Research on the Path to Enhancing the Digital Teaching Ability of Medical Graduate Supervisors Based on AIGC

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Abstract: With the advancement of AIGC and related technologies, medical education is undergoing a profound digital transformation. However, medical graduate supervisors face multiple challenges in this process, including insufficient technical proficiency, low utilization of teaching resources, outdated pedagogical models, and an underdeveloped evaluation system. To address these issues, this study proposes a multidimensional framework for enhancing supervisors' capabilities. Key strategies include strengthening technical training, establishing a mechanism for sharing high-quality resources, encouraging innovation in teaching methods, and implementing a dynamic evaluation system. These measures aim to improve the effectiveness of digital teaching and lay a solid foundation for cultivating healthcare professionals who meet the demands of the new era.

***Keywords*:** AIGC, medical postgraduate supervisor, digital teaching ability, improvement path

1. Introduction

1.1 Research background

As an important branch of AI technology, Artificial Intelligence Generated Content (AIGC) uses advanced machine learning and deep learning technologies[1], In the field of medical education, Artificial Intelligence Generated Content (AIGC) technology is causing deep changes in teaching models. This is due to its exceptional content generation capabilities. In recent years, China has placed great importance on developing teachers' digital teaching abilities. The government has released several policy documents. These include the "Education Informatization 2.0 Action Plan", "China's Education Modernization 2035", and the "14th Five-Year Plan for the Digital Economy". These documents all require strengthening the development of the teaching faculty. They aim to build a professional development system for teachers. The goal is to enhance teachers' digital teaching skills and information literacy. Teachers must adapt to the changes brought by information technology to education. These efforts accelerate the modernization of China's education strategy[2].Survey results indicate that the insufficient digital teaching capacity of medical supervisors in China has become a critical bottleneck constraining the quality improvement of high-level medical talent cultivation. Enhancing the development of supervisors' digital teaching competencies is a strategic imperative to adapt to the digital transformation of education and cultivate high-caliber medical professionals in the new era.

1.2 Research purpose and significance

This study focuses on the professional development of medical graduate supervisors in the field of digital teaching. It analyzes the core factors that affect their ability improvement. The study also constructs a capability framework. This framework consists of technical operation, resource management, method innovation, and effectiveness evaluation. It provides specific theoretical guidance and practical solutions. The aim is to enhance the digital teaching level of medical graduate supervisors.

Theoretically, this research enhances the understanding of digital transformation in medical education among some graduate supervisors. Practically, improving the digital teaching capabilities of supervisors offers significant benefits. It enables the training of more competent clinical medical talents. This supplies healthcare institutions, such as hospitals, with high-quality professionals. Furthermore, it facilitates the modernization of traditional medical teaching models.

2. The current application status of AIGC technology in medical education

2.1 The transformation of AIGC teaching model

AIGC technology is playing an increasingly important role in the field of medical education. Published literature shows that AIGC demonstrates significant potential in multiple areas. These areas include clinical practice, patient management, medical education, and scientific research innovation[3].In traditional teaching models, the learning process typically follows a specific sequence. First, teachers deliver knowledge. Then, students receive this knowledge. Following this, students form thinking frameworks to approach problems. Finally, they apply these frameworks to solve problems[4].AIGC technology presents complex medical knowledge intuitively through dynamic 3D models and virtual scenarios. It intelligently generates customized content based on each student's learning progress. Simultaneously, it provides data feedback to instructors. This enables precise teaching interventions. These capabilities significantly improve learning outcomes.

Table 1. Comparison between Traditional Medical Education and AIGC technology-enabled Education

Comparison Dimension	Traditional Medical Education	AIGC-Empowered Education	Examples
Teaching Methods	Limited to static illustrations.	Dynamic 3D models and VR scenarios	Disassemblable organ models for multi-angle observation
Personalized Learning	Fixed teaching pace	Automatically plans personalized learning paths.	Targeted weak-point reinforcement
Practical Training	limited hands-on opportunities	Virtual surgery simulations	Virtual training for medical and surgical procedures.

2.2 Technical application level

Current medical graduate supervisors generally face multiple shortcomings in applying digital teaching tools. Most supervisors can only use intelligent dialogue systems for basic queries. They lack the ability for deeper application. Their proficiency in operating medical image processing tools is insufficient. Furthermore, their ability to utilize data analysis functions for teaching optimization is relatively weak.This technological proficiency shows a clear generational divide. Younger medical graduate supervisors generally demonstrate better skills. Some older supervisors experience difficulties in using these tools. This significant digital divide leads to uneven levels of technology application across teaching teams. It directly affects the overall quality of teaching performance.

2.3 resource integration capability

During the promotion of digital transformation in medical education, the effective integration of teaching resources has become a critical problem that needs urgent solution. To find required literature information, researchers may need to repeat searches across ten or even dozens of databases. This process leads to significant waste of time and energ[5].High-quality teaching resources are characterized by fragmented distribution. They are scattered across multiple professional platforms both domestically and internationally. This situation makes the process of resource retrieval and filtering time-consuming and labor-intensive.Due to the specific nature of medical education, the need for cross-disciplinary resource integration is becoming increasingly prominent. However, most supervisors show significant deficiencies in information retrieval skills. They also lack sufficient knowledge reserves across different disciplines.This condition directly hinders the systematic construction of teaching resource systems. Consequently, it restricts the depth and breadth of teaching content. As a result, course materials often fail to fully reflect the latest developments in the discipline.

3. Construction of the Digital Teaching Competence Framework for Medical Postgraduate Supervisors

3.1 Core competence elements

The digital teaching competency system for medical graduate supervisors consists of four key dimensions. The primary dimension is technological application ability. This requires supervisors to master the operation of various intelligent teaching tools. They must be able to effectively use AIGC technology to create medical visual materials.The second dimension is resource management capability. This emphasizes the ability to acquire high-quality teaching materials from diverse sources. It also includes the ability to systematically integrate these materials.The third dimension is teaching innovation capability. The focus lies on combining digital technology with medical professional characteristics. This combination enables the development of innovative teaching solutions.The fourth dimension is teaching evaluation capability. This involves using

data analysis techniques to achieve accurate assessment of teaching effectiveness. It also supports continuous improvement through such assessment.These four dimensions support each other. Together, they form a complete digital teaching competency system.

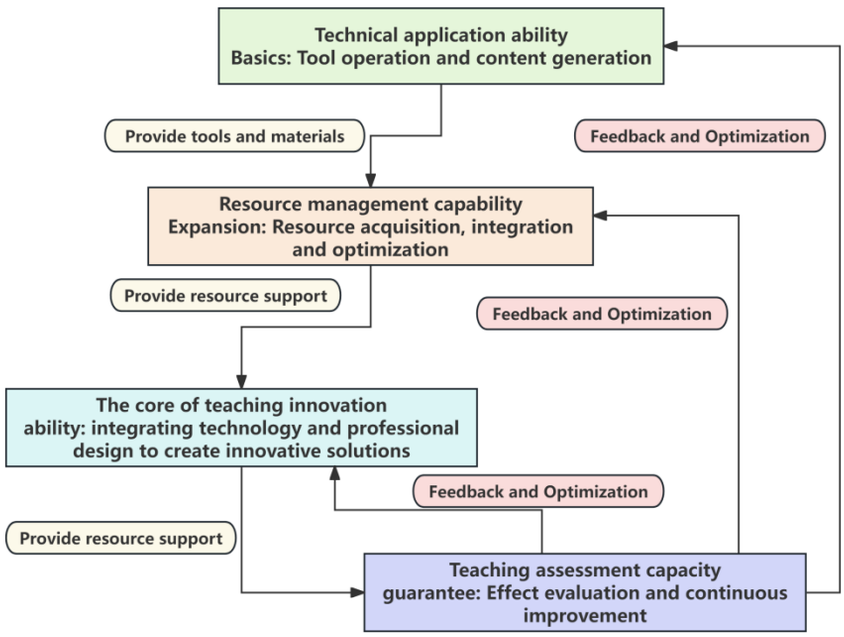

Figure 1. Digital Teaching Ability System

3.2 The demonstration of technical application ability

In the application of intelligent interactive tools, supervisors should master the operational skills of natural language processing systems.AIGC can generate interactive teaching content. Examples include scenario-based questions, simulated experiments, and virtual laboratories. This allows students to learn in an interactive environment. It enhances the interest and engagement of learning[6].

In the application of medical visualization tools, supervisors must possess the ability to adjust professional parameters, enabling them to generate targeted anatomical models using 3D modeling software based on syllabus requirements, thereby enhancing students' comprehension of complex human structures. Regarding data analysis, proficiency in querying clinical databases and utilizing statistical tools is essential to guide students in understanding disease patterns. Furthermore, establishing a mechanism for continuous learning is crucial for promptly mastering new AI-assisted teaching tools and sustaining the currency of pedagogical methods.

Table 2. Technical Application Ability

Technology Competency Dimension	Core Skill Requirements	Educational Value & Objectives
Intelligent Interaction Tools Application	Proficiency in NLP system operation	enable deeper, personalized teaching interactions
Medical Visualization Tools Usage	Professional parameter adjustment capability	Deepens students' understanding of pathological mechanisms.
Data Mining & Analysis	Proficient in clinical data retrieval and statistical applications	Develop data-driven clinical thinking and research capabilities
Continuous Learning Mechanism	Establish learning plan	Maintain teaching methodology advancement and effectiveness

3.3 The role of resource integration capabilities

Resource integration capability plays a significant role in the digital teaching of medical graduate supervisors. Through the systematic integration of interdisciplinary resources, AIGC can generate personalized learning content. This content includes learning paths, learning methods, study materials, and problem-solving approaches. It changes the current "one-

size-fits-all" approach in teaching. This technology enables the customization of individual learning plans for each student[7].

4. The path to Enhancing the Digital Teaching Ability of medical postgraduate supervisors

4.1 Training program design

To improve the digital teaching abilities of medical graduate supervisors, training should focus on the basic operation and application of AIGC technology. Technical experts should be invited to explain the use of tools such as ChatGPT. They should also demonstrate how to integrate these tools into medical theory and practical teaching.

A personalized teaching resource library should be established. Personalized learning theory emphasizes teaching based on individual student aptitudes. It focuses on the individual differences of each student. Supervisors can analyze student learning data. Based on this analysis, they can recommend personalized learning paths[8]. This approach helps stimulate innovative thinking.

4.2 Resource integration strategy

A medical education resource sharing platform should be established. This platform will collect and categorize medical materials scattered across different platforms and databases. It will allow supervisors to obtain resources quickly.The resource library must be updated regularly. It should include the latest medical research findings. It should also incorporate resources generated by AIGC technology. These measures ensure the timeliness and relevance of teaching content.This process will build a comprehensive digital teaching resource system. The system will be both rich in content and well-organized.

Table 3. Medical Resource Platform

Platform	Primary Resource Type	Key Features
Body Interact	Virtual patient simulations	Trains clinical thinking and decision-making
Complete Anatomy	Interactive 3D anatomy	Exquisite models, powerful features
Labster	Virtual lab experiments	Simulates hazardous/costly experiments

4.3 Encouragement of innovative practice

To promote digital teaching innovation among medical graduate supervisors, specific project support measures can be implemented. A dedicated application channel should be established for special projects. This channel should prioritize support for developing new clinical teaching methods based on intelligent technologies.Supervisors should be encouraged to combine teaching innovation practices with scientific research. They should transform their teaching innovation outcomes into research achievements. This approach enhances supervisors' motivation for innovation and improves their academic level.These measures will create a beneficial cycle where teaching and research mutually reinforce each other.

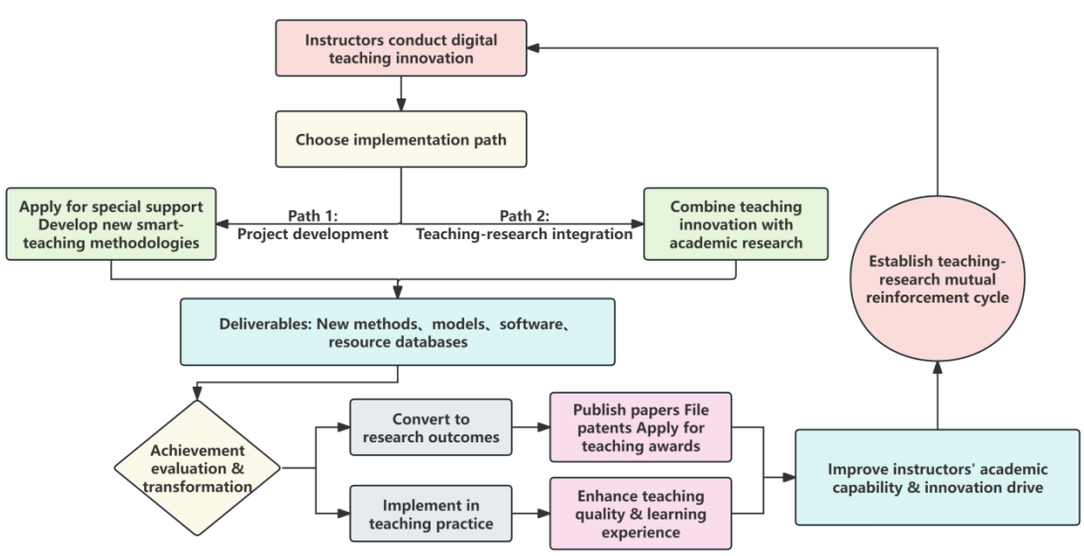

Figure 2. Flowchart of Teaching Innovation

4.4 Design of Incentive Mechanism

Regarding the evaluation mechanism, key indicators should be included in the annual assessment. These indicators cover the effectiveness of modern educational technology application. They also include the quality of teaching resource development. Furthermore, they involve the use of innovative teaching methods.Incentive mechanisms should be provided for AIGC technology talents. These incentives may include scholarships and research project support. Such measures encourage active participation in technology research and application.Career development plans should be created for these talents. These plans should clarify promotion paths and development directions. This approach helps retain outstanding personnel[9].

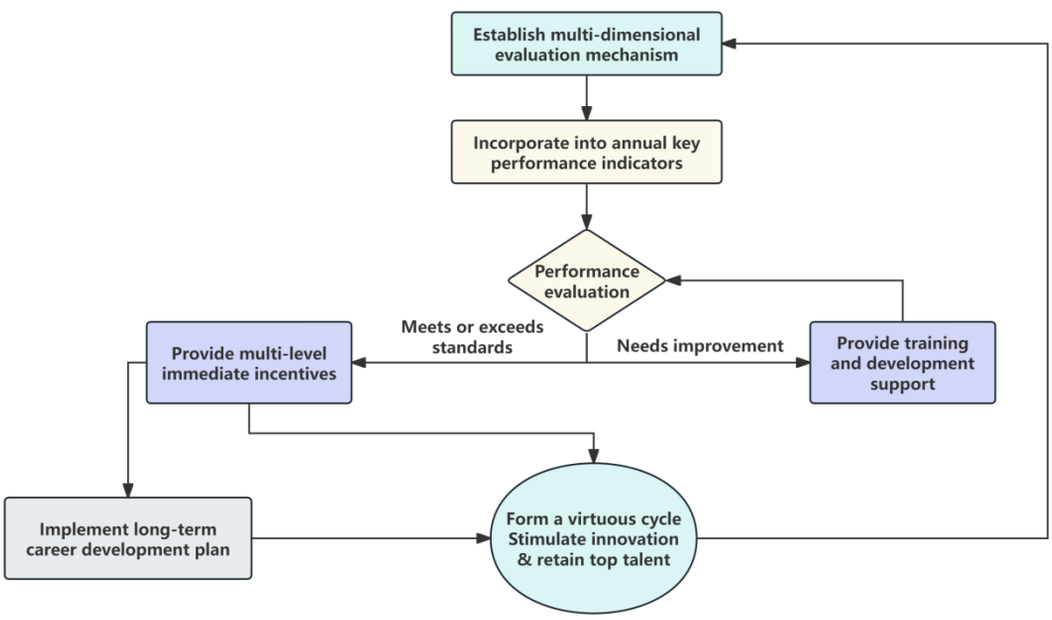

Figure 3. Flowchart of the incentive mechanism

5. The Impact of enhancing the digital teaching ability of medical postgraduate supervisors on the quality of medical education

5.1 Promote students' autonomous learning

In previous education and teaching models, students were in a generalized state of passive acceptance. Educators overlooked students' understanding and reflection on learning resources. This prevented students from effectively connecting knowledge with society, culture and practice[10].In the context of digital medical education, supervisors can use intelligent content generation technology. This technology helps develop diverse digital materials. Examples include dynamic 3D medical models and virtual surgery scenarios. These resources can overcome time and space limitations. They provide learners with immersive extracurricular learning experiences.

Simultaneously, AIGC technology can be used to develop comprehensive medical education platforms. These platforms integrate teaching resources. They also optimize and share these resources. This breaks down time and space constraints. The goal is to build a systematic and complete medical education content system[9].

5.2 Cultivate innovative medical talents

Medical graduate supervisors can use AIGC technology to integrate cutting-edge medical knowledge and the latest research findings into teaching. For example, virtual reality technology can simulate advanced medical experiments and surgical procedures. This allows students to closely engage with innovative medical practices.

Additionally, supervisors can utilize digital tools to develop innovative teaching projects. These projects should encourage student participation in scientific research and innovation. They should combine theoretical knowledge with practical application. This approach helps develop students' innovative thinking and practical abilities.

The enhancement of supervisors' digital teaching capabilities helps create a positive environment for teaching innovation.

It also stimulates students' innovative potential.

5.3 Enhance international competitiveness

Through digital teaching, supervisors can provide students with medical education resources that meet international standards. These resources include advanced medical imaging data from abroad. They also include cutting-edge medical research literature.

This approach enhances the international competitiveness of medical students. It ultimately helps cultivate internationally-oriented medical talents.

5.4 Promote the reform of the medical education model

With AIGC technology, medical graduate supervisors can overcome the limitations of traditional knowledge transfer. They can transform abstract medical concepts into highly visual teaching materials.A large amount of medical education-related data can provide rich training material for AIGC. This data can cover various teaching scenarios. It also includes student behaviors and teaching outcomes.This enables AIGC to learn and understand different aspects of medical education more comprehensively[9].

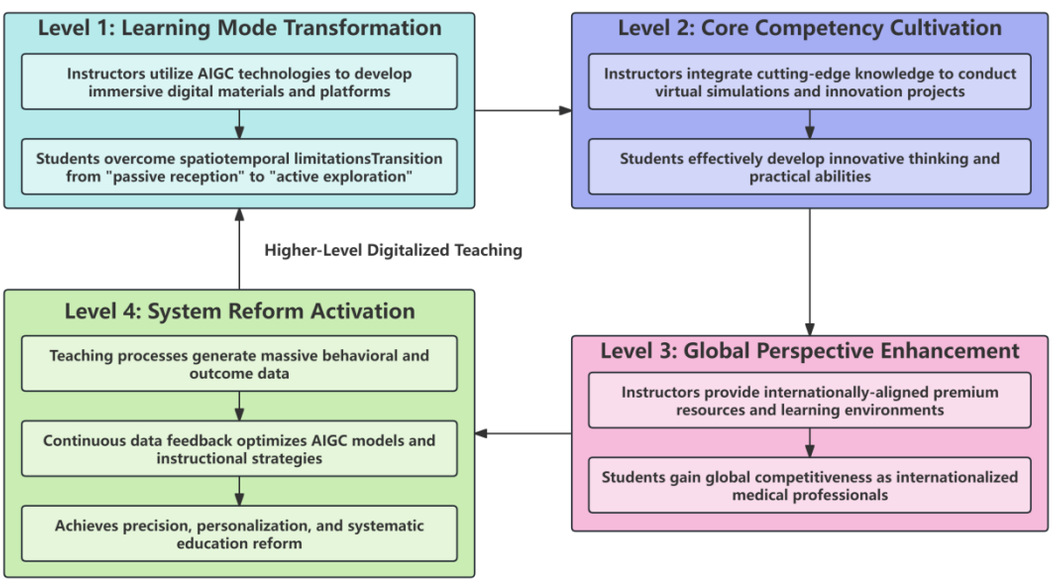

Figure 4. The Impact of Enhancing Digital Teaching Capabilities on the Quality of Medical Education

6. Conclusion

Under the backdrop of digital transformation in medical education, research on enhancing the teaching capabilities of graduate supervisors urgently requires further depth. Future efforts should focus on three key directions: first, strengthening the integration of AIGC technology to develop intelligent teaching tools and resources; second, empirically investigating the impact of digital teaching on students' innovative abilities and constructing a scientific evaluation system; third, systematically examining and standardizing ethical issues such as data security and privacy protection to ensure the high-quality and sustainable development of medical education.

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