

Exploration of a Postgraduate Scientific Paper Guidance Model Based on Three-Stage Empowerment and Dual-Tutor Collaboration

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Abstract: As China's higher education enters a stage of connotative development, postgraduate education, as the core position for cultivating high-level innovative talents, shoulders the important mission of serving the national strategy of technological self-reliance and self-improvement. Scientific paper writing is a crucial stage for postgraduates to integrate academic knowledge, refine scientific research capabilities, and produce innovative achievements. Its quality directly reflects postgraduates' academic literacy and scientific research potential, and also measures the core effectiveness of postgraduate training in universities. Therefore, it is necessary to strengthen educational reform, construct a three-stage empowerment mechanism integrating basic cognition, ability improvement, and practical output, and leverage the resource integration advantage of "dual-tutor collaboration" to build a new postgraduate scientific paper guidance model. Based on this, this paper analyzes and studies the postgraduate scientific paper guidance model based on three-stage empowerment and dual-tutor collaboration for reference.

Keywords: three-stage empowerment; dual-tutor collaboration; postgraduates; scientific papers; guidance model

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1. Introduction

Postgraduate scientific papers are the core carrier for cultivating scientific research capabilities. They are key indicators for postgraduate graduation assessment and important support for measuring talent training quality and the university's scientific research level. At present, China's postgraduate education is transforming from scale expansion to quality improvement, and there is an urgent need to solve problems in traditional paper guidance such as a single guiding subject and tutors' focus on academic theoretical guidance. Against this background, constructing an integrated mechanism of

three-stage empowerment + dual-tutor collaboration helps carry out educational guidance in a progressive manner, and relies on the collaborative linkage of academic tutors and industry tutors to improve the writing quality and level of postgraduates' scientific papers.

2. Overview of three-stage empowerment and dual-tutor collaboration theories

Three-stage empowerment refers to drawing on the ability progressive training theory, dividing the entire process of postgraduate scientific paper guidance into three stages: basic empowerment, special empowerment, and comprehensive empowerment. Each stage sequentially advances three core goals, forming a gradual and progressive ability training mechanism, thereby realizing the transformation of postgraduates from academic novices to quasi-research practitioners. According to the writing rules of postgraduate scientific papers, the guidance process can be divided into three stages: entry period, critical period, and finalization period, with different empowerment goals and tasks set for each stage. The entry period cultivates students' basic abilities, helping postgraduates establish scientific research thinking and writing foundations. The critical period focuses on cultivating postgraduates' core abilities, focusing on problem exploration and innovative practice. The finalization period pays more attention to result optimization, enhancing the research depth of the paper and its academic nature ^[1-2].

Dual-tutor collaboration breaks the single university guidance teaching model and constructs a dual-tutor team of "university academic tutor + enterprise industry tutor". Academic tutors focus on theoretical guidance through research method guidance and academic standard control, while industry tutors focus on industrial needs, practical scenario connection, and demonstration of the feasibility of achievement transformation. Clarify their respective powers, responsibilities, and collaborative mechanisms to achieve effective connection between academic training and industrial needs ^[3].

3. Practical dilemmas in postgraduate scientific paper guidance

3.1. Imbalanced guidance models

At present, postgraduate scientific paper guidance generally has an imbalance, and there are prone to problems of "spoon-feeding" and "hands-off" guidance. In spoon-feeding guidance, tutors provide direct writing opinions on the entire process of students' paper writing, from topic selection, framework design, data processing to subsequent revision and polishing. Although this guidance model can ensure the progress of paper writing, it is not conducive to postgraduates' independent exploration, making it difficult for them to deeply explore scientific research knowledge, which is not conducive to their future study and development. Unlike spoon-feeding guidance, in hands-off guidance, due to heavy daily teaching and research tasks or deviations in educational concepts, tutors lack scientific and effective guidance for students, only conducting simple reviews before the finalization of the paper. This also leads to students losing their way in the topic selection stage, lacking method support, and the paper progress is relatively lagging. These two models are not conducive to postgraduates' scientific paper writing and difficult to improve their scientific research capabilities ^[4].

3.2. Uneven resource allocation

Unreasonable resource allocation is an important factor affecting the development of guidance work, generally reflected in two aspects: first, the insufficient quantity of guidance resources. With the continuous expansion of the postgraduate scale, the guidance tasks of some university tutors are relatively heavy. Many tutors guide dozens of postgraduates per person, which makes it difficult to ensure sufficient guidance time and energy, and difficult to achieve refined guidance. Second, the serious structural imbalance of guidance resources. Most university tutors are more proficient in academic theoretical research but lack industry practical experience, unable to guide postgraduates to combine theory and practice. This also

leads to the disconnection between paper research and actual needs, and the research results have no application value^[5]. In addition, the introduction of industry resources is insufficient, and industry tutors' participation in guidance lacks the support of more cutting-edge academic materials, making it difficult to make up for the deficiencies in practical guidance.

3.3. Lack of process management

The traditional guidance model lacks a systematic and perfect management and feedback mechanism. On the one hand, feedback is mainly result-oriented rather than process-oriented. Tutors often conduct centralized evaluations only after students submit the complete first draft. The feedback content mainly includes vague understandings such as chaotic logic and imprecise argumentation, lacking operable suggestions for specific links. This also makes it difficult for students to accurately locate problems, which is not conducive to their efficient completion of the paper^[6]. On the other hand, the evaluation mechanism is not sound, mainly taking the final results as the core evaluation orientation, which also ignores the improvement of postgraduates during the research period, is not conducive to fully reflecting the effect of guidance, and cannot provide support for the process optimization of guidance.

3.4. Poor integration of learning and application

At present, postgraduate scientific papers focus more on theoretical research, which is disconnected from industry development, and the technological transformation value of the results needs to be improved. The root cause of this problem lies in the lack of practical orientation in the guidance process. On-campus tutors pay more attention to determining research directions based on hot academic topics, which directly ignores the actual situation of industry development. Postgraduates lack more opportunities for practical projects, unable to obtain real data and resources, which also leads to paper research staying at the theoretical analysis level and difficult to solve industry problems. This problem of separation between academia and practice directly reduces the value of scientific papers and is not conducive to the formation of postgraduates' practical innovation capabilities^[7-8].

4. Postgraduate scientific paper guidance model based on three-stage empowerment and dual-tutor collaboration

4.1. Three-stage empowerment: progressive ability training

According to the writing rules of postgraduate scientific papers, the guidance process can be divided into three stages: entry period, critical period, and finalization period. Each stage should set differentiated empowerment goals to ensure the gradient of design.

The first stage is the entry basic empowerment stage. This stage aims to help postgraduates establish scientific research thinking abilities, master basic paper writing methods and skills, and clearly set research directions and topics, thereby ensuring adequate preparation for preliminary writing. At this stage, academic tutors should conduct theoretical teaching and method training for students, through special lectures, literature seminars, and other forms, in-depth explain basic knowledge such as literature retrieval methods, academic paper structures, and research methods, guide students to sort out the cutting-edge trends in research work, and form new research ideas. Industry tutors should conduct in-depth analysis of industry development problems and solve bottlenecks according to actual needs, thereby helping postgraduates optimize the direction of topic selection, ensuring that the research topic has important research value and conforms to the actual current industry development^[9].

The second stage is the critical period ability empowerment stage. This stage focuses more on cultivating postgraduates' independent research capabilities, problem-solving capabilities, and innovative thinking capabilities, thereby achieving breakthroughs from framework to content. At this stage, teachers should clarify corresponding guidance goals, allowing postgraduates to improve research design capabilities, data processing capabilities, and practical operation capabilities. Academic tutors should focus on the scientificity and feasibility of research plans, guide postgraduates to

determine research methods, design experimental processes and plans, and solve theoretical problems in the research process.

The third stage is the achievement empowerment stage, whose goal is to improve the academic standardization, argumentation rigor, and achievement transformation value of the paper, thereby realizing the optimization of achievements from the first draft to high-quality works. The core goals of this stage are to improve postgraduates' paper writing capabilities, achievement condensation capabilities, and transformation and application capabilities. Academic tutors need to guide postgraduates to organize and analyze data, sort out the logic of the paper, grasp academic standardization, thereby improving the paper and submitting it for publication. Industry tutors need to conduct in-depth analysis of the feasibility and innovation of paper achievements from the perspective of industrial application, guide postgraduates to transform research achievements into patents and technical schemes, and align with the actual requirements of enterprises. Set up transformation training camps, invite enterprise tutors and intellectual property experts to teach, guide postgraduates to complete patent layout, thereby improving the effectiveness of achievement transformation. Dual tutors jointly guide postgraduates to participate in discipline competitions and academic conferences, thereby enhancing the influence of achievements ^[10].

4.2. Dual-tutor collaboration: Clarifying the responsibilities of the guidance team

The guidance of scientific papers requires the joint participation of dual tutors to achieve good guidance results. To this end, it is necessary to clarify the core responsibilities and collaborative processes of dual tutors, and through the way of division of labor without separation, effectively achieve complementary advantages and collaborative efforts, avoiding overlapping guidance or lack of responsibility.

The core responsibilities of university academic tutors include the following aspects: first, theoretical guidance, responsible for interpreting cutting-edge academic trends, imparting research methods, and training academic standards, helping postgraduates build a systematic and complete academic thinking system. Second, process control, providing full-process guidance on paper topic selection, proposal defense, writing, revision, and other links, reviewing research plans and paper quality, and trying to avoid academic misconduct. Third, resource support, providing scientific research resources such as university laboratories and databases, recommending postgraduates to participate in vertical projects, and building academic exchange platforms. Fourth, growth guidance, paying more attention to the cultivation of postgraduates' academic literacy and scientific research mentality, enabling them to form innovative qualities ^[11].

The core responsibilities of enterprise industry tutors include the following aspects: first, demand connection, providing research topic directions and practical materials according to the actual production and technical needs of enterprises, ensuring that they are combined with industry development. Second, practical guidance, providing practical platforms such as enterprise laboratories and production sites, guiding postgraduates to conduct practical operation training and data collection, and effectively solving difficulties in the practical field. Third, transformation empowerment, fully evaluating the value of paper research, guiding work in areas such as patent applications and technical scheme transformation, ensuring the effective implementation of achievements. Fourth, career value guidance, fully sharing industry-related development trends, thereby providing more help for postgraduates' career planning ^[12].

Dual tutors should strengthen collaborative work and establish a collaborative mechanism of two-way connection, regular communication, and joint review. In the topic selection stage, dual tutors jointly conduct demand analysis and direction demonstration. During the research implementation stage, review progress through online meetings every week and carry out offline joint guidance every month. In the achievement review stage, dual tutors need to jointly participate in links such as proposal defense, mid-term assessment, and thesis defense, thereby ensuring evaluations from both academic and practical aspects.

4.3. Collaborative guarantee: multi-dimensional linkage support mechanism

To ensure the effective operation of the model, the university should optimize and improve the construction of systems,

resources, and assessment mechanisms, make up for the deficiencies of traditional university-enterprise collaborative work, and thus form a joint force for collaborative education.

At the system guarantee level, formulate documents such as the Measures for the Management of Dual Tutors for Postgraduates and Collaborative Education Agreement, clarifying the selection standards, division of powers and responsibilities, and assessment rules of dual tutors. Universities should strengthen cooperation with enterprises, establish a talent training steering committee, and jointly formulate paper guidance plans and evaluation standards to ensure that industrial needs are integrated into the overall guidance work^[13].

At the resource sharing mechanism construction level, build a university-enterprise collaborative education platform to realize the two-way opening of scientific research resources, practical resources, and educational resources. Universities should open laboratories, databases, and other resources to enterprises, and enterprises should provide practical positions, R&D funds, and real project resources for postgraduates. During this period, build an online resource sharing platform, upload content such as dual tutors' courseware, industrial cases, and academic materials, providing a more complete guidance environment for postgraduates^[14-15].

At the assessment and incentive mechanism level, establish a diversified dual tutor assessment system, incorporating guidance effectiveness, postgraduate satisfaction, achievement transformation, and other aspects into assessment indicators, and linking assessment results with tutor allowances and selection of excellent tutors. Provide more financial support and priority in project cooperation for outstanding dual tutor teams. Provide scholarships, academic exchange opportunities, and other rewards for postgraduates with outstanding achievements. At the same time, establish a feedback mechanism to collect postgraduates' opinions and suggestions on dual tutor guidance through questionnaires, interviews, and other forms, and dynamically optimize the guidance plan.

5. Conclusion

In summary, the writing of postgraduate scientific papers is somewhat difficult, which requires universities to strengthen educational guidance and construct a guidance model of three-stage empowerment and dual-tutor collaboration to help improve the quality of postgraduates' papers and innovative capabilities. This model is postgraduate-centered, demand-oriented, and collaboration-supported, focusing more on academic standardization and theoretical depth, emphasizing practical application and achievement transformation, and is more in line with the inherent requirements of the high-quality development of postgraduate education in the new era. It is believed that in the future, with the continuous deepening reform of postgraduate education, this model will continue to deepen in practice, thereby adapting to postgraduates of different disciplines and types, providing differentiated guidance, cultivating more talents with academic depth and practical capabilities, and contributing to industrial development.

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