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Integrating Medical Humanities into Systematic Anatomy Laboratory Education: A Bibliometric Analysis and Construction of a Reform Framework

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Abstract: ***Systematic anatomy laboratory teaching bears dual responsibilities for delivering professional knowledge and skills as well as life - ethics education. However, traditional teaching places excessive emphasis on technical training rather than humanistic cultivation, while relevant studies lack systematic sorting and reform practices remain scattered. Drawing on CiteSpace - assisted bibliometric analysis of 336 CNKI articles (1990 - 2026) retrieved with subject terms anatomy and humanistic education, this paper sorts out practical problems prevailing in current anatomy laboratory teaching: inadequate humanistic development of laboratory settings, insufficient shaping of students' reverence for life and empathy, inflexible teaching contents and forms, and defective mechanisms for integrating professional training with humanistic education. Targeting these problems, this paper establishes a four-in - one reform pathway of "environmental immersion, emotional cultivation, diversified empowerment, and systematic guarantee", and innovatively puts forward the 112234 teaching model together with a three - tier theory - practice - service medical humanities education system.***

Keywords: Systematic anatomy, Medical humanities, Bibliometric analysis, CiteSpace, Teaching reform.

1. Introduction

Systematic anatomy laboratory education serves as a core early-stage teaching carrier in medical training, through which students acquire morphological knowledge and hands-on skills by observing and dissecting donated bodies. Beyond professional competence, this process carries the essential educational missions of life education, ethical awareness, and professional empathy cultivation, and it represents a critical stage in shaping medical students' professional values and medical literacy. However, traditional anatomy laboratory teaching has generally emphasized skills and knowledge at the expense of situated humanistic nurturing, resulting in weak awareness of reverence for life, inadequate empathy, and superficial integration of humanistic education. Although attention to humanistic education in anatomy has grown both domestically and internationally, existing research lacks a systematic synthesis of its evolutionary trajectory and hotspot structure, and practical reform efforts remain fragmented and unsystematic. Based on a CiteSpace bibliometric analysis of 336 articles retrieved from the China National Knowledge Infrastructure (CNKI) using the subject terms *anatomy* and *humanistic education* published from 1990 to 2026, this study systematically reviews the current status and evolutionary patterns of humanistic education in anatomy, constructs a targeted integrated reform framework, and explores feasible pathways for the in-depth integration of anatomy laboratory teaching and medical humanities education.

2. Research Status of Humanistic Education in Anatomy

2.1 Characteristics of the Keyword Co-occurrence Network

A bibliometric analysis was performed using CiteSpace based on 336 articles retrieved from the China National Knowledge Infrastructure (CNKI). The keyword co-occurrence network (frequency threshold ≥ 4) contains 40 nodes and 234 links, with a network density of 0.300, where all nodes form a single connected component. Node size corresponds to keyword frequency, and both nodes and links are color-coded according to the average publication year (purple represents 1990, yellow represents 2010, red represents 2026). *Human Anatomy* appears 104 times and is the largest central node, serving as the undisputed knowledge hub. *Anatomy* (45) and *Humanistic Education* (36) form the secondary core, followed by *Curriculum Ideology* (33), *Teaching Reform* (28), *Teaching* (27), and *Experimental Teaching* (23), which together constitute the network backbone. Other notable nodes include *Medical Students* (19), *Body Donation* (19), *Anatomy Teaching* (18), *Topographical Anatomy* (18), *Humanistic Quality* (17), *Medical Humanities Education* (16), *Systematic Anatomy* (15), and *Humanistic Care* (11). Yellow and light-orange nodes in the upper and peripheral areas (e.g., *Quality Education, Medical Ethics*) correspond to earlier studies (2010–2015), reflecting an early focus on humanistic and ethical education. Deep-red nodes in the lower and outer areas (e.g., Curriculum Ideology, Systematic Anatomy, Humanistic Care) correspond to recent studies (2020–2026), marking emerging frontiers (Figure 1). Overall, the field has evolved from a core centered on *Human Anatomy* toward a diversified structure integrating curriculum ideology and politics, refined anatomical specialties, and teaching-method innovation.

2.2 Cluster Structure of Research Topics

Based on the word cloud and cluster analysis produced by CiteSpace, 12 major keyword clusters were detected for the period 1990–2026. The silhouette values ranged from 0.674 to 0.954, all exceeding 0.5, indicating that the cluster structure as a whole is reliable and internally consistent. In terms of cluster size and themes, Cluster #0 (34 nodes, 2017) was the largest, centered on body donation, anatomy teaching, medical humanities, and medical ethics, and formed the most

mature and influential knowledge domain in the field. Cluster #1 (27 nodes, 2016) and Cluster #2 (25 nodes, 2014) focused on teaching and experimental teaching/teaching reform, respectively, reflecting that teaching practice and experimental curriculum construction have consistently been the main research thread. Cluster #3 (25 nodes, 2015), marked by anatomy, education, and humanistic quality, serves as the pivotal hub connecting the anatomical knowledge system and humanistic education.

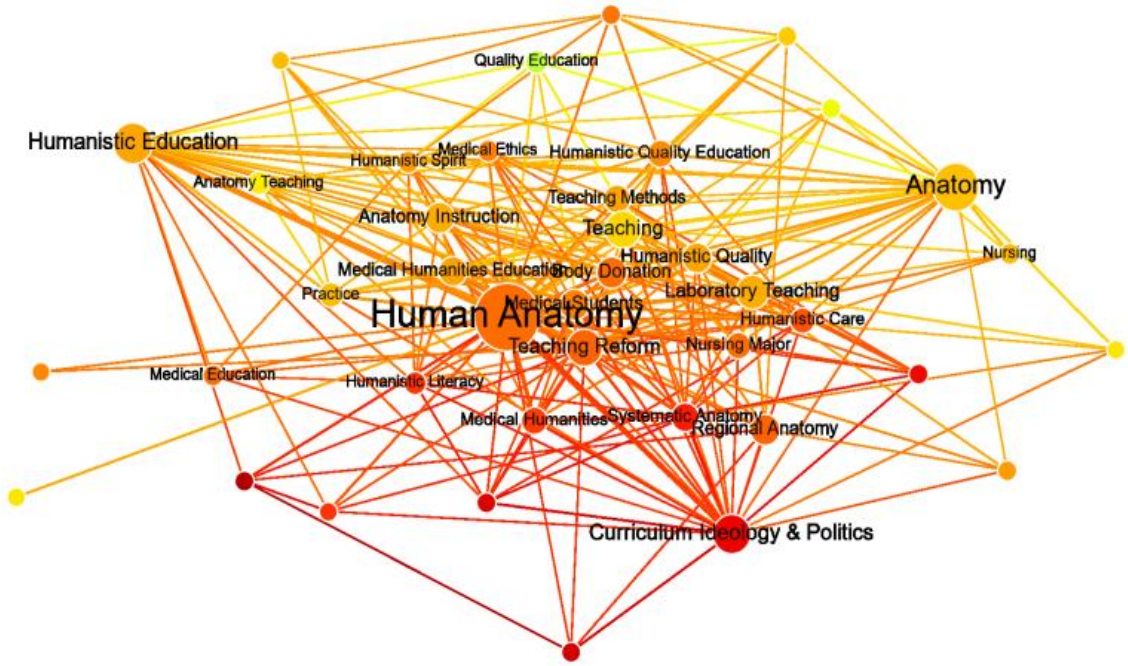


Figure 1: Keyword co-occurrence network of humanistic education in anatomy (frep ≥ 4)

With respect to temporal evolution, Cluster #7 (2011; humanistic spirit/scientific spirit) had the earliest average publication year and represents the early value orientation of the field, whereas Cluster #5 (2019; curriculum ideology/ talent cultivation/professional quality) had the latest average publication year, with a silhouette value of 0.796, indicating that curriculum ideology and moral education have rapidly emerged as recent frontiers. In addition, Cluster #4 (2018; humanistic education/new media/online teaching/cadaveric dissection) and Cluster #9 (2016; teaching methods/learning outcomes/curriculum ideology education) reflect the digital transformation of teaching tools and pedagogical innovation. Cluster #8 (2016; medical education/body donation station/ five-in-one model/historical inheritance) had the highest silhouette value (0.954) and the most focused theme, mainly addressing the institutional development of body donation and the inheritance of medical education. Cluster #6 (2014; nursing/humanistic literacy/vocational schools) reflects the subdivision of research into nursing education and vocational education. Overall, the field presents a landscape in which anatomy teaching serves as the foundation, humanistic education acts as the main thread, body donation and medical ethics constitute the distinctive features, and curriculum ideology together with pedagogical innovation represent the research frontiers (Figure 2). Cross-fertilization among clusters is evident, and hotspots have shifted over time from early humanistic spirit cultivation toward recent priorities in curriculum ideology and the development of New Medical Science.

2.3 Temporal Evolution of Research Topics

The Timeline View intuitively presents the evolutionary trajectory of research hotspots over time: the horizontal axis spans years, node colors gradient from blue (1990s) to red (2020s), node size denotes keyword frequency, and link thickness reflects co-occurrence strength. The period from 1990 to 2010 was an embryonic stage, with sparse and scattered nodes; only a few yellow nodes, such as practical ability and internship, appeared on the Cluster #11 trajectory, as research was largely attached to clinical clerkships and had not yet formed an independent theme. The period from 2011 to 2015 was a growth stage, with a marked increase in nodes: the teaching reform node was the largest on the Cluster #1 teaching trajectory, the anatomy and anatomy teaching nodes expanded synchronously on the Cluster #3 trajectory, and laboratory construction and experiment began to emerge on the Cluster #2 experimental teaching trajectory, making teaching reform and anatomy teaching system construction core issues. The period from 2016 to 2020 was an outbreak stage, with nodes turning red overall: the largest red node in the entire graph, human anatomy, appeared on the Cluster #3 anatomy trajectory; humanistic education, medical humanities, and humanistic literacy were densely distributed on the Cluster #4 trajectory; and the humanistic spirit and medical ethics nodes on the Cluster #7 trajectory grew markedly, indicating a rapid upsurge in medical humanities education. Since 2020, the field has entered a deepening and diversification stage: deep-red successively emerged in Cluster #0 (body donation), Cluster #5 (curriculum ideology), Cluster #9 (teaching methods, including PBL, flipped classroom, and case-based teaching), and Cluster #8 (medical education, New Medical Science), with curriculum ideology and blended teaching methods becoming the latest frontiers.

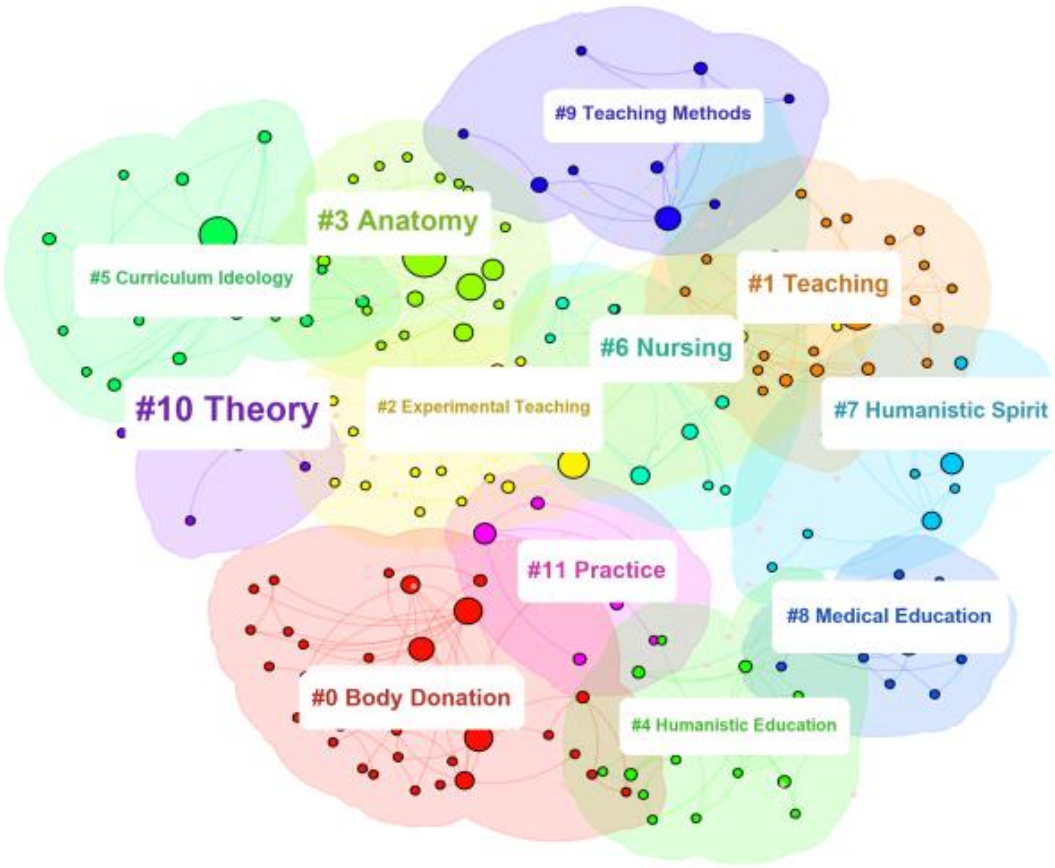


Figure 2: Keyword clustering network of humanistic education in anatomy (1990–2026)

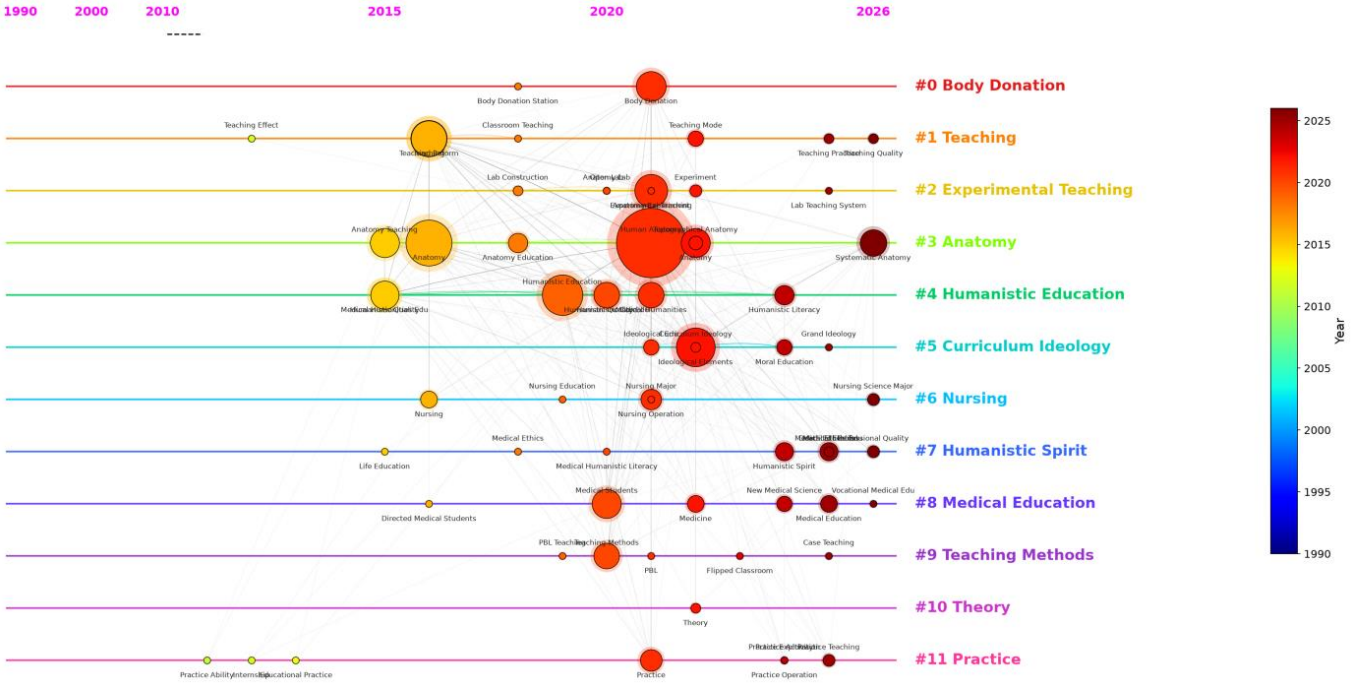


Figure 3: Timeline view of keyword clusters in anatomy-related medical humanities research (1990–2026)

In terms of inter-cluster links, Cluster #3 (anatomy) has the densest connections with Cluster #1 (teaching) and Cluster #4 (humanistic education), serving as the knowledge hub linking teaching reform and humanistic education. The links between Cluster #5 (curriculum ideology) and Cluster #7 (humanistic spirit) and Cluster #8 (medical education) are concentrated after 2018, reflecting that the cross-integration of curriculum ideology with medical humanities and medical education is a newly emerging direction (Figure 3). Overall, the field follows a four-stage evolutionary path—starting with practical teaching, moving through teaching reform and anatomy system construction, then deepening humanistic education, and finally reaching the frontiers of curriculum ideology and New Medical Science—with research themes expanding from isolated teaching techniques to diversified educational philosophies, and inter-cluster cross-fertilization

increasing steadily.

2.4 Burst Detection and Generational Succession of Research Hotspots

Building on the temporal evolution analysis, keyword burst detection was used to further identify research frontiers. Twelve keywords with the strongest bursts were identified, and the burst themes showed a clear pattern of generational succession. From 2004 to 2012, quality education (burst strength 3.31) represented the first generation of humanistic research hotspots in the field. From 2010 to 2013, the focus shifted to humanistic education (2.05), establishing humanistic education as an independent research theme. From 2014 to 2017, the focus narrowed to humanistic quality (3.02), as research moved from conceptual advocacy toward the specification of cultivation objectives. From 2015 to 2020, successive sub-hotspots emerged, including nursing (2.28), anatomy (2.03), humanistic care (1.87), and medical students (1.98), continuously broadening and deepening the research domain.

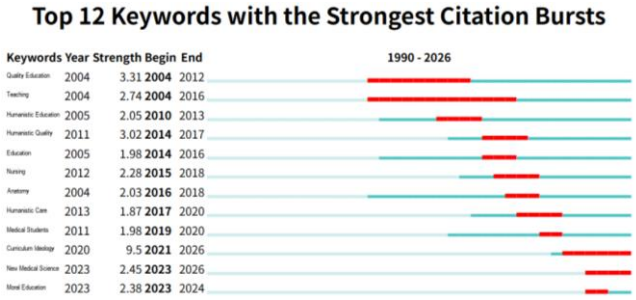


Figure 4: Top 12 keywords with the strongest citation bursts in anatomy-related medical humanities research (1990–2026)

Since 2021, the field has entered a new stage centered overwhelmingly on curriculum ideology, whose burst strength reached 9.50—nearly three times that of quality education, the second-ranked term—constituting the strongest outbreak of a research hotspot in the field's history. Together with New Medical Science (2.45, from 2023) and moral education (2.38, 2023–2024), it forms a cluster of research hotspots that remains active (Figure 4). Overall, the hotspot evolution of humanistic education in anatomy follows a clear progression — basic teaching, humanistic concepts, quality cultivation, ethical care, and curriculum ideology—with a thematic iteration every three to five years. Policy-driven shifts are the main driver of hotspot transitions, and the field is currently at its most active point, where curriculum ideology and New Medical Science intersect.

3. Existing Problems in Humanistic Education in Anatomy

3.1 Lagging Humanistic Educational Environment and the Absence of a Cultural Empowerment System in Laboratories

The keyword co-occurrence and cluster temporal results show that from 1990 to 2015 the field was in a foundational construction stage, with research highly concentrated on technical dimensions such as dissection operation standards, experimental teaching system construction, and clinical skills training. Soft educational elements, such as humanistic nurturing scenarios and cultural atmosphere building in laboratories, were long marginalized in research [1-3], which closely mirrors the shortcomings in current anatomy laboratory teaching environments. Anatomy laboratories are generally built on a traditional, technology-oriented educational philosophy: resource allocation, spatial design, and cultural construction all center on professional skills training, with heavy investment in hardware resources such as precision equipment and standardized training venues [4], while neglecting the systematic development of hidden educational scenarios such as life ethics education, gratitude for body donation [5], and medical humanistic care [6]. The frequency distribution shows a pronounced long-tail pattern, with core hotspots highly concentrated in technical teaching; research related to humanistic environment construction accounts for an extremely low proportion, reflecting the pervasive *skills over humanities* bias in anatomy education in China. Influenced by traditional medical education paradigms and institutional inertia, systematic anatomy laboratories have yet to establish a systematic, normalized humanistic empowerment system, lacking targeted cultural construction plans and scenario design, and are thus unable to provide immersive cultivation of reverence for life and medical humanistic literacy through the laboratory space. The educational dimension of laboratories is singular, supporting only professional skills training, and they struggle to fulfill the core goal of coordinated *skills plus literacy* cultivation under the New Medical Science initiative, leaving a clear gap in a holistic educational environment.

3.2 Weak Cultivation of Students' Humanistic Literacy and Deficiencies in Respect for Life and Empathy

Analysis of the CiteSpace node features shows that core humanistic keywords such as humanistic care, respect for life, and body donation exhibit the typical "low-frequency, high-centrality" pattern. Although they serve as critical bridges connecting anatomy training techniques with medical ethical norms within the knowledge network and represent an indispensable core educational dimension, they have long failed to become core implemented modules in laboratory teaching, directly leading to a structural deficiency in medical students' humanistic cognitive system. Under the dual influence of examination-oriented education and a skills-centered teaching model, students' learning focus is fixed on explicit assessment content such as identifying anatomical structures and standardizing experimental procedures, and they lack systematic awareness and deep identification with the professional value and educational significance of medical humanities.

From the trajectory of research hotspot iteration, the field has evolved from early conceptual explanations of quality education to a refined stage of moral education and precision humanistic care. However, there is a disconnect in the translation of frontier theoretical achievements into grassroots teaching practice [7-10]. The absence of humanistic penetration in the tripartite school-family-society educational system has led to common problems among medical students, such as weak reverence for life and a lack of professional empathy, which manifest during anatomy laboratory work as improper behaviors—including a lack of reverence for body donors, casual use of teaching specimens, and disregard for

the dignity of life [11]. Meanwhile, the cluster results show that cultivating medical students' humanistic literacy is a sub-hotspot, but research on implementable, practical approaches remains insufficient, further confirming that the current teaching system lacks targeted cultivation mechanisms for students' life concepts and humanistic behavioral norms, making it difficult for students to internalize medical ethics and reverence for life and to translate them into action.

3.3 Rigid Content and Forms of Humanistic Education and Insufficient Innovative Teaching Models Aligned with Frontier Research

The temporal evolution analysis indicates that research on humanistic education in anatomy in China has undergone multiple rounds of thematic iteration, gradually moving from initial theoretical explanations of humanistic spirit to frontier directions such as in-depth integration with curriculum ideology, diversified teaching model innovation, and clinical-humanistic articulation. However, the humanistic education system in current laboratory teaching lags seriously behind academic frontiers, with prominent problems including rigid educational content, monotonous teaching forms, and insufficient clinical articulation. In terms of content, existing laboratory teaching only superficially introduces basic humanistic concepts, without conducting in-depth, thematic instruction around high-centrality core topics such as body donation, medical ethics, and gratitude for life, and the exploration of humanistic connotations remains shallow [12,13]. Moreover, humanistic education content is disconnected from clinical practice settings and physician professionalism cultivation, making it difficult to achieve the forward-looking, systematic cultivation of core clinical humanistic skills such as physician-patient communication, patient empathy, and humanistic service. A content system aligned with the talent cultivation requirements of New Medical Science has yet to be established.

In terms of teaching models, research has widely validated the educational value of diverse methods such as PBL, flipped classrooms [14,15], case-based discussion [16], and scenario simulation [17], and digital blended learning has also become a recent hotspot. Nevertheless, current anatomy laboratory teaching still adheres to the traditional single paradigm of "teacher lecture plus passive student operation," lacking experiential, interactive, and inquiry-based humanistic vehicles. Cluster data show that teaching method innovation and curriculum ideology teaching reform have been core research directions since 2016, yet these frontier models have not been implemented in anatomy laboratory teaching, making it difficult to stimulate students' proactive humanistic inquiry and participatory engagement. As a result, medical humanities education remains superficial and formalistic, unable to achieve systematic, deep cultivation of students' humanistic literacy.

3.4 Imperfect Integration Mechanism Between Professional Teaching and Humanistic Education and Structural Weaknesses in the Coordinated Cultivation System

The keyword co-occurrence and clustering results show that anatomy teaching, experimental teaching, and humanistic education are the three core hub clusters, with strong cross-integration associations at the theoretical level. From the perspective of curriculum system construction, constrained by traditional instrumentalist teaching philosophies, medical humanities education has long occupied a marginal, ancillary position in systematic anatomy laboratory courses and has not been incorporated into the core educational framework. Laboratory teaching consistently centers on technical operation training and anatomical knowledge memorization, neglecting the infiltration of humanistic cores such as the dignity of life, medical ethics, and professional calling, and lacking targeted cultivation of students' critical thinking, humanistic perception, and professional mission. From the perspective of teaching resource support, although scholarly research on the integration of curriculum ideology, New Medical Science, and moral education has reached scale [18,19], grassroots teaching teams generally lack interdisciplinary faculty with both medical professional expertise and humanities and social science literacy, and they also lack supporting integrated curriculum resources, training programs, and evaluation systems, making it impossible to support normalized, deep coordinated integration of anatomy practice and humanistic education.

Analysis from the temporal evolution dimension shows that since 2020, the cross-integration of curriculum ideology with medical humanities and anatomy teaching has become the strongest research hotspot, aligning with the core orientation of New Medical Science reform. However, current teaching practice has not kept pace with frontier research trends and policy guidance, and an integration mechanism between professional and humanistic education adapted to New Medical Science has yet to be constructed. This has led to the fragmentation and insufficient coordination between professional skills teaching and humanistic literacy cultivation, producing a "skills over literacy" educational bias and making it difficult to meet the core requirement of cultivating outstanding medical professionals in the new era who foster virtue through education and integrate moral character with technical competence.

4. Reform Strategies and Implementation Pathways

4.1 Innovatively Constructing the "112234" Three-Dimensional Educational Teaching Model to Address Shortcomings in the Humanistic Environment

To address the problems of a single humanistic scenario, the absence of a cultural empowerment system, and insufficient hidden education in current laboratories, and in line with the current frontier trend of "scenario-based, experiential, and immersive" humanistic education in anatomy, this study independently constructs a distinctive "one exhibition room, one garden, two ceremonies, two acts, three letters, four competitions" (*112234*) teaching model to reshape the humanistic educational space of the anatomy laboratory and improve the humanistic education system through coordinated hardware and software.

The "one exhibition room" refers to a standardized human

specimen exhibition hall, divided into four functional zones — embryonic development, physical anatomy, sectional anatomy, and virtual anatomy—centered on the theme of life exploration, breaking the limitation that traditional laboratories serve only skills teaching. Through intuitive display of physical specimens illustrating life development and human structural features, and by building a virtual anatomy platform based on a "digital human" system and 3D Body interactive software, it creates an interactive learning scene combining virtual and real elements. While enhancing students' initiative and learning efficiency, it guides them to revere life and cherish specimens, laying a solid foundation for professional medical literacy.

The "one garden" refers to a dedicated learning garden for human anatomy and humanistic education, which organizes the disciplinary development history of anatomy, typical cases of medical humanities, stories of gratitude for body donation, and achievements of curricular humanistic activities, building a display platform where disciplinary knowledge, medical history, and humanistic spirit intersect. While acquiring professional knowledge, students can perceive the profound heritage of medical development and the warmth of medical humanities, compensating for the lack of humanistic atmosphere in traditional teaching.

The "two ceremonies and two acts" build a ritualized education system: medical students' oath ceremony and the memorial ceremony for body donors are conducted on a regular basis, while the two humanistic practice acts of delivering gratitude cards and bowing in tribute are standardized, using solemn ritual to strengthen students' reverence for life and professional mission. The "three letters" thematic activity requires students to write letters to body donors, their future selves and patients, encouraging multi-perspective reflection on medical dedication, professional accountability and doctor-patient relationships, as well as enhanced humanistic empathy. The "four competitions" provide a competitive education platform: anatomy knowledge contests, skills operation contests, anatomy-and-humanities essay competitions, and sectional imaging anatomy contests are held regularly, promoting learning and reflection through competition and internalizing the medical ethos of "reverence for life, willingness to contribute, and boundless love" into students' hearts and deeds.

4.2 Building a Three-Tier "Theory–Practice–Service" System to Create a Distinctive Humanistic Education Brand

To address the problems of disconnection between humanistic education and clinical practice and social service, and the weak implementation of educational outcomes, and based on the frontier trend of "socialized humanistic education and extended educational outcomes," this study builds a full-chain medical humanities service system of theoretical foundation, practical empowerment, and service sublimation on the basis of the *112234* educational carriers, forming a closed-loop humanistic education mechanism.

At the theoretical foundation level, immersive activities such as oath ceremonies, memorial ceremonies, gratitude and tribute, and letter writing help students establish life ethics awareness and medical professional convictions, consolidating the ideological foundation of humanistic education and addressing the core problems of weak humanistic cognition and lack of empathy. At the practical empowerment level, humanistic principles are deeply integrated into anatomy laboratory teaching and extracurricular social practice, guiding students to practice humanistic norms during specimen handling and structure identification, standardizing experimental operation behaviors, cherishing teaching specimens, and simultaneously refining core clinical competencies such as physician-patient communication and humanistic care—overcoming the educational drawback of traditional teaching that emphasizes skills over literacy.

At the service sublimation level, through achievement exhibitions of competitions, promotion of humanistic activities, and public science communication about body donation, a school ethos of virtue and practice is fostered internally while the spirit of medical humanities is disseminated externally. Outstanding students are recruited as dedicated docents of the specimen exhibition hall and humanistic learning garden to provide science popularization and health education services on and off campus. This extends medical humanities education from the classroom to society, achieves the socialized output of educational value, and creates a replicable and scalable distinctive brand of humanistic education in anatomy.

4.3 Integrating Diversified Teaching Paradigms Throughout the Whole Process to Achieve In-Depth Integration of Humanities and Professional Training

To address the problems of single content, rigid forms, and superficial integration in traditional humanistic teaching, and aligned with the research hotspots identified by the CiteSpace analysis—diversified teaching, blended learning, and scenario-based teaching—this study reconstructs a pre-class, in-class, and post-class integrated teaching system based on the *112234* model, achieving normalized, deep integration of humanistic and professional education.

Before class, immersive preview is conducted through the specimen exhibition hall and virtual anatomy platform to help students build structural cognition; pre-class humanistic activities such as the learning garden, memorial ceremony, and letter writing create an immersive humanistic atmosphere and guide students to develop professional awareness of reverence for life and gratitude for dedication. During class, teachers deliver real-scene professional teaching using physical specimens and sectional images, while simultaneously integrating humanistic content such as medical ethics, physician-patient care, and professional responsibility, and aligning students' practical operations with competition standards, so that professional explanation and humanistic guidance advance in tandem and mutually reinforce each other. After class, students use the interactive section of the humanistic garden to reflect on their learning and summarize insights; teachers provide targeted humanistic guidance and academic feedback, and conduct comprehensive evaluation based on competition results and classroom performance, promoting bidirectional improvement of

students' professional competence and humanistic literacy.

Meanwhile, grounded in the Outcome-Based Education (OBE) philosophy, the model integrates diverse methods including flipped classroom, case-inspired teaching, Sandwich teaching, and blended online-offline learning. The flipped classroom cultivates students' independent inquiry and teamwork; real clinical physician-patient cases inspire their critical thinking and humanistic reflection; Sandwich teaching organically connects theory lectures, simulated practice, and humanistic discussion; and blended learning enriches humanistic learning resources and broadens educational pathways. Together, these methods comprehensively address the problems of the single traditional teaching model, low student engagement, and formalistic humanistic education.

4.4 Strengthening Faculty Humanistic Literacy to Build the Core Support for Coordinated Education

To address the integration-mechanism shortcomings of a shortage of interdisciplinary humanistic faculty and insufficient teaching resource support, this study establishes a normalized mechanism for faculty humanistic cultivation and practical empowerment, building a "dual-qualified" teaching team with strong professional expertise and deep humanistic grounding. Teachers are required to deeply participate in the entire process of laboratory culture construction, organization of humanistic activities, and public welfare service. By regularly maintaining and updating specimen displays and humanistic garden exhibits, they deepen their mastery of anatomical knowledge and disciplinary humanistic connotations, accurately grasp students' learning patterns and humanistic growth needs, and enhance their ability to infuse humanistic values in the classroom.

Teachers participate throughout in ritualized educational activities such as memorial ceremonies for body donors, medical student oath ceremonies, and gratitude tributes, deeply appreciating the sacredness of the medical profession and the core value of life education, and accurately guiding students to form correct views on life, profession, and medical ethics. Meanwhile, through social practice such as free clinics and science popularization, community service, and lectures on body donation, teachers continuously broaden their humanistic horizons and social-service awareness, enhancing their own medical humanistic literacy and ability to foster virtue through education. This overcomes the traditional problem of insufficient faculty humanistic competence and weak implementation of integrated teaching, and provides long-term faculty support for the deep integration of humanistic education and anatomy laboratory work.

4.5 Deepening the Integration of OBE Philosophy to Build a Long-Term Holistic Education Mechanism

Closely aligned with the frontier orientation of New Medical Science and curriculum ideology, this approach adheres to student-centered development and outcome-based orientation, embedding the OBE philosophy throughout the entire process of integrating anatomy laboratory teaching and humanistic education. Based on the distinctive *112234* teaching model and the "theory–practice–service" educational system, teaching objectives, teaching processes, and evaluation systems are reconstructed, focusing on the holistic cultivation of students' independent learning ability, clinical practical ability, clinical reasoning ability, teamwork ability, and medical humanistic literacy.

Through the coordination of hardware and software educational scenarios, the integration of diversified teaching methods, and bidirectional humanistic empowerment between teachers and students, this approach thoroughly corrects the traditional educational bias of "emphasizing technology over humanities and theory over practice," and builds a long-term integration mechanism in which professional teaching and humanistic education resonate at the same frequency and mutually reinforce each other. It achieves the integrated cultivation of medical knowledge, practical skills, professional competence, and humanistic spirit, meeting the requirement of training outstanding medical professionals in the new era who integrate moral character with technical excellence.

5. Conclusion

In summary, based on a CiteSpace bibliometric analysis, this project systematically reviews the research status, thematic clusters, temporal evolution, and hotspot bursts in the field of humanistic education in anatomy from 1990 to 2026. It reveals that although the field has formed a relatively mature thematic system, four practical pain points remain: lagging construction of the humanistic laboratory environment, the absence of cultivation of students' respect for life and empathy, monotonous educational content and forms, and an imperfect integration mechanism between humanities and anatomy. Addressing these problems, this project constructs a four-in-one reform pathway of "environmental immersion, emotional cultivation, diversified empowerment, and systematic guarantee," achieving precise alignment of problems and measures through the systematic implementation of the 112234 teaching model and the comprehensive construction of the "theory–practice–service" medical humanities service system. The project is expected to achieve coordinated educational outcomes in four dimensions — environment, emotion, competence, and values — providing a replicable and scalable practical paradigm for humanistic education reform in anatomy courses at local medical colleges, and contributing to the cultivation of applied medical professionals with noble medical ethics, exquisite clinical skills, and deep humanistic compassion.

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