

Reconstruction of Teaching Order Driven by Technology: Social Research on the Promotion of Smart Platforms in Medical Education at Our University

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Abstract

To serve the implementation of the Healthy China strategy, systematically plan the cutting-edge directions of university construction, promote the interdisciplinary integration and innovative development medicine, natural sciences, and social sciences in ethnic universities, and provide strategic support for scientific research layout and talent cultivation in the future health field. Starting from September 2025, our university will promote the smart teaching platform in multiple affiliated hospitals and full-process teaching hospitals, marking the localized implementation smart education tools in our university. These tools, based on modern information and network technologies, enable teaching interaction, resource sharing, mobile learning, the construction of teaching portals, teacher development, teaching monitoring, and resource sharing. Adopting a sociological research perspective, the author examines the micro-mechanisms through which smart education tools are accepted, adapted, and trigger changes in classroom order the clinical teaching field, utilizing participant observation, interviews, questionnaires, and platform data backtracking. Research finds that the local promotion of smart education platforms has undergone a cognitive transformation of “administrative initiation-peer demonstration-voluntary internalization”; classroom interaction has shifted one-way lecturing to teacher-student negotiation linked by real-time feedback; the full-process data tracking, while forming teaching evidence, has also raised concerns about formalism. The suggests that the transformation of the teaching paradigm is not an inevitable result bestowed by technology, but a social prod-

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uct repeatedly constructed amidst organizational pressure, technological characteristics, and human adaptation.

Keywords

Smart Teaching, Medical Education, Sociological Research, Students' Core Competencies

1. The Smart Teaching Platform Has Been Localized and Implemented in Our School

In September 2025, the Teaching Quality Management Department of our college launched the promotion of the “Rain Classroom” teaching platform. As is well known, the main functions of the Teaching Quality Administrative Management Department are to undertake teaching quality monitoring and teacher development. Based on Microsoft Office PowerPoint (PPT) and WeChat, the Rain Classroom platform can implement smart functions such as Artificial Intelligence (AI) learning companion, AI teaching companion, courseware push, in-class tests, bullet chat submissions random roll calls, and after-class assignments. It can also automatically generate teaching data for all stages of the classroom, including attendance check-ins, in-class test analysis, after-class assignment analysis. The original intention of the promotion is to leverage AI intelligence teaching and online offline hybrid modes to establish a student-centered classroom order without significantly increasing the on teachers and students.

It is necessary to conduct sociological research on the localized teaching models of smart teaching platforms. The sociology of medical education is a modern educational branch discipline that and matured in the West, and its research will inevitably learn from and draw upon Western educational sociology theories and methods. In addition, since there are some common problems in the educational development of countries, educational sociology research in all countries will reflect international characteristics. However, as with other social science research, the theoretical research and practical exploration of educational sociology cannot be detached from the social of the country, namely its political and economic conditions as well as cultural traditions. Otherwise, its research cannot be targeted, and it cannot effectively explain and serve the country's and society. Therefore, how to grasp China's specific educational practices to carry out educational sociology research and construct an educational sociology system with Chinese characteristics, namely achieving the localization of educational sociology, an important task facing Chinese educational sociology as it moves into the 21st century (General Office of the State Council of China, 2020). Clinical teaching is characterized by practicality, intuitiveness, comprehensiveness, and innovativeness. Here, starting only from the meaning of the localization of educational sociology, we will reflect on goals and achievement issues of the localization of educational

sociology research in our country (Ye & Yin, 2023).

2. Clinical Education Should Be Adapted to the Social Context of the Country

Guided by the strategic goals of Healthy China and combined with the requirements of the new round of accreditation for undergraduate clinical medicine majors traditional clinical medicine teaching methods are no longer able to adapt to the actual needs of current medical education scenarios. The talent cultivation model of medical education urgently needs comprehensive optimization to better adapt to new trends of industry development. With the booming development of modern medicine and the increasingly high standards of all sectors of society for the quality of medical services, smart medical teaching platforms have met new requirements for the development of the health cause in terms of assisting talent cultivation and promoting knowledge popularization, showing huge development potential. How to continuously improve the quality of medical talent cultivation and high-quality new composite talents for the health cause is an important issue facing the field of modern medical education. In order to realize the strategic idea of Healthy China, respond to challenges as population aging, high incidence of chronic diseases, and uneven distribution of medical resources, and promote the medical paradigm change brought about by technological revolutions such as artificial intelligence and precision medicine In order to cultivate high-level medical innovative talents who are a trinity of “good doctors, scholars, and leaders”, in 2018, the Ministry of Education issued “Opinions on Accelerating the Construction of High-level Undergraduate Education and Comprehensively Improving Talent Cultivation Capabilities”, which includes the Six Excellences and One Top-notch plan, namely the Top-notch Student Cultivation Plan for Basic Disciplines, the Excellence Program for Journalism and Communication Talents, the Excellence Program for Rule of Law Talents, Excellence Program for Agriculture and Forestry Talents, the Excellence Program for Doctors, the Excellence Program for Engineers, and the Excellence Program for Teachers. The Ministry of Education has incorporated the construction New Medical Science education into the core agenda of national higher education reform. The New Medical Science education plan is implemented for medical students who will work in medical colleges, hospitals, scientific, and educational administration institutions. This is to ensure that medical students can provide high-quality clinical services and lead medical and technological innovation when they enter their posts, and be capable of posts in medical basics, prevention, clinical practice, teaching, research, and management at any time (Ministry of Education of China & Ministry of Health of China, 2008).

The fundamental goal of clinical education is to cultivate advanced medical talents who are physically and mentally healthy, creative, and responsible. Clinical medicine programs aim to train applied talents who can adapt to the development needs of the medical and health industry, possess good professional ethics, preliminary clinical working abilities, lifelong learning abilities, and a foundation for

further studies, and can engage in safe and effective medical practice in various levels of healthcare institutions under the guidance and supervision of senior physicians (Zhao et al., 2020).

Core concepts of clinical education: Student-centered: Emphasizes that students should take an active role in the teaching process, and teachers stimulate students' learning interest through practical sessions, prompting them to shift from passive knowledge reception to active exploration, while focusing on cultivating students' practical and innovative abilities. Patient-centered Clinical teaching should revolve around the actual needs of patients, enabling students to improve their ability to diagnose and treat patients through clinical practice, while simultaneously familiarizing themselves with hospital systems, establishing doctor-patient relationships, and learning relevant knowledge such as healthcare, medical ethics, and medical insurance. Disease-oriented: Utilizing cases as teaching examples, teaching activities should be conducted based the occurrence, development, and objective laws of diseases. Through typical cases or simulated patients, combined with theoretical lectures, inter-class internships, and classroom discussions, students' learning is stimulated, mobilizing their initiative and enthusiasm. In clinical trial activities, the three core concepts of "understanding, respecting, and believing" should be established, aiming to reshape society's of clinical trials, emphasizing the importance of clinical trials to medical progress, respecting the contributions of volunteers, and believing that clinical trials conducted under strict ethical review and scientific standards can protect the rights and interests of and provide cutting-edge diagnostic and treatment opportunities. Although these concepts are primarily directed at clinical trials, they also reflect the emphasis on scientific understanding, ethical respect, and trust and cooperation in clinical (He, 2005).

3. Clinical Education Should Be Adapted to the Talent Needs under the Background of New Medical Science

In the field of medical education, the training models for medical talents are diverse, with interdisciplinary integration being mainstream. It emphasizes the combination of medicine with science, technology, humanities, and social sciences, breaking down disciplinary barriers and focusing on enhancing students' comprehensive abilities. In the United States the positioning of medical education is clear and the division of labor is well-defined: medical schools focus on basic education, training students to master fundamental knowledge; graduate programs cultivate research capabilities and residency and specialist training develop clinical skills. The most common medical talent training model in the U.S. is the Doctor of Medicine (MD) Doctor of Philosophy (PhD) program, which involves two years of basic coursework, followed by three to five years of PhD training, and finally two years of clinical coursework and skill training. The interleaving of basic clinical training enables students to simultaneously master both research and clinical skills. Furthermore, placing clinical training in the final stage facilitates stu-

dents' smooth transition into standardized residency training after graduation. At Shanghai Jiao Tong University School of Medicine, in collaboration with the Puyuan School of Future Technology, a domestically pioneering MD PhD interdisciplinary and composite talent training model is being jointly piloted to a high-level medical innovation talent training mechanism that aligns with the characteristics of future disciplines. In addition, the cultivation of practical abilities focuses on students' practical and hands-on skills. Through the application of virtual simulation technology and intelligent medical equipment, diversified practical opportunities are provided—such as simulated cases, simulated surgeries, and virtual reality—to enhance students' ability to actual clinical problems. Personalized and customized teaching models: customized learning paths are provided based on students' interests, potential, and development directions to improve learning outcomes. For example, the SJ School of Medicine utilizes a smart teaching platform to provide students with personalized learning paths and resource recommendations. The construction of diversified practical teaching platforms: in collaboration with enterprises, medical institutions, and research institutes, diversified practical teaching platforms are jointly developed to achieve a transition from the biomedical model to the intelligent medical model, comprehensively promoting industry-university-research cooperation. Diversification of standards: based on the characteristics of each discipline, categorized “Medical AI” evaluation standards are formulated. AI technology is integrated into the entire process of medical talent training, and medical students encouraged to actively participate in medical artificial intelligence innovation competitions and practical projects, with these activities accounting for a certain proportion of the evaluation results. Cultivation of teamwork and leadership skills: is conducted in a multidisciplinary team collaboration environment to improve students' communication and leadership skills, meeting the needs for solving complex problems in modern medicine. These models reflect the demand for composite talents in the context of the “New Medical Sciences” and the drive for innovation in educational models (Hu & Wang, 2021).

4. Clinical Education Should Be Adapted to the Current Development of the National Medical and Health Cause

As a medical college of ethnic medicine located in an old revolutionary base area, our institution has been rooted in western Guangxi and deeply engaged in ethnic medicine science since its founding. Closely adhering to the core requirements of “reaching new heights and strengthening characteristics,” and focusing on the goal of building a regional high-level university of ethnic medicine we have worked diligently in areas such as Party building, discipline construction, talent cultivation, and characteristic development. With solid educational achievements, we continuously empower the development of medical and health undertakings border ethnic areas and the construction of a Healthy China (Liu et al., 2021).

Reviewing the development footprints of pioneering and innovative spirit since

the academy's establishment in 1958, we feel the original mission teachers, students, and staff to cultivate talents and serve the country through science and technology. Fruitful achievements have been made in areas such as school positioning, major construction, faculty development talent cultivation, and scientific research and innovation. This proves the school's clear development path. Closely centering on the goal of promoting the modernization of higher education, we will improve implementation mechanism for fostering virtue and cultivating people, optimize the cultivation system for innovative talents, focus on key construction and leading projects represented by the "Double First-Class" initiative, better play the guiding role of the classified reform of universities. According to the school's strategic arrangements, we will further improve the university governance system, make every effort to take root the border region, continuously improve the teaching level, and strive to build a first-class medical university with distinct characteristics. We must closely revolve around the heavy responsibility of building a socialist international metropolis with global influence, more actively and proactively integrate into serving national strategies and regional development, strengthen scientific, cultural, think tank, and talent support, and continuously enhance the contribution of universities in supporting and leading economic and social development (Tu, 2023).

Medical education is characterized by its interdisciplinary nature, integrating the theories and practices of medicine, pedagogy, and sociology; its applied nature focusing on solving practical problems in the field of medical education; and its continuous nature, evolving with advancements in medical science and technology and the updating of educational concepts. Its goal is to cultivate talents equipped with interdisciplinary knowledge and practical abilities in medical pedagogy and sociology. The purpose of studying medical education is to enrich the theories of sociology and medical pedagogy by exploring the mutual relationship between medical education and society, and analyzing the medical education system using sociological perspectives and concepts, thereby improving medical education and promoting social progress. Specifically, the purposes of studying the sociology of education include the following points: knowledge of the sociology of medical education is a component of the theory of medical pedagogy; in addition to basic medicine, clinical medicine, and other professional, the theoretical foundation of medical pedagogy should also include introductions to social science disciplines such as philosophy, psychology, history, and sociology. Research in the sociology of medical education can enable medical decision-makers to value the sociological factors that influence medical education. The sociology of medical education also focuses on issues such as the relationship between social structure and medical education, the impact of class structure on personality development and academic achievement, the relationship between socio-political structure and medical education, the influence of family, groups, and schools as basic units of individual socialization the impact of groups on medical talent and the healthcare system, the relationship between medical education and social change, and the

social structure of medical institutions. Understanding the knowledge of the sociology of medical can help medical educators understand their roles and tasks (Liang, 2021).

The new medical talent cultivation program explicitly requires strengthening students' autonomous learning and clinical thinking abilities, and the teaching paradigm must shift from the three centers of "teachers, textbooks, and classrooms" to a "student-centered" approach. However, in the process of core clinical medicine courses and graduation internship rotations, most teachers are-qualified teachers with both academic and practical capabilities, and students also engage in an intersection of theory, skill training, and bedside practice. Both teachers and students face the problem of fragmented time. Generally, clinical classroom teaching is dominated by lectures, resulting in low student engagement and making it difficult for teachers to receive specific feedback on students' learning progress in class., there is an urgent need for a method with a low barrier to entry and fast feedback speed to help teachers establish a "student-centered" teaching paradigm (Wang & Liao, 2023).

From the perspective of international trends, the digital transformation of education is driving medical education to transition from "experience transmission" to "digital and intelligent empowerment," the reconstruction of artificial intelligence and digital education ecosystems has become a key issue. Meanwhile, as a new carrier combining online and offline teaching, the value of hybrid smart teaching platforms university education has been widely recognized, but their promotion still faces dilemmas such as teachers' insufficient information literacy and weak synergy between online and offline teaching. As early as when the concept of learning re-emerged, it was pointed out that so-called Blended Learning is to combine the advantages of traditional learning methods with those of digital learning, both playing the role of teachers and reflecting the subject status of students.

However, the introduction of a teaching tool is never just a technical update. Ultimately, it must be embedded into the existing assessment system and teacher-student patterns, and in actual use, it will be understood, adjusted, and even resisted. Therefore, what we are truly concerned about is: how is this lightweight technology gradually accepted within clinical teaching organization? What subtle changes does it bring to the teacher-student relationship and teaching decisions in the classroom? Does the fully automated data collection become a basis for improvement, an invisible pressure? These questions cannot be fully answered by research on teaching effectiveness; they require a close-up observation in the style of a sociological study (Zhang et al., 2025).

5. Selection of Research Methods

Its core content is that medical education should fundamentally resolve the contradiction between the growing health and medical needs of residents and the relative shortage of medical services; its observation should not only collect and investigate the individual cases themselves, but also include the social context or

scenarios generated by the cases within the scope of examination. It requires a comprehensive evaluation through the four dimensions of identity, spatio-temporal scope, analytical level, and theoretical level, along with the extensions of historicity, relationality, and futurity.

1. Period and Units: Track the promotion process of the smart teaching platform from September 2025 to April 2026 in 3 affiliated hospitals (Southwest Hospital Affiliated to Youjiang Medical University, Liuzhou Hospital Affiliated to Youjiang Medical University, and Yulin Hospital Affiliated to Youjiang Medical) and 2 full-process teaching hospitals (Main Campus of the Affiliated Hospital of Youjiang Medical University, and Cheng dong Campus of the Affiliated Hospital). Data collection method Teaching management personnel will participate in 30 training and teaching-research activities throughout the process, recording the methods of teaching organization and mobilization, teachers' immediate reactions, and informal. Through the implementation cases of these 5 units, clarify the reasons and process for the success of the smart teaching platform, thereby providing a reference for teaching reform and practice in other.

2. In-depth interview participants: 1) Recruitment methods: 10% of clinical teachers using the smart teaching platform were randomly selected; 30% of teaching administrators were randomly selected; 1 class of full-time clinical medicine students was randomly selected; 1 class of clinical intern medical students was randomly selected. 2) Sampling results: 32 clinical teachers, 12 teaching administrators, 50 full-time students, and 50 interns. 3) Method: -structured interviews were conducted, focusing on their perceptions of using the smart teaching platform, their role experiences, and their understanding of the data.

3. Questionnaire: The attitude scale used is the Thurstone Scale. Method: Collect ≥ 100 statements related to the attitude to be, ensuring an adequate proportion of statements that are unfavorable, neutral, and favorable to the topic. Select ≥ 20 raters to categorize each statement into 11 categories based on degree of favorability or unfavorability of the attitude expressed, where Category 1 represents the most unfavorable attitude, Category 6 represents a neutral attitude, and Category 11 represents most favorable attitude. Calculate the frequency distribution of each statement across these 11 categories. By inviting raters to classify the statements by degree of agreement, a set of clearly meaningful statements is and the average value of the statements agreed upon by the subjects serves as the attitude score. Delete statements with overly dispersed frequency distributions. Calculate the median for each retained statement and categorize them median, selecting one or two representative statements from each category and arranging them in a mixed order. A self-developed questionnaire, including an attitude scale and open-ended questions, was distributed clinical teachers, and 267 copies were collected.

In-depth interviews: Semi-structured interviews were conducted with 32 clinical teachers, 12 teaching administrators, 50 current students, 50 interns, focusing on their usage experiences, role perceptions, and data cognition.

Questionnaire survey: A self-developed questionnaire was distributed to clini-

cal teachers, with 67 responses collected, including attitude scales and open-ended questions.

4. Platform data: De-identified backend records of 105 courses were exported with authorization, covering interaction, test participation, etc.

All materials were summarized through thematic coding to extract social processes from phenomena, rather than testing preset hypotheses.

6. Research Results

1. How the Tool Is Adopted: From Administrative Push to Peer Influence

As a medical college for ethnic minorities located in an old revolutionary base area, our institution needs to localize high-quality resources on its smart teaching platform adapt to local teaching contexts and student needs, which places higher demands on teachers. Teachers' use of digital resources is currently limited to basic browsing, lacking the ability to efficiently select, and innovatively use them; in particular, they exhibit a fear of using smart teaching tools, making it difficult to effectively apply appropriate resources in classroom teaching. This leads to issues such as insufficient technical application skills among teachers, difficulties in integrating resources with teaching, challenges in training and practice, difficulties in the deep integration of technology and teaching, and the pressure to continuously improve design capabilities and their ability to teach students according to their aptitude. In the early stage of promotion, the Teaching Quality Department urged hospitals to incorporate the tool's usage into teaching inspection indicators, such as requiring the dynamic check-in function to be used in the theoretical sessions of every course, and interactive function to be used at least 3 times. This administrative pressure quickly broke the deadlock, but also gave rise to perfunctory usage for the sake of usage: some teachers only used the smart platform during check-in, and returned to traditional lecturing after randomly calling on students 3 times. In summary, the organizational pressures for promoting smart teaching platforms are mainly concentrated in aspects such as teacher competence, resource integration, training practice, technological integration, and continuous improvement of teachers' teaching abilities. Addressing these pressures requires systematic strategies and sustained efforts.

The turning point came from typical demonstrations. The Quality Management Department selected three clinical teachers to explore first. One gastroenterology teacher used in-class tests in the classroom, immediately discovered the students' collective misunderstanding of the differential diagnosis between liver cirrhosis ascites and spontaneous bacterial peritonitis, and adjusted the teaching focus on the spot. This was repeatedly shown and publicly praised by the Dean of Education. The news spread among the departments, and several teachers admitted: "I wasn't convinced by the documents, but seeing my colleagues use it effectively and save the effort of calculating daily scores, that I started learning it seriously." The questionnaire showed that after six months of promotion, the proportion of those that it "makes it easier for me to be student-centered" rose to 69.3%,

while the proportion who thought it “increased the burden” dropped from 1.5% to 22.8%. Administrative pressure, peer demonstration, and practical burden reduction jointly promoted the cognitive legitimacy of the tool.

2. Changes in Classroom Interaction: From Authoritative Monologue to Instant Negotiation

Anonymous submissions, bullet chats, and random calling functions have directly changed the distribution discourse in the classroom. It has undergone a gradual process from silence to tentative attempts and then to active participation.

In the early stages of promotion, students hardly sent any bullet chats only passively sending them when teachers used them for attendance check-in. The turning point occurred after some teachers embedded bullet chats into the teaching process—when a teacher posed a true-false question and asked students to send their answers via bullet chat, the bullet chat area instantly became active. Subsequently, the teacher continued to pose an anonymous in-class discussion, students spontaneously started discussing in the bullet chat. A teacher candidly admitted: bullet chat is not for taking attendance, it is for dialogue.

Students’ usage behavior changed accordingly. From only sending check-in codes, to actively answering questions, and then to asking the teacher questions. The anonymity mechanism the psychological threshold for speaking in class; previously, they didn’t dare to raise their hands for fear of embarrassing themselves by answering incorrectly, but now they dare to send messages anonymously. The classroom has transformed from a monologue by a few active students into a space where the majority can participate.

More significant changes are occurring at the level of classroom instructional decision-making. With real-time response data, students’ understanding becomes visible. A gynecologist teacher described: “A pre-class test revealed that 85% of the students had already mastered the basic knowledge of cervical cancer, so I skipped the planned lecture and instead an AI teaching assistant to generate cases for students to conduct case discussions.” This adjustment of teaching based on learning is becoming increasingly frequent, and the role of teachers is beginning to shift from authorities to learning designers. The evolution of the bullet-chat function from attendance to Q & A, and then from Q & A to dialogue, reflects the social process by which tools are gradually accepted and given meaning in the classroom.

3. Full-Process Data Tracking: The Dual Effect of Transparent Evidence

Automatically capturing all courseware views, test scores, interaction participation, assignment data makes the previously vague classroom process clear and verifiable. Teaching management departments can intuitively see the interaction frequency and participation rate of each course, accurately identify silent classrooms, and use the for developmental feedback rather than rankings. Multiple teachers stated: “Seeing that my interaction data is lower than my colleagues” naturally makes me want to try a few more times next week.

However, data transparency also brings hidden concerns. In the open-ended questions of the questionnaire, about 13% of teachers expressed concern that

“good-looking data does necessarily reflect real learning,” and a senior professor bluntly stated: “Good teaching is the exchange of looks between teachers and students, not the number of bullet comments.” This voice reminds us when “student-centered” is simplified into quantifiable interaction indicators, there is a risk of the classroom sliding into “data performance.” Full-process tracking provides evidence for teaching improvement, it may also create new anxieties. This tension itself is a social phenomenon worth continuous observation.

4. Flexible Adaptation of Blended Spaces

The three full-process teaching hospitals are distributed across three different regions, and the instructors are all the hospitals’ own faculty. Due to geographical isolation, it is difficult for the main campus to conduct real-time on-site supervision of off-site teaching (He, 2005). The smart platform the role of “traceable supervision” in this scenario: the management department uses the platform to check whether teachers are conducting teaching in an orderly manner according to the syllabus, whether they arbitrarily increasing or decreasing class hours, and whether the teaching progress is consistent with the plan.

A teaching administrator described it this way: “We mainly look at the degree of matching the course syllabus and the actual progress on the platform, as well as the upload time and chapter sequence of the courseware. All of these can reflect whether the teaching is proceeding according the plan.”

This monitoring logic shapes teachers’ usage behavior. Some teachers admitted: “You can’t just change things on the platform. You have to follow order of the syllabus, otherwise you’ll be asked ‘Why did you make adjustments?’” Consequently, some teachers hold a cautious attitude toward the platform, viewing it more as a than an empowerment.

However, some teachers have found room for flexible operation within the monitoring framework. For example, without changing the order of the syllabus chapters, they upload supplementary materials “extracurricular reading,” thereby indirectly enriching the teaching content. In remote teaching scenarios, the platform is primarily a normative evidence system for teaching, and only secondarily a teaching aid. How technology is implemented ultimately depends on the organizational management logic.

In summary, the organizational pressures in promoting smart teaching are mainly concentrated in aspects such as teacher competence, resource integration, training practice, technology integration, and the continuous of teachers’ teaching abilities. Addressing these pressures requires systematic strategies and sustained efforts.

With the development and application of emerging technologies such as the Internet of Things, big data, and artificial intelligence, informatization has permeated various fields including culture economy, society, and education, becoming a core competitiveness that countries are racing to develop. As the high-end form of educational informatization, smart education aims to build a smart learning, transform traditional teaching and learning models, and foster an educational system for the intelligent era. Developing smart education is conducive to the educa-

tion sector keeping pace with the times, breaking through bottlenecks currently existing in educational reform, and promoting the systemic transformation of education (Liang et al., 2023).

7. Discussion and Implications

This study indicates that a student-centered teaching paradigm cannot be unilaterally implanted by training documents. Its germination and diffusion administrative forces to break the ice, peer demonstrations to build confidence, and technological convenience to provide continuous momentum, and it must be repeatedly imbued with meaning in the daily interactions between teachers and. In this process, it acts more like a “social glue,” connecting the assessment needs of management departments, the burden-reduction expectations of teachers, and the participation demands of students. However, whether it ultimately leads to a genuine transformation in teaching depends on whether the organizational ecology encourages development or creates pressure.

It is particularly worth noting that the continuous tracking of inherently possesses a monitoring attribute. If it is simply equated with evidence of “student-centeredness,” it is highly likely to spawn formalized interactive performances, deviating from the original intention of. Teacher development centers should consciously position themselves as cultural cultivators, continuously promoting the narrative that “data is for improvement, not for judgment,” and protecting the space for teachers’ professional judgment.

Information technology can be considered the pinnacle of the Industrial Revolution, while artificial intelligence may surpass this peak and become the starting point of a new revolution. Artificial intelligence will greatly change human thinking patterns, impact human intelligence, and simultaneously expand human thinking. Smart education courses should take information awareness, computational thinking, digital learning and innovation, and information social as the core competencies of the discipline to respond to the zero-point revolution of educational technology (Osório & Garma, 2025).

8. Conclusion

The profound transformation of teaching paradigms is never a solo performance by tools, but a social process jointly woven by institutions, technology, and in specific contexts. Its promotion provides us with an observation window: when administrative impetus and grassroots creativity, transparent data and educational warmth, and unified platforms and decentralized sites collide, a new order quietly takes shape amidst various tensions and negotiations. Understanding and nurturing this process is far more important than calculating the “effectiveness” of a single tool.

Author Contribution Statement

The order of authors for this paper was jointly discussed and determined by all

authors before submission and will not be changed after submission. If a change is absolutely necessary, a certificate from the institution and a written statement of no objection signed by all authors must be provided. The authors of this paper simultaneously meet the following conditions:

- 1) Participated in the topic selection and design of the paper, or participated in the analysis and interpretation of the data;
- 2) Drafted or the key theories or other main contents of the paper;
- 3) Able to revise the paper according to the editorial department's comments, answer academic questions, and finally to the publication of the paper;
- 4) In addition to being responsible for their own research contributions, agree to be responsible for the integrity issues in all aspects of the research.

Liang Ye: data collection, organization, statistical analysis, plotting, and paper writing; Shi Guiling was involved in conceptualization, resources, data management, software, analysis, funding acquisition, investigation, visualization, methodology, writing the original draft, project management, writing review and editing, and strictly revised the final manuscript. This manuscript has been revised by authors and unanimously agreed to be published.

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Statement of Ethics

All the participants involved in the study were provided written informed consent and the study was conducted according to the Helsinki declaration and the research protocol approved by the hospital ethics committee (Approval number: NO. YYFY-LL-2026-015).

Conflicts of Interest

The authors report no conflict of interest in this work.

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