

Research on Cultural Confidence and Linkage Mechanism Between Government, School, Enterprise and Society in the Training of International Students in Science and Technology

Chan Gu, Yafei Yang, Xiaomeng Cao

Shaanxi University of Science and Technology, Xi'an, Shaanxi, 710021, China

ABSTRACT

This article focuses on the cultivation of cultural confidence and the linkage mechanism among government, schools, enterprises, and society in the training of international students in control science. It first outlines the characteristics of this training, including the interweaving of disciplinary professionalism and cultural diversity, the close integration of theory and practice with dynamic demand changes, and the equal emphasis on cultivating an international perspective and local cultural identity. It then analyzes the current issues, such as insufficient integration of cultural confidence training, an imperfect linkage mechanism among government, schools, enterprises, and society, and an inadequate evaluation system. Finally, it proposes optimization strategies to enhance the quality of training, including strengthening cultural confidence training to build a systematic education system, improving the linkage mechanism among government, schools, enterprises, and society to enhance collaborative cooperation, and establishing an evaluation system to ensure the quality of training. These measures aim to cultivate compound talents with both professional skills and cultural confidence.

KEYWORDS

Training of international students; Quadruple helix collaboration; Optimization of training quality

1 Characteristics of training of international students in control science

1.1 Interweaving of subject professionalism and cultural diversity

Control science is a highly specialized field that encompasses complex knowledge systems, including automatic control theory and intelligent control technology. It places high demands on the foundational knowledge of mathematics and physics for international students, making it challenging to teach and learn professional courses^[1]. International students come from diverse cultural backgrounds, which leads to differences in their thinking patterns, learning methods, and values. For instance, students from Europe and America tend to emphasize the development of logical reasoning and critical thinking, while those from Asia are often diligent and systematic in their studies. This cultural diversity enriches classroom discussions with diverse perspectives and fosters innovation. However, it also poses risks of communication barriers and cultural conflicts. In group projects, students with different cultural backgrounds may exhibit differences in communication styles and decision-making habits. Therefore, in the process of talent development, it is essential to ensure systematic professional knowledge instruction while respecting cultural differences. Establishing cross-cultural communication platforms, organizing cultural exchange activities, and setting up cross-cultural communication courses can enhance mutual understanding among international students, promote the organic integration of academic professionalism and cultural diversity, and improve the quality of education^[2].

1.2 The combination of theory and practice is close and the demand changes dynamically

Control science is highly practical, and its theoretical knowledge must be validated and deepened through practical application. International students need to understand the principles of control algorithms and gain hands-on experience in laboratory simulations and factory equipment adjustments^[3]. With the rapid advancement of science and technology, the field of control science has seen significant technological advancements, such as the integration of artificial intelligence with control theory and the application of industrial internet to control systems. This has led to a dynamic shift in the requirements for practical skills and cutting-edge knowledge among international students. To meet these evolving needs, universities should strengthen their collaboration with enterprises by jointly establishing internship bases, enabling international students to stay updated with the latest industry technologies. Measures such as adjusting course offerings, increasing the proportion of practical courses, and introducing real-world project cases can help international students enhance their practical skills by solving real-world problems^[4]. Establishing a dynamic curriculum update mechanism and aligning teaching content with industry trends ensures that the learning materials are closely aligned with market demands, thereby enhancing the employment competitiveness of international students.

1.3 Equal emphasis should be placed on international vision and local cultural identity

In the global context, the development of control science exhibits international characteristics, requiring international students to have a broad international perspective, understand the latest research trends, and engage in international academic exchanges and collaborations. However, the process of cultivating international talents also requires an appreciation of local culture. China has a long history and a rich culture, which provides valuable insights for the development of control science. For example, the concept of 'harmony between heaven and man' in traditional Chinese culture resonates with the systems theory in modern control science. By integrating Chinese culture into the training process, such as through Chinese cultural courses and cultural experience activities, international students can enhance their pride in their own national culture while experiencing the charm of Chinese culture^[5]. Encouraging international students to combine Chinese culture with their professional knowledge, they can spread Chinese culture through international exchanges, promote cultural exchange and integration, and cultivate control science talents with an international perspective and cultural confidence.

2 There are problems in the cultivation of cultural confidence and the linkage mechanism between government, school, enterprise and society for international students in control science

2.1 The cultivation of cultural confidence is insufficient and lacks systematic planning

In the cultivation of controllable scientific students, the development of cultural confidence often takes a secondary role. In terms of course design, there are few specialized courses dedicated to fostering Chinese cultural confidence; instead, cultural content is scattered throughout a few humanities courses, making it difficult to form a cohesive knowledge system. Regarding teaching methods, instructors tend to focus on explaining professional knowledge, with limited effort devoted to cultivating cultural confidence. They often only briefly mention cultural phenomena without providing in-depth analysis or guidance. Cultural activities lack systematic planning and simple formats, mostly limited to daily activities such as museum visits and traditional festival experiences, failing to integrate the unique characteristics of control science to explore deeper cultural meanings. For example, the integration of ancient Chinese technologies, such as the water clock and astronomical instruments, with modern control science has been neglected, making it challenging for international students to appreciate the charm of Chinese culture from a professional perspective. As a result, the cultivation of cultural confidence remains superficial, failing to truly integrate into the cognitive framework of international students, and it is difficult to evoke a deep sense of identity and pride in Chinese culture among them.

2.2 The linkage mechanism between government, school, enterprise and community is not perfect, and the synergistic effect has not been fully brought into play

The current linkage mechanism for the development of international students in government, schools, enterprises, and social organizations is fraught with numerous shortcomings. Although the government has introduced policies to encourage cooperation, there is a lack of specific implementation guidelines and oversight mechanisms, leading to insufficient enforcement of these policies. This makes it challenging to effectively guide the integration of resources across various sectors. University-enterprise collaborations often remain superficial, with companies offering internships but failing to integrate their core technologies and industry needs into the curriculum and teaching content, resulting in a disconnect between what students learn and practical applications. Social organizations have limited channels for participation and low enthusiasm, failing to leverage their strengths in cultural dissemination and career planning. Information exchange is not smooth, and information sharing platforms are ineffective. Universities lack a clear understanding of the latest technological trends in companies, while companies have unclear views on the progress of talent development at universities, making it difficult for social organizations to accurately align with various needs.

2.3 The evaluation system is not perfect, and it is difficult to measure the training effect comprehensively

The current evaluation system for the development of international students in control science has significant shortcomings. In terms of evaluation indicators, there is an excessive focus on academic performance while neglecting the cultivation of cultural confidence and the effectiveness of collaboration among government, schools, enterprises, and society. For instance, there is currently no quantifiable measure of the international students' understanding of Chinese culture, their emotional connection to it, or the contributions of various stakeholders in collaborative efforts. The evaluation methods are overly simplistic, primarily relying on traditional written tests and papers, which fail to comprehensively reflect the overall quality and capabilities of the international students. Regarding the cultivation of cultural confidence, evaluations based solely on classroom performance and homework completion cannot accurately

assess the students' practical cultural engagement. Concerning the collaboration among government, schools, enterprises, and society, there is a lack of comprehensive assessments of the outcomes of cooperative projects and the extent of resource sharing. This incomplete evaluation system fails to provide a scientific basis for adjusting and optimizing the training programs, making it difficult to identify issues in the training process. It also hinders the continuous improvement of the quality of scientific international student training and makes it challenging to cultivate talents who are adaptable to global development and possess both professional skills and cultural confidence.

3 The optimization of cultural confidence and linkage mechanism between government, school, enterprise and society in the training of overseas students in control science

3.1 Strengthen the cultivation of cultural confidence and build a systematic education system

When regulating the training of scientific international students, it is essential to integrate the cultivation of cultural confidence throughout the entire talent development process. In course design, a new distinctive course has been introduced that combines Chinese culture with control science, such as 'Ancient Chinese Scientific and Technological Control Wisdom.' This course provides an in-depth analysis of ancient astronomical instruments, water conservancy projects, and other control principles, allowing international students to appreciate the depth and breadth of Chinese culture. Cultural elements are integrated into professional courses, for example, by introducing examples of China's aerospace control systems in the 'Principles of Automatic Control' course to enhance international students' recognition of China's scientific and technological achievements. Teaching methods include case studies and group discussions to inspire international students to actively think about the cultural connotations of Chinese culture. A variety of cultural practice activities have been organized, such as visits to science museums and participation in cultural experience workshops, which deepen international students' understanding of Chinese culture through practical activities. Efforts are made to strengthen faculty teams, improve teachers' cultural literacy and teaching skills, encourage research on the cultivation of cultural confidence, and establish a systematic education system for cultural confidence, ensuring that cultural confidence is genuinely integrated into the knowledge systems and values of international students.

3.2 Improve the linkage mechanism between government, universities, enterprises and communities, and strengthen coordination and cooperation

The government should take the lead and establish clear policies and regulations to ensure institutional support for cooperation among government, schools, enterprises, and communities. A special fund should be established to support cooperative projects between universities, enterprises, and social organizations, and to encourage enterprises to participate in the training of international students. Universities should actively engage with enterprises and social organizations to build long-term and stable relationships. They should collaborate with enterprises to establish practical teaching bases, integrating real-world projects into the curriculum to help international students enhance their practical skills in a real-world setting. Enterprises should be invited to participate in course design and teaching to ensure that the content aligns closely with industry needs. Social organizations should leverage their strengths, such as cultural institutions conducting cultural exchange activities and vocational training institutions providing career guidance, to promote the comprehensive development of international students. Regular communication mechanisms should be established among all parties to share information, resources, and outcomes, forming a powerful synergy in talent cultivation and jointly improving the quality of international student training in control science.

3.3 Improve the evaluation system to ensure the quality of training

To ensure the quality of training for international students in science, it is essential to establish a comprehensive and scientific evaluation system. This system includes two key dimensions: the cultivation of cultural confidence and the effectiveness of collaboration among government, schools, enterprises, and communities. In fostering cultural confidence, we can set evaluation criteria based on various aspects of international students' understanding, acceptance, and practice of Chinese culture, such as their participation frequency in cultural activities and the accuracy of their responses to questions about Chinese culture. For the collaboration among government, schools, enterprises, and communities, we can assess the level of cooperation, resource sharing, and the outcomes of collaborative projects among all participating entities. The evaluation methods should be diversified, combining teacher evaluations, student self-assessments, enterprise evaluations, and community evaluations to ensure the objectivity and fairness of the results. Regular evaluations and adjustments to the evaluation system should be conducted, and the evaluation indicators and methods should be optimized according to the training objectives and actual conditions to ensure the system's

effectiveness and adaptability, thereby providing strong support for continuously improving the quality of training for international students in science.

4 Conclusion

This article explores the cultivation of cultural confidence and the linkage mechanism among government, schools, enterprises, and society in the training of international students in control science. By analyzing the characteristics of this training, it is found that it combines disciplinary professionalism with cultural diversity, integrates theory with practice closely, and responds to dynamic changes in demand. It also emphasizes the importance of cultivating both an international perspective and a sense of local cultural identity. The article highlights several issues, including insufficient integration of cultural confidence training, an imperfect linkage mechanism among government, schools, enterprises, and society, and an inadequate evaluation system. To address these issues, the article proposes enhancing the cultivation of cultural confidence by building a systematic education system, improving the linkage mechanism among government, schools, enterprises, and society to strengthen collaborative efforts, and establishing a robust evaluation system to ensure the quality of training. In the future, continuous attention and improvement are needed to enhance the quality of training for international students in control science and to cultivate more high-quality talents who can adapt to global development.

Funding

Shaanxi University of Science and Technology in 2024, "Internationalization Education and Teaching Reform Research " (YB202402)

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