- E. Bridge educational domains to establish synergy mechanisms
- F. Other: _____

End of Questionnaire. Thank you for your cooperation!