

Research on the Collaborative Education Mechanism among In-School Mentors, Enterprise Mentors, and Counselors from the Perspective of Sanquan Education

Jie Jia¹, Yipin Wan^{1*}, Hailong Fan¹, Tingting Gao¹, Xuding Song^{1,2}

¹School of Construction Machinery, Chang'an University, Xi'an 710064, Shaanxi Province, China

²Engineering College, Xi'an Siyuan University, Xi'an 710038, Shaanxi Province, China

*Corresponding author: Yipin Wan, wyipin@chd.edu.cn

Copyright: © 2024 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract: This study addresses the issues existing in the current cultivation process of outstanding graduate students and explores the collaborative education mechanism among in-school mentors, enterprise mentors, and counselors in the cultivation of outstanding engineers in the mechanical field based on the perspective of Sanquan education (i.e., holistic, full-course, and all-round education). Through exploring this mechanism, we attempt to construct a more scientific and efficient education model to enhance students' comprehensive quality and practical skills, thereby meeting society's demand for high-quality talents in the mechanical field.

Keywords: Graduate students; Mechanical field; Sanquan education; Collaborative education; Practical exploration

Online publication: October 21, 2024

1. Introduction

With the continuous technological advancement and rapid economic development, the demand for high-quality talents in the mechanical field has become increasingly urgent^[1,2]. To fulfill this demand, universities have continuously explored new education models in mechanical engineering education^[3,4]. Among them, the concept of Sanquan education has been widely applied in various educational practices due to its comprehensiveness and systematic nature^[5-7]. Taking the cultivation of outstanding engineers in the mechanical field as an example, this paper discusses the collaborative education mechanism among in-school mentors, enterprise mentors, and counselors from the perspective of Sanquan education, aiming to provide a reference for the educational and teaching reform of mechanical engineering majors.

2. Analysis of problems in collaborative education

Examining the collaborative education mechanism among in-school mentors, enterprise mentors, and counselors from the perspective of Sanquan education (i.e., holistic, full-course, and all-round education) in the context of cultivating outstanding graduate students in the mechanical field, we can identify several issues that affect the overall quality and effectiveness of graduate education.

2.1. Insufficient awareness of collaborative education

There is insufficient awareness between in-school and enterprise mentors: Some in-school mentors and enterprise mentors have different conceptual perspectives regarding collaborative education. In-school mentors may focus more on students' academic research and theoretical knowledge enhancement, while enterprise mentors emphasize practical skills and professional literacy cultivation. This discrepancy hinders consensus on educational goals, affecting the depth and breadth of collaborative education.

There is also insufficient awareness between counselors and mentors: Counselors are primarily responsible for students' ideological and political education and daily management, while mentors focus on academic guidance. However, in some cases, a lack of effective communication and collaboration between counselors and mentors leads to neglecting students' overall development. Counselors may be unaware of students' specific academic performance, while mentors may overlook students' ideological and psychological states.

2.2. Inefficient information exchange channels

There is an absence of an information-sharing mechanism. Currently, many universities lack effective information exchange channels between counselors, in-school mentors, and enterprise mentors. The absence of regular meeting systems and specialized information exchange platforms makes it difficult for all parties to timely and accurately understand students' performance and needs in different aspects. This information asymmetry not only affects the effectiveness of education but may also lead to duplicate work and resource waste.

There is also a lack of a collaborative problem-solving mechanism. When facing issues such as abnormal student behavior or poor organizational discipline, counselors, in-school mentors, and enterprise mentors lack an effective collaboration mechanism. This may result in unresolved problems or even missed opportunities to eliminate campus safety hazards.

2.3. Imperfect incentive and support mechanism

Incentive mechanisms are lacking. For in-school and enterprise mentors, a lack of clear quantitative standards and reward systems reduces their enthusiasm for participating in collaborative education. Similarly, counselors also lack sufficient incentives and support in this process, making it difficult for them to fully commit to this work.

Inadequate safeguard mechanisms are also important issues. In terms of material support and policy incentives, universities' investment in collaborative education mechanisms is insufficient. The lack of dedicated venues, funding, and policy support hinders the effective implementation of collaborative education efforts.

2.4. Inconsistent educational goals

There is a disconnection between academia and practice. In-school mentors tend to focus on academic

research, while enterprise mentors emphasize practical application. This inconsistency in educational goals may make it difficult for students to find a balance between academia and practice, affecting their overall development.

There is a neglect of comprehensive development. During collaborative education, aspects such as moral, physical, aesthetic, and labor education are often overlooked. These omissions may lead to low comprehensive quality among students, making it challenging for them to adapt to future societal demands.

3. Construction and implementation paths of the collaborative education mechanism

The Sanquan education concept encompasses holistic, full-course, and all-round education. Holistic education emphasizes the involvement of all educators in education efforts to form a joint force; all-round education focuses on cultivating students' knowledge, skills, and qualities from multiple dimensions; full-course education spans students' entire academic careers, from enrollment to graduation, paying attention to their growth and development.

3.1. Collaborative education mechanisms

In-school mentors are the primary guides for students' professional studies and research work. From the Sanquan education perspective, in-school mentors should focus on students' comprehensive development, providing guidance not only in professional knowledge and skills but also in personality development and career planning. Simultaneously, in-school mentors should maintain close communication with enterprise mentors and counselors to jointly develop education plans, ensuring the pertinence and effectiveness of education efforts.

Enterprise mentors are essential for cultivating students' practical skills and professional literacy. With rich engineering practice experience and profound industry backgrounds, they can provide students with authentic work environments and practical opportunities. In the collaborative education mechanism, enterprise mentors should leverage their strengths to guide students in participating in actual engineering projects, fostering their practical skills and innovative spirits. Furthermore, they should collaborate with in-school mentors and counselors to focus on students' career development, offering robust support for their employment and entrepreneurship.

Counselors are responsible for students' ideological and political education and daily management. From the Sanquan education perspective, counselors should pay attention to students' mental health and personality development, providing psychological counseling and guidance services. Additionally, counselors should actively cooperate with in-school mentors and enterprise mentors to jointly carry out education work, forming a united educational force. They should also focus on students' career planning and development, offering employment guidance and entrepreneurship support.

3.2. Implementation paths for collaborative education

A comprehensive communication mechanism is established. In-school mentors, enterprise mentors, and counselors should regularly convene joint meetings to discuss education plans and implementation schemes, ensuring the pertinence and effectiveness of education efforts. Personalized education plans are developed. Based on students' interests, strengths, and development needs, personalized education plans are developed to ensure comprehensive and systematic cultivation for each student. Practical teaching components are

strengthened. The construction and management of practical teaching components are enhanced, offering more practical opportunities and platforms to cultivate students' practical skills and innovative spirits. A student feedback mechanism is established to promptly understand students' opinions and suggestions on education efforts, continuously improving and refining the education mechanism.

4. Analysis of collaborative education for outstanding graduate students in mechanical engineering

The outstanding graduate student training program in mechanical engineering at Chang'an University aims to cultivate high-quality engineering and technical talents with innovative spirits and practical skills. Emphasis is placed on the integration of theory and practice, providing students with abundant practical opportunities and authentic engineering environments through school-enterprise cooperation, industry-university-research integration, and other means. Additionally, the program stresses the holistic development of students, focusing on nurturing their comprehensive qualities and professional ethics. Taking the outstanding graduate student training program in mechanical engineering at Chang'an University as an example, this section explores the specific practices of the collaborative education mechanism involving university mentors, enterprise mentors, and counselors.

Guided by the concept of Sanquan education (holistic education involving all teachers, all courses, and all aspects of education), a joint effort by university mentors, enterprise mentors, and counselors has successfully cultivated a group of outstanding engineers with high quality, capabilities, and accomplishments. The specific approaches include establishing a joint mentorship system to integrate university and enterprise mentors, strengthening the construction and management of practical teaching sessions to offer more practical opportunities and platforms, and establishing a student feedback mechanism to promptly understand students' needs and opinions, continuously improving and refining the education system.

4.1. Implementation pathways for collaborative education of outstanding graduate students in mechanical engineering

Chang'an University's outstanding graduate student training program in mechanical engineering has established a joint mentorship system, achieving an organic integration of university and enterprise mentors. These joint mentors jointly formulate student training plans, guide scientific research and practical activities, and assess students' learning outcomes. This system effectively integrates high-quality educational resources from both inside and outside the university, providing a solid foundation for students' holistic development.

The program emphasizes the construction and management of practical teaching sessions, providing students with ample practical opportunities and platforms. Through deep cooperation with enterprises, the program has established numerous practical teaching bases and laboratories, offering authentic engineering environments and advanced experimental equipment. Students are encouraged to participate in research projects and engineering practices, enhancing their practical skills and innovative spirits.

A student feedback mechanism has been established to promptly understand students' opinions and suggestions on educational efforts. Through regular student forums, surveys, and other methods, the program collects evaluations and recommendations on the collaborative education system. Based on this feedback, continuous improvements are made to enhance the quality of education.

4.2. Practical experiences in collaborative education for outstanding mechanical engineers

- (1) Guidance and leadership from university mentors: In the cultivation of outstanding engineers, university mentors serve as the primary guides for students' professional studies and research work. They are responsible for guiding students in coursework, research training, and practical teaching, ensuring they acquire solid professional knowledge and skills. Moreover, university mentors focus on nurturing students' innovative consciousness and practical skills, guiding them to participate in research projects and engineering practices, thereby enhancing their comprehensive qualities.
- (2) Practical guidance and career planning from enterprise mentors: Enterprise mentors, with rich engineering practical experience and profound industry backgrounds, provide students with authentic engineering environments and practical opportunities. In the cultivation of outstanding engineers, they guide students in internships, practical training, and project practices, helping them apply their knowledge to actual engineering projects. Additionally, enterprise mentors pay attention to students' career development, offering career planning advice and employment guidance to facilitate smooth career transitions and advancements.
- (3) Ideological and political education and psychological counseling from counselors: Counselors are primarily responsible for students' ideological and political education and daily management. In the outstanding graduate student training program, counselors monitor students' mental health and personality development, providing psychological counseling and guidance services. Collaborating with university and enterprise mentors, counselors jointly carry out educational work, forming a synergetic force. Through organizing various activities and conducting thematic education, counselors guide students to establish correct values and outlooks on life, fostering their social responsibility and sense of mission.

The collaborative education mechanism involving university mentors, enterprise mentors, and counselors plays a pivotal role in the cultivation of outstanding graduate students in mechanical engineering. Through the practical exploration, optimization, and refinement of this mechanism, a group of outstanding engineers with high quality, capabilities, and accomplishments has been successfully cultivated. However, the practical exploration of collaborative education from the Sanquan education perspective is a long-term and complex process requiring concerted efforts and cooperation from mentors, universities, and all sectors of society to continually improve relevant mechanisms and measures, thereby enhancing the pertinence and effectiveness of collaborative education.

5. Conclusion and prospects

From the Sanquan education perspective, this paper delved into the collaborative education mechanism involving university mentors, enterprise mentors, and counselors in the cultivation of outstanding graduate students in mechanical engineering. Taking Chang'an University's outstanding graduate student training program in mechanical engineering as an example, analysis and discussion of the collaborative education implementation plan are conducted, clarifying that the collaboration effectively enhances students' comprehensive qualities and practical skills, meeting the societal demand for high-quality talents in the mechanical field. In the future, relying on the strong support of the university and its colleges, we will continue to deepen research and practical exploration of this mechanism, further improving and optimizing the educational model, thereby providing robust support for educational and teaching reforms in mechanical

engineering programs.

Funding

- (1) Chang'an University Graduate Student Ideological and Political Education Innovation Demonstration Project (300103740013)
- (2) Education Science Research Project of China Association of Transportation Education (JT2022YB222)

Disclosure statement

The authors declare no conflict of interest.

References

- [1] Zhu X, 2024, Research on the Coordinated Development of Postgraduate Party Building and Ideological and Political Education from the Perspective of “Three-Dimensional Education.” *School Party Building and Ideological Education*, (09): 57–59.
- [2] Liu J, 2024, The Role and Implementation Path of Counselors in “Three-Dimensional Education” in Colleges and Universities. *Educational Theory and Practice*, 44(03): 43–47.
- [3] Zhong L, 2023, Construction of Ideological and Political Education System in Colleges and Universities from the Perspective of “Three-Dimensional Education.” *Middle School Political Teaching Reference*, (44): 118.
- [4] Li Y, Tan C, 2023, The Generative Logic, Realistic Examination, and Improvement Path of “Three-Dimensional Education” in Colleges and Universities. *Contemporary Education Forum*, (01): 93–99.
- [5] Yang X, Qu L, 2022, Innovating Systems and Mechanisms to Promote Comprehensive Reform of “Three-Dimensional Education.” *China Higher Education*, (Z1): 58–60.
- [6] Cui Y, 2021, An Analysis of the “Three-Dimensional Education” Mechanism in Graduate Ideological and Political Work. *Ideological and Political Education Research*, 37(04): 129–132.
- [7] Han H, 2012, Constructing a New Pattern of “Three-Dimensional Education” in Graduate Ideological and Political Education. *China Youth Studies*, (07): 109–112.

Publisher's note

Bio-Byword Scientific Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.