Examining Pathways to Enhance the Academic Competencies of Chinese Master's Students in Sports: A Qualitative Analysis Based on Grounded Theory

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Abstract: This study utilizes grounded theory methodology to conduct an in-depth analysis based on interviews with 24 sports master's students, aiming to explore the enhancement pathways for academic capabilities in this demographic within China. The findings highlight several key factors affecting these capabilities: individual factors, mentorship, and environmental conditions. Specifically, graduate funding and living conditions directly impact the academic capabilities of sports master's students, whereas the extent of institutional focus and the level of school support along with geographical factors have a latent effect. Additionally, the role of mentors is found to modulate and enhance these environmental conditions. Proposed developmental pathways include: 1) Stimulating internal drivers by emphasizing the integration of extensive and intensive literature reviews to strengthen and implement theoretical research foundations; 2) Boosting external drivers through enhancing mentor-student interactions to foster positive relational development; 3) Building supportive environmental conditions by actively coordinating life and research funding aspects to fully enhance academic capabilities.
Keywords: Sports Master's; academic competency; Enhancement Pathways; Grounded Theory

1 Introduction

According to the Ministry of Education's 2022 Education Statistics, China enrolled 1.1035 million master's students in 2022, with 689,700 pursuing professional master's degrees and 413,700 pursuing academic master's degrees [1]. The professional-to-academic enrollment ratio of approximately 2:1 highlights the scale and complexity of professional master's education. Sports master's programs, as part of China's graduate education framework, aim to integrate theoretical knowledge with practical skills, humanistic values with scientific rigor, and professional expertise with broad competencies. These programs focus on skill enhancement and the development of well-rounded professionals [2].

Sports master's students now face stricter thesis evaluations and random inspections [3]. Their limited ability to conduct in-depth literature reviews and synthesis [4] often results in theses lacking strong theoretical foundations and scholarly significance [5]. Addressing these challenges requires a fundamental enhancement of their academic competencies.

Sports master's programs, combining methodologies from both the social and natural sciences, present unique challenges in developing academic competencies. Research on the academic development of sports graduate students in China is limited, typically focusing on external factors, such as mentorship, curriculum, and pedagogy [6][7][8], and student-related factors, such as research skills and training [9][10]. The first Chinese study on this topic, published in 2009, highlighted the link between academic innovation and core values [11]. However, research in this area remains sparse and lacks high-quality contributions.

Current research in China on developing academic competencies in sports master's students shows: (1) diverse perspectives but homogeneous findings; (2) reliance on single-method approaches; (3) a narrow focus on mentors, curriculum, and student factors, while overlooking broader influences; and (4) a lack of practical strategies for improvement.

To address these gaps, this study centers on a fundamental question: "How can the academic competencies of Chinese sports master's students be effectively enhanced?" It also explores related sub-questions: "How are such competencies formed and developed? Which factors influence their progression, and how do these factors interrelate?" Drawing on grounded theory, we conducted in-depth interviews with 24 sports master's graduates from a range of institutions (16 comprehensive universities and 8 specialized universities) who had published at least one paper in CSSCI, SCI, SSCI, CSCD, or a key journal recognized by Peking University during their graduate studies. We then applied three-level coding to analyze the interview data. Ultimately, we constructed a theoretical model for enhancing Chinese sports master's students' academic competencies and proposed corresponding implementation pathways.

1 Research Design and Data Collection
1.1 Method Selection

Grounded theory is not strictly a "theory" per se, but rather a theoretical construction method based on the analysis of qualitative research data [12]. It is regarded as one of the most scientifically rigorous methodologies within qualitative research [13]. The generally accepted procedures for grounded theory research are illustrated in Figure 1.
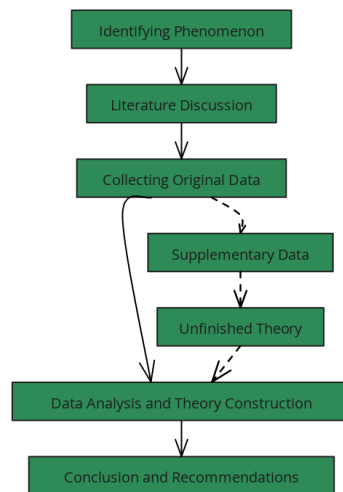
Figure 1. Research Process of Grounded Theory

Based on the above considerations, this study adopts grounded theory for two main reasons: (1) There is a scarcity of research on enhancing the academic competencies of sports master's students. Therefore, selecting a bottom-up, data-driven approach like grounded theory to construct a theoretical model from original data and experiences is justified. (2) Relying solely on literature reviews, surveys, or interviews would not provide sufficient depth to uncover the intrinsic mechanisms underlying the formation and improvement of academic competencies. Grounded theory, through its longitudinal and context-sensitive examination of complex social settings, can identify dynamic processes, evolving patterns, and interactive relationships. This advantage makes it particularly suitable for addressing pathway-related issues.

1.2 Data Collection
1.2.1 Sample Selection
In social science research, it is not feasible to survey every potential participant; therefore, a subset must be chosen [14]. Given the clear objectives of this study and the need for high-quality original data, we set strict criteria for sample selection. Specifically, the "high-quality sample" consists of sports master's graduates who, during their graduate studies, published at least one paper in CSSCI, SCI, SSCI, CSCD, or a key journal recognized by Peking University. Emphasis was placed on the quality of the data rather than quantity. Following these criteria, we selected 24 outstanding sports master's students—16 from comprehensive universities and 8 from specialized universities.

1.2.2 In-depth Interviews
A semi-structured interview format was adopted. After discussing the proposed research framework with several experts, an interview outline was developed.The semi-structured interview guide serves primarily as a tool to help researchers structure their thoughts, rather than as a strict protocol to follow during the interview. In conducting in-depth interviews, the researcher employs a grounded theory methodology, maintaining a high level of attentiveness to the interviewee's responses. This approach allows the researcher to capture the "local discourse" of participants and to ask probing follow-up questions as the conversation unfolds. Core questions included: "What do you consider academic competency to be? How is it formed, and how can it be improved? How do you cultivate an interest in academic research? What factors influence its development, and how are these factors interrelated?" "When publishing

your first high-quality journal article, which factors played a role? What setbacks and difficulties did you encounter, and how did you select your research topic?" Grounded theory studies typically involve 20–30 interviewees [15]. In this study, 24 sports master's graduates (16 from comprehensive universities and 8 from specialized universities) were interviewed one-on-one between September and December 2023. Each interview lasted between 35 and 120 minutes and took place either in-person (17 participants) or online (7 participants). With participants' consent, a confidentiality agreement was signed and the entire interview was recorded. The final compiled interview transcripts amounted to approximately 353,900 characters.An example of the open coding process is shown in Table 1.

Table 1: Detailed Information of Some Interview Participants

ID	Gender	University	Current Status	Interview Date	Interview Duration	Transcribed Text	Publications during Master's	Publications after Master's
Y1	Male	Comprehensive	Graduated one year ago (currently PhD)	2023.09.14	54 min	12,881 characters	2 SCI Q2; 1 SCI Q2	2 SCI Q2; 1 SCI Q3
Y2	Male	Comprehensive	Third year of PhD	2023.09.11	43 min	10,399 characters	1 Sports Science; 1 SSCI Q2	
Y3	Male	Specialized	Graduated one year ago (currently PhD)	2023.09.10	66 min	17,874 characters	1 Journal of Shenyang Sport University; 1 Journal of Wuhan Institute of Physical Education	
Y4	Female	Comprehensive	Third year of PhD	2023.09.13	51 min	12,013 characters	1 SCI Q2	

| Y5 | Male | Comprehensive | Graduated two years ago (planning PhD) | 2023.09.17 | 47 min | 11,066 characters | 2 Chinese Journal of Tissue Engineering Research; 1 Sports Science; 1 Chinese Sports Technology; 1 Modern Preventive Medicine | 1 Modern Preventive Medicine |

2 Data Analysis

2.1 Open Coding

Open coding represents the first level of coding in grounded theory. During the interview process, new issues emerged and were probed further. Subsequently, audio recordings were transcribed into text. The researcher then approached the original material with a completely open mindset, analyzing, integrating, and labeling the data word by word, sentence by sentence, line by line, paragraph by paragraph, or event by event. From these data, key pieces of information were identified and labeled. In this study, a total of 490 key information labels were generated. By comparing these labels, examining similarities and differences, and identifying their properties, structures, and causal relationships, the researcher grouped labels of similar meaning into concepts. Then, through further comparative analysis among these concepts, categories were ultimately unified. An example of the open coding process is shown in Table 2.

Table 2. Example of the Open Coding Process

Category	Conceptualization	Tags	Original Statement
Academic Competence Manifestation	Writing Papers Publishing Papers	Literature reading; Trend application; Academic sensitivity; Thesis selection; Research methodology; Logical ability; Summary and innovation; Journal selection	"Repairman Effect": Mastery of research methods is like a repairman—the more tools you have, the better you can solve problems. (Y2) Reading literature helps understand past views, find new research areas, and guide thesis direction. (Y8) When choosing a topic, identify innovative points from reading, then discuss with a mentor to finalize. (Y3) I link trending topics with paper writing to boost publication chances (Y15) Refining article structure, grammar, and innovation points should progressively improve during the writing process. (Y4) Submitting a paper is an art; finding a matching journal with a short review cycle is challenging. (Y2)...

A total of 52 categories were ultimately abstracted: effort level, study engagement, self-discipline, interest cultivation, learning attitude, motivation for graduate studies, manifestations of academic competency, motivation for enhancing academic competency, formation of academic competency, primary training environment, technological influence, mentor's academic output, mentor's professional guidance, mentor's academic rank, mentor's social influence, mentor's level of expectations, mentor's training methods, mentor's conveyed principles, mentor's encouragement level, mentor's available time and energy, mentor's mentoring attitude, regularly scheduled group meetings, mentor-arranged courses, mentor-student communication methods, mentor-student communication venues, mentor's behavioral perceptions, ethical perceptions, curriculum-related factors, experimental equipment, study environment, opportunities for academic exchange, funding support, academic incentive mechanisms, institutional culture, academic resources, institutional support for research projects, institutional academic incentive mechanisms, dormitories, parental attitudes, peer influence, the academic atmosphere of the mentor's research group, institutional financial support at the departmental level, institutional financial support at the university level, mentor's project support, aspirations for advanced academic institutions, labor market demands, local sports culture, influence of physical exercise, outlook on pursuing graduate studies, physical foundation, graduation planning, and differences between master's and undergraduate phases. Table 3 provides a partial example of the coding process from conceptualization to categorization.

Table 3. Partial Presentation of the Open Coding Results

Category	Concept	Tags
Effort Level	Efficiency	Efficiency (High, Low)
	Time	Time Spent on Learning (Much, Little)
Learning Investment	Cognitive Investment	Mental Effort (Understanding, Memory, Problem-solving)
	Emotional Investment	Emotional Experience (Interest, Enthusiasm, Frustration, Satisfaction)
	Behavioral Investment	Actual Actions
Self-discipline	Daily Habits	Learning is a habit
	Independent Learning	No need for external prompting, self-directed learning
	Work-rest Arrangement	Forgo sleep to allocate tasks efficiently
	Goal Setting and Pursuit	Set specific goals, achieve expectations
	Emotional Management	Effectively control one's emotions
	Self-regulation	Clearly know what to do at each stage
Interest Cultivation	Life Experience	Focus on Hot Topics
	Mentor Introduction	Peer Communication (Classmate Interaction)
	Material Basis Rewards	Mentor Leads the Way
	Subjective	Academic Reward Mechanisms in Colleges and Universities
	Consciousness	Inherent Love, Actively Cultivating

2.2 Axial Coding
Axial coding refines and integrates the multitude of initial concepts identified during open coding, establishing interconnections and logical sequences among them. After comparing and analyzing the 53 categories derived from open coding, these were further distilled into 14 main categories: academic attitude, personal aspirations, reflections on academic competency, the degree of departmental emphasis, the mentor's personal competencies, the mentor's

educational style, the mentor's level of involvement, communication methods, the mentor's professional ethics and conduct, institutional support, living environment, graduate funding, regional factors, and academic safeguards. As shown in Table 4:

Table 4. Full Display of the Axial Coding Process

Main Category	Category	Included Concepts
Academic Attitude	Effort Level； Learning InvestmLearning Attitude cipline； Interest Cultivation； Learning Attitude	Energy; Time Cognitive Investment; Emotional Investment; Behavioral Investment Daily Habits; Independent Learning; Work-rest Arrangement (Forgo Sleep; Task Allocation); Goal Setting and Pursuit; Emotional Management; Self-regulation Life Experience; Mentor Introduction; Material Basis Rewards; Subjective Consciousness (Inherent Love, Actively Cultivating)
Personal Ideal	Motivation for Postgraduate Entrance Exam； Prospects for Postgraduate Studies； Graduation Planning	Employment; Self-improvement； Clear Positioning; Continue to Doctorate; Employment； Doctorate; Primary/Secondary Education; Civil Servant; Vocational Education
Academic Ability Reflection	Formation； Mode of Expression； Motivation for Improvement； Main Training Locations； Impact of Technology； Differences between Bachelor's and Master's Degrees	Independent Thinking; Independent Discovery; Independent Writing Writing Papers; Publishing Papers Ideal; Desire for Knowledge; External Stimuli Dormitory; Library; College Study Room; Laboratory Tool Software; Artificial Intelligence Comprehensive Ability, Quality; Scientific Research Practice; Employment
Degree of Importance Placed by the College	Course Factors Experimental Equipment Learning Locations Opportunities for Communication Fund Support Academic Reward Mechanisms Culture	Teaching Method; Faculty Provision; Course Selection Abundant; Old; "Institute-Enterprise" Cooperation; "Institute-Institute" Cooperation; Course Selection Study Room; Classroom Open Academic Salon; Special Report; Academic Lecture Self-established Scientific Research Fund Reward Mechanisms for SCI Journal Partitioning; CSSCI Reward Mechanism; Peking University Core Reward Mechanism Academic Style; Academic Culture; Academic Tradition
Mentor's Own Capabilities	Academic Achievements Professional Title Professional Guidance Social Influence	Abundant; Not Abundant Associate/Full Professor Thesis Writing; Journal Selection Guidance Networking Resources；Submission Platform
Mentor's Educational Style	Level of Requirement Cultivation Method Conveying Ideas Level of Motivation	Supervisory; Liberal Focus on Individual Cultivation; Emphasize Group Cultivation More Emphasis on Academic Output; More Emphasis on Process Cultivation Character; Leading the Way; Academic Innovation; Daring to Make Mistakes; Read More; Write More Encourage Ideas; Require Direction
Level of Participation	Energy Attitude (Cooperation)	Age Active Guidance; Passive Guidance

Form of Communication with Students	Regular Group Meetings	Meeting Format; Meeting Content; Meeting Frequency
	Arrange Courses	Tool Courses; Literature Review Courses; Thesis Writing and Publishing Courses
	Communication Method	Offline (Frequency High, Low); Telephone (Frequency High, Low)
	Communication Venue	College; Sports Field; Other Places
Mentor's Ethics and Style	Behavioral Cognition	Mentor-Student Relationship (Good Promotion, Employment)
	Moral Cognition	Diminished Sense of Responsibility, Damaging Students' Legitimate Rights and Interests
Level of School Support	Academic Resources；Project Proposal；Academic Reward Mechanisms	Library Construction; Open Classrooms (Used as Study Rooms); Arrangement of Academic Lectures, Conferences, Forums; Foreign Language Assistance
		Project Diversity; Number of Places
		Social Sciences (Grade 1 to 3); Natural Sciences (Grade 1 to 3)
Living Atmosphere	Dormitory	Dormitory Conditions; Study Atmosphere
	Parental Attitude	Support; Neutral; Oppose
	Peer Influence	Role Model; Inspiring Progress; Learning Attitude; Academic Exchange; Stress Relief
	Academic Atmosphere in the Mentor Group	Single-Line Strategy; Collective Intelligence PR; Private Academic Exchange; Senior Mentor Guidance
	Impact of Sports	Sport Itself; Sports Media
Graduate Funding	College Financial Support	Page Charges; Field Research; Academic Conferences (Travel)
	School Financial Support	Scholarship; Academic Scholarship; Inspirational Scholarship; Other Scholarships; Poverty Assistance; Student Loans
	Mentor's Project Support	Academic Reimbursement; Student Participation
Regional Factors	Labor Market Demand	Interview Competition; Policy Incentives
	Local Sports Atmosphere	Sports Infrastructure; Number of Celebrity Experts
	Universities Desired for Further Study	Number of Core Journal and Magazine Offices
		Conditions for Advanced Study at Universities
Academic Security	Physical Foundation	Academic Research Stability Guarantee
		The Foundation of Health

2.3 Selective Coding

The main goal of selective coding is to identify a core category that integrates all the main categories derived from axial coding and to establish a new theoretical framework supported by propositional conclusions [16]. By continuously analyzing and comparing the relationships among the main categories and connecting them into a narrative storyline, the coding process reveals the phenomena and patterns it aims to present and constructs a new theoretical framework for enhancing the academic competencies of sports master's students.

Ultimately, three core categories emerged: student-related factors, environmental factors, and mentor-related factors. The student-related domain includes reflections on academic competency, academic attitude, and personal aspirations; the mentor-related domain comprises the mentor's own competencies, educational style, level of involvement, communication methods, and professional ethics and conduct; and the environmental domain encompasses the living atmosphere, the degree of departmental emphasis, the level of institutional support, graduate funding, and regional factors. The selective coding process is shown in Table 5.

Table 5. Results of Selective Coding

Core Category	Main Category	Core Category	Main Category	Core Category	Main Category
Main Factors	Academic Ability Reflection Academic Attitude Personal Ideal	Environmental Factors	Living Atmosphere Degree of Importance Placed by the College Level of School Support Graduate Funding Regional Factors	Mentor Factors	Own Capabilities Educational Style Level of Participation Form of Communication Mentor's Ethics and Style

2.4 Identifying Core Categories and Constructing a Theoretical Model

The narrative surrounding the core categories can be summarized as follows: The key elements influencing the enhancement of sports master's students' academic competencies encompass student-related contexts, specialized sports domains, pedagogical factors, and environmental factors. Based on these insights, a new model for improving the academic competencies of sports master's students can be constructed, as shown in Figure 2.
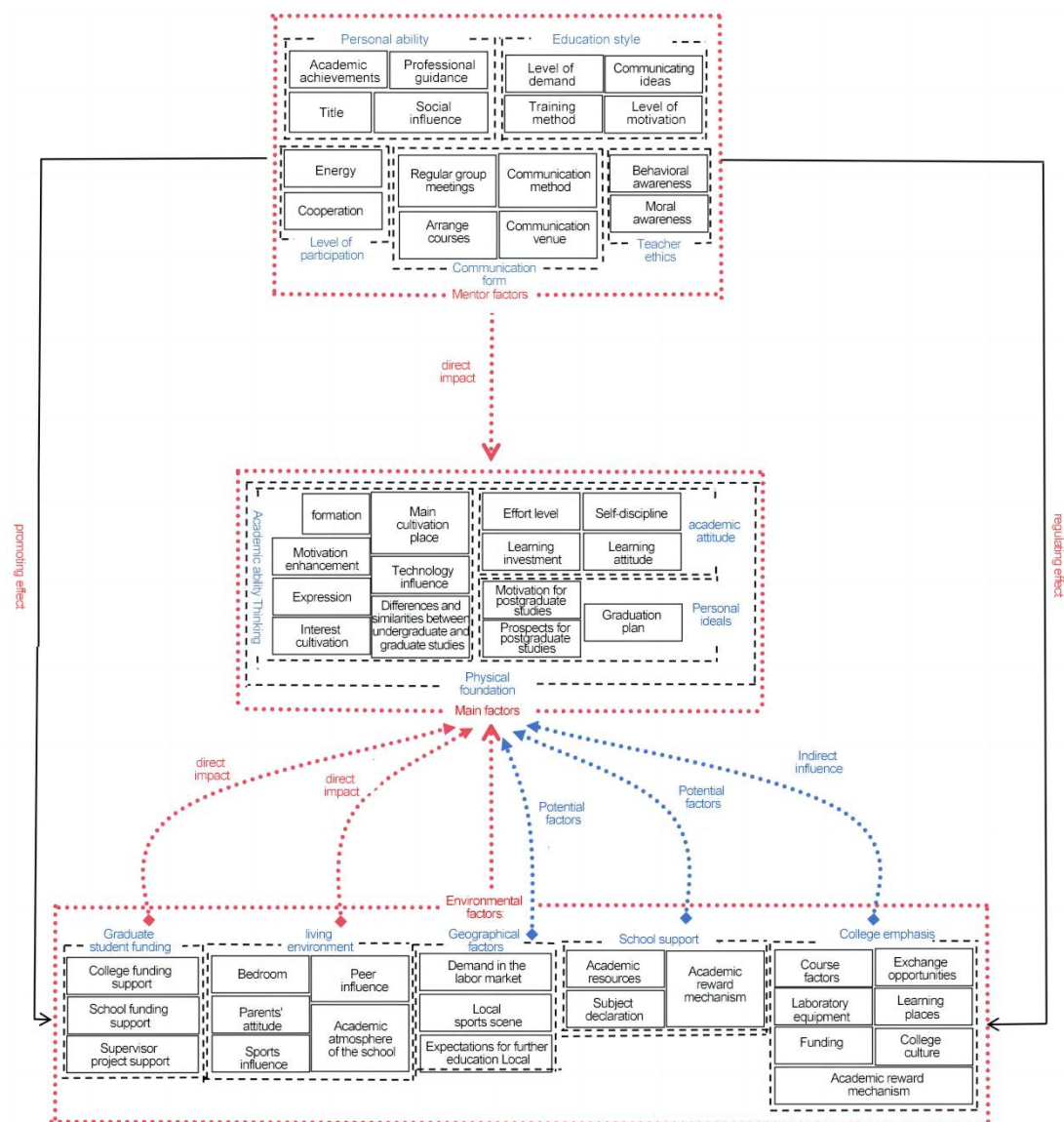
Figure 2. Model of Pathways for Enhancing the Academic Competencies of Chinese Sports Master's Students

From this model, it is evident that the primary factors influencing the development of Chinese sports master's students' academic competencies are student-related factors, mentor-related factors, and environmental factors. Student-related factors include reflections on academic competency, academic attitude, and personal aspirations; mentor-related factors comprise the mentor's own competencies, educational style, level of involvement, communication methods, and professional ethics; and environmental factors encompass the living atmosphere, the degree of departmental emphasis, the level of institutional support, graduate funding, and regional contexts.

Among these, student-related and mentor-related factors have a direct impact on improving the academic competencies of Chinese sports master's students. Within the environmental domain, graduate funding and living atmosphere exert a direct influence, departmental emphasis indirectly affects academic competency enhancement, and institutional support and regional

factors have potential impacts. Moreover, mentor-related factors serve to moderate and promote the influence of environmental factors. All these dynamics function on the premise that Chinese sports master's students possess a solid physical foundation as a prerequisite.

2.5 Testing for Theoretical Saturation

To ensure the richness of the research data and minimize the omission of results, an additional six interviews (one-quarter of the initial sample size) were conducted with sports master's students who met the pre-established criteria of this study. After collecting and coding these new data, a cross-analysis was conducted between the newly obtained codes and the previously gathered codes to determine whether any new concepts or categories emerged. The results indicated that no new categories or relationships were identified, suggesting that the previously constructed model for enhancing the academic competencies of sports master's students was sufficiently comprehensive. Hence, the model achieved theoretical saturation.

3 Conclusions and Recommendations

Informed by previous analyses of the operational mechanisms and outcomes of a model designed to enhance the academic capabilities of Master's students in physical education in China, and following subsequent reflection by the researchers, several strategic pathways are proposed to advance the academic development of these students. These recommendations are intended to serve as a guide for academic departments involved in the training of Master's students in physical education, as well as for the students themselves. The goal is to foster improvements in the academic competencies of these students, thereby elevating the overall quality of physical education graduate education in China.

3.1 Research Conclusions

3.1.1 Internal Driving Forces within Students Stimulate the Enhancement of Academic Competencies

Researchers consider internal motivation to be an internal stimulus that activates behavior—this can be innate (e.g., thirst, hunger) or acquired through reflective thinking. In this study, the reflections on academic competency, academic attitude, and personal aspirations of sports master's students serve as the internal driving forces, representing a way to better interpret the internal context of the student:

(1) Continuous reflection on academic competency spans the entire graduate journey. This includes contemplating the formation of academic competency, its manifestations, the motivation for enhancement, primary training venues, technological influences, and differences from the undergraduate stage. Such purposeful introspection generates internal motivation, steadily driving the improvement of academic competencies.

(2) Conducting academic research requires a humble and rigorous attitude. Academic attitude, to a certain extent, determines the quality and quantity of academic outputs. It is reflected in effort level, study engagement, self-discipline, interest cultivation, and learning attitude.

(3) Personal aspirations are a guiding beacon, illuminating the path of academic research for sports master's students. Each key element on the pathway to enhancing academic competency becomes more vibrant when illuminated by personal aspirations, which are evident in students' motivations for pursuing graduate studies, their outlook on future academic prospects, and their expectations upon graduation.

3.1.2 mentor-Related Factors as External Drivers of Academic Competency Enhancement
mentor-related factors not only play a critical role in training sports master's students but also shape their academic growth. The mentor's role is central among the external driving forces, reflected in the mentor's competencies, educational style, level of involvement, professionalism and ethics, and communication methods:

(1) The mentor's competencies include the breadth and depth of academic outputs, academic rank, and professional capabilities in guiding topic selection, manuscript preparation, journal targeting, and leveraging social influence and networks.

(2) The mentor's educational style encompasses the degree of expectations, training methods, conveyed principles, and the level of encouragement. All these aspects profoundly influence students' academic competencies and development.

(3) The mentor's level of involvement reveals their sense of responsibility and helps determine whether they can be considered a "qualified" mentor. This qualification is gauged by the mentor's available time and energy as well as their mentoring attitude.

(4) Communication methods between mentors and students—such as regular group meetings, mentor-arranged courses, the modes and settings of mentor-student interaction—are crucial elements during the graduate study period.

(5) The mentor's professionalism and ethics, encompassing both behavioral cognition and moral understanding, reflect professional competency and educational quality. This plays a key role in improving teaching quality, shaping positive faculty-student relationships, and fostering students' comprehensive development.

3.1.3 Environmental Factors Exert Direct or Potential Influences on Academic Competency Enhancement
Environmental factors are critical to the growth and development of sports master's students. From an educational ecology perspective, the academic environment and graduate students form an interconnected and mutually influential community, often termed the "academic ecosystem." Drawing from educational ecology, the collected data, and the researchers' insights, this study identifies the following environmental factors: living atmosphere, the degree of departmental emphasis, institutional support, graduate funding, and regional contexts.

(1) The living atmosphere is manifested in dormitory conditions, parental attitudes, peer relations, the academic climate within the mentor's research group, and the influence of sports and physical exercise. This atmosphere is akin to the soil in which knowledge is sown, determining the speed and quality of its growth.

(2) Departmental emphasis indirectly affects the academic competency of sports master's students. Specific dimensions include curriculum factors, facilities and equipment, study environments, opportunities for exchange, grant funding, academic incentive mechanisms, and departmental culture.

(3) Institutional support, manifested through academic resources, project applications, and academic incentive mechanisms at the university level, has a potential impact on enhancing sports master's academic competencies.

(4) Graduate funding mechanisms form an essential component of the long-term quality assurance and intrinsic motivation systems in graduate education [17]. They include departmental funding, institutional financial support, and mentor-supported projects. Notably, the allocation of scholarships—an integral part of institutional support—can encourage students to strive harder in academic research. However, fairness issues in scholarship allocation have arisen, as some interviewees noted. These issues appear on two levels:

Scholarship eligibility criteria: Students with extensive social practice experiences often surpass those who focus on research in comprehensive evaluations.

The influence of mentors and student counselors: Students who have favorable relationships with counselors or hold class positions may receive higher comprehensive evaluations than research-focused students.

The resulting impact is that students who have received first-class scholarships over three years are more readily hired by employers. This raises the question: Are first-class scholarship recipients necessarily more outstanding than second-class scholarship recipients who devote themselves solely to research?

(5) Regional factors—aspirations for pursuing further education at top universities, labor market demands, and the local sports culture—all exert a subtle influence on the academic competency development of sports master's students.

3.2 Discussion of Enhancement Pathways
Building on the operational mechanisms and findings derived from the model of enhancing Chinese sports master's students' academic competencies, along with the researcher's reflections, we propose several pathways to facilitate academic competency development. These recommendations aim to assist both departments involved in training sports master's students and the students themselves, ultimately improving the overall quality of their education in China.

3.2.3 Stimulating Internal Motivation—Emphasizing the Organic Integration of Extensive and Intensive Literature Reading to Strengthen and Implement Theoretical Foundations
The phrase "Broad learning, thorough inquiry, careful reflection, clear discrimination, and earnest practice" comes from *The Doctrine of the Mean·Chapter 20*, illustrating two progressive phases of learning. Here, we focus on literature reading and academic writing.

(1) Phase One: Integrating Extensive and Intensive Literature Reading
The first phase in developing the academic research pathway for sports master's students involves cultivating both the breadth and depth of literature reading, corresponding to the notion of "broad learning." After accumulating a certain level of knowledge and engaging in rigorous thinking, students should "thoroughly inquire" and "carefully reflect" on each piece of literature. Selecting key information from the literature corresponds to "clear discrimination." This is not

only a necessary prerequisite for researchers conducting academic studies but also a critical stage for novice researchers (mainly master's students) entering and building their academic competence [18].

How can students ensure a sufficient quantity of literature while also rapidly extracting key elements such as main ideas, writing logic, and research methods from each paper to enhance reading depth? The following strategies are recommended [19]:

Skimming to Identify Key Points: Start by quickly understanding the title and abstract to determine if the paper is worth a closer look. Next, review the study's subjects and methods. For lengthy papers, rapidly identify their main ideas. Read the first and last paragraphs (the conclusion) to decide whether the paper warrants further exploration. Also, skim through figures and tables for a general sense of the research. Finally, read the first and last sentences of each paragraph. By doing so, you complete the skimming process.

Discerning Key Information: Once you find a valuable paper, locate essential content. Typically, focus on the abstract (assessing the paper's research value), introduction (understanding the background and research objectives), conclusions (focusing on key points and visuals), and insights (noting the first and last paragraphs of each section). Afterward, reflect on four questions: What is new or innovative about this paper? What is its research objective? Is there anything you can adopt or cite? Are there limitations or shortcomings? Making reading notes helps maintain both breadth and quality of literature reading, thereby effectively improving academic competencies.

Mastering Intensive Reading to Probe the Essence: Intensive reading selections are drawn from the skimmed literature—generally high-value and high-quality papers characterized by frequent citations, downloads, and relevance to the student's current research direction. After identifying such papers, begin with skimming, then attempt to summarize the article in a few sentences. Next, read critically, pondering the paper's innovations, the problems it aims to solve, its limitations, and missing areas of research. Finally, take detailed notes, recording key information and raising questions. Use your own words to restate research content or viewpoints and note which methods might apply to your future work.

Literature Integration for Expansion and Innovation: After conducting intensive readings in the same research field, compare and analyze the selected papers. Distinguish between previously established insights and unaddressed questions. This step helps clarify research directions and identify valuable points of innovation for future studies.

(2) Phase Two: Implementing Theoretical Foundations in Practice

"Earnest practice" is the final stage, meaning applying acquired knowledge and insights to guide practice. After completing Phase One, students gain a certain level of recognition and understanding of their research direction. However, they should not remain at the cognitive stage; rather, they must embody the principle of "unity of knowledge and action" [20]. In this context, "action" refers to "earnest practice," which corresponds to writing research papers—arguably the clearest reflection of one's academic competency.

Writing a thesis generally involves four stages: the initial stage, the implementation stage, the writing stage, and the submission stage.

Initial Stage: Driven by curiosity and supported by mentor guidance, students develop an initial inclination to write.

Implementation Stage: Students read extensively to establish a theoretical foundation, then select a research topic—either within a range suggested by the mentor or directly assigned—and learn appropriate research methods.

Writing Stage: Students apply these methods, display logical thinking, summarize findings, and innovate.

Submission Stage: Students seek appropriate journals for manuscript submission.

Essentially, the five-word maxim—"broad, thorough, careful, clear, and earnest"—from *The Doctrine of the Mean* aptly encapsulates the entire process of forming and enhancing academic competencies. Chinese sports master's students who sincerely adhere to these principles can expect a qualitative improvement in their academic abilities.

3.2.4 Boosting External Drivers—Emphasizing Mentor-Student Interaction to Foster a Healthy Relationship

"The foundation of goodness lies in education, and the foundation of education lies in teachers." In graduate education, mentors serve as the primary responsible parties for student training, playing a pivotal "bridge" role in promoting student development [21].

(1) Enhancing Students' Pre-Enrollment Mentor Selection and Post-Enrollment Communication Skills

From the student's perspective, discussing mentor-student interaction should begin with mentor selection [22]. An mentor's academic prowess and age significantly influence the improvement of a sports master's student's academic competency. Findings indicate the following key factors in selecting an mentor:

Academic Productivity and Quality, Academic Rank, and Doctoral Supervisory Eligibility: Mentors who can recruit doctoral students usually possess considerable academic influence, research experience, and teaching capabilities. Academic rank (associate or full professor) and professional achievements often determine the level of guidance they can provide.

Social Influence: Mentors with broader networks and social capital can offer students richer academic resources and more publishing platforms.

Mentor's Age and Energy: Younger mentors (under 44) may have more energy to guide students frequently. Middle-aged mentors (45–59) might focus more on their careers, sometimes holding administrative posts, leading to less student supervision. Older mentors (60+) often have substantial social influence and resources but may lack the energy for hands-on mentoring.

In current practice, institutions and mentors hold absolute authority in the mentor-student matching process, focusing primarily on explicit indicators like academic background and test scores, while neglecting implicit factors like personality traits [23]. This approach can breed mismatches and hinder effective mentor-student interaction. Granting students the right to choose their mentors and, by extension, fostering a student-centered ethos, can effectively improve interaction quality [24]. Having this choice allows students to proactively seek information about potential mentors and thus enhance mentor-student interactions. Such empowerment not only underscores a student-centered educational philosophy but also encourages competition among mentors, compelling them to continually improve their academic caliber and mentorship to maintain their reputation.

Furthermore, post-enrollment, students should actively communicate with their mentors. Findings suggest that students who produce high-quality papers often engage regularly with their mentors, whether through scheduled group meetings, mentor-arranged courses, or private consultations. To optimize communication:

Upon enrollment, clarify personal academic goals and expectations with the mentor, then adjust research directions based on their suggestions.

Treat the mentor as an external driving force in achieving personal goals, actively seeking their counsel.

Communicate efficiently: Record questions in a notebook as a numbered list before meetings or send queries in sequence via messaging tools. This approach saves time and increases focus, improving communication efficiency.

(2) Mentors Should Actively Foster Emotional Bonds and Create a Positive Mentor-Student Environment

From the mentor's perspective, results indicate that mentor-related factors directly influence the enhancement of sports master's academic competencies, making the mentor a critical external driver. Mentors should have "measure," "boundaries," and offer "support."

Measure (Depth, Breadth, and Warmth):

Depth: Mentors should thoroughly understand each student's academic progress and assign appropriate tasks. Such regular, in-depth engagement fosters students' academic initiative and competency.

Breadth: Mentors should serve as creators of a conducive environment, organizers of academic interactions, and facilitators of student development. By maintaining an academically vibrant research group and offering guidance tailored to each student's needs, they promote holistic growth.

Warmth: Mentors should exhibit humanistic care, deepening their understanding of students beyond academics and helping them address challenges or anxieties. Such empathy builds strong mentor-student bonds and enhances academic motivation [25].

Boundaries: Mentors should maintain appropriate "boundaries" to prevent overcontrol or exploitation of students [26]. Behaviors that compromise students' rights or reduce them to mere laborers are detrimental [27]. These issues reflect a deviation in the mentor's moral and behavioral cognitions. To safeguard students' legitimate interests, institutions may formalize mentor-student relationships through clear regulations, agreements, and ethical guidelines, referencing international standards (e.g., U.S. policies that categorize mocking or belittling students as discrimination or harassment) [28][29][30]. These measures ensure a fair and respectful environment, encouraging positive interactions and holding mentors accountable for their responsibilities [31].

Support (Mechanisms and Third-Party Intervention): Institutions that train sports master's students should establish mechanisms for mediation and oversight. If conflicts or dissatisfaction arise, students should have access to third-party arbitration [32]. While Chinese universities have dedicated offices and staff for graduate management, they lack effective feedback and supervisory mechanisms for mentor-student relations. Adopting practices from institutions like the University of Melbourne—utilizing graduate research centers, student associations, mentory committees, and platforms for improving graduate mentorship—can offer guidance [33]. Only when mentors resolve issues of measure, boundaries, and support can they enhance mentor-student interactions and effectively bolster students' academic competencies.

3.2.5 Constructing Environmental Factors—Actively Engaging Multiple Elements (Lifestyle, Funding, etc.) for Comprehensive Academic Competency Enhancement

Environmental factors are crucial to improving sports master's students' academic competencies. From an educational ecology perspective, the academic environment and graduate students form an interconnected "academic ecosystem."

(1) Applying Peer Education Models to Enhance Academic Communication Among Students
Peer education emphasizes mutual help among students with similar backgrounds, interests, and knowledge levels. Under this model, students support each other, creating a collaborative rather than isolated learning environment. Drawing on the findings of this study, sports master's students can incorporate peer education into their daily lives:

Dormitory Academic Sharing Sessions: Roommates can hold regular mini-seminars to discuss recent research projects, insights, or difficulties, even sharing emotional burdens.

Sports as a Medium for Academic Exchange: Students can engage in sports together. During breaks or post-exercise gatherings, they can discuss research ideas, fostering intellectual collisions, new insights, and refreshing their minds. Physical exercise relieves pressure, enhances focus, and stimulates academic thinking.

Study Sessions in Designated Classrooms: Members of the same research group can study together in designated study halls or attend regularly scheduled group meetings, share academic progress, and receive feedback.

Small-Scale Academic Forums Organized by the Department: Invite one or two experts or instructors to each forum, select multiple students to present their research, and have other participants ask questions. Experts or instructors then evaluate the presentations, providing valuable feedback.

(2) Strengthening Funding Support from Mentors' Projects and Training Institutions to Provide a Solid Academic Foundation

At the mentor level, granting students more responsibility in research projects can improve academic competencies. Assigning tasks at various stages—project proposals, implementation, and completion—helps students gain hands-on research experience, enhances teamwork, and can ultimately lead to published papers. Mentors can reimburse page fees or travel expenses for academic conferences to encourage students.

At the institutional level, consider the following pathways:

Increasing Departmental Funding, Research Grants, and Academic Incentives: Offer support for journal page fees and fieldwork (including conference participation) to reduce financial burdens on students and mentors. Establish incentive mechanisms tied to SCI, CSSCI, and key national journals, and set up dedicated research funds for various directions. These measures stimulate academic motivation and interest.

Refining Scholarship Criteria and Limiting Counselor Interference: Shift evaluation metrics to focus more on academic achievements and commitment. Consider granting extra points for publications in reputable journals. During departmental reviews, form a scholarship evaluation committee composed of student representatives (avoiding class officials to reduce counselor influence). The counselor serves only as a supervisor to ensure a fair process. Summarize committee results and submit them to department leaders for final review.

(3) Increasing the Emphasis at All Levels and Enriching Academic Exchange Opportunities

At the departmental level, the availability and quality of experimental equipment greatly influence students in sports science or physical education research. Institutions can adopt "department-enterprise" or "inter-departmental" cooperation to alleviate limitations posed by outdated or scarce equipment. Through such collaborations, students gain access to advanced facilities, and the department can recruit better-trained graduates.

Departments should also improve classroom access, create dedicated study spaces, and introduce policies encouraging autonomous study. Enhancing academic exchange opportunities—academic salons, thematic reports, lectures—helps students deepen their understanding of research directions, find solutions to academic bottlenecks, and foster innovation.

Course offerings should include academically targeted courses (research methods, foundational knowledge, literature analysis, and academic writing), interdisciplinary electives, specialized skills courses, and general education classes to nurture comprehensive development [34]. Qualified faculty should be capable researchers to ensure course quality and cutting-edge content. A blend of online and offline teaching methods is recommended to engage students fully.

At the university level, the library should strengthen its online academic resource databases, acquire software licenses, and provide more study seats and research rooms. Enhancing the

availability of sports-related literature and opening classrooms as study spaces improve the learning environment. Offering courses on foreign language testing, literature retrieval, and journal selection for publishing abroad can help students gain international exposure. Additionally, inter-university or university-enterprise collaborations—inviting external experts for academic talks—broaden students' academic horizons.

Through these measures, an enriched academic ecosystem—comprising improved living conditions, increased funding, departmental support, and institutional collaboration—fosters comprehensive academic competency development in Chinese sports master's students.

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