

The Role and Practice of Engineering Survey Skills Competitions in Cultivating Craftsmen in Chengdu

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Abstract: With the rapid development of industry and urbanization, the demand for precise and high-quality engineering survey skills is increasing. The engineering survey skills competition serves as an effective mechanism for skills cultivation and evaluation, playing a significant role in improving craftsmen's skills. This paper systematically studies the engineering survey skills competition in Chengdu, exploring its role and effectiveness in cultivating craftsmen, promoting the spirit of craftsmanship, and interacting with the educational system. Through empirical analysis, this study reveals the practical impacts of competition in improving craftsmen's skills, integrating educational resources, and increasing societal recognition of the spirit of craftsmanship. Additionally, the study provides suggestions for the future development of engineering survey skills competitions.

Keywords: Engineering survey skills; Skills competition; Craftsman cultivation; Educational system

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1. Introduction

In the context of the rapidly developing global economy, the cultivation of skilled talents has become an urgent need in various industries. The engineering survey skills competition is not only a platform for showcasing skill levels but also an important carrier for the inheritance of craftsmanship and the innovation of vocational education. Especially in large cities like Chengdu, organizing such competitions can effectively enhance local craftsmen's professional skills, promote the alignment of the educational system with industry demands, and increase public awareness and respect for craftsman culture. Therefore, researching the role and practice of engineering survey skills competitions in cultivating craftsmen in Chengdu is not only significant for optimizing the allocation of local educational resources but also provides valuable experience for other regions.

2. Theoretical foundation

2.1. Educational theory of craftsmanship

Craftsmanship refers to the professional attitude of pursuing perfection and excellence and the spirit of creating

high-quality products for society. In the field of education, cultivating craftsmanship is the core of vocational education. Its purpose is to inspire students' enthusiasm for professional skills and cultivate their ability for continuous improvement and innovation. With the rapid development of technology and the constantly changing market, the educational theory of craftsmanship increasingly emphasizes the combination of practical abilities and innovative thinking, highlighting the importance of continuous trial and error and correction in practical activities to achieve skill refinement ^[1].

In educational practice, cultivating craftsmanship requires not only theoretical learning but also experiential learning through hands-on operations and project-based training processes. For example, designing project-based training courses allows students to encounter and solve problems through actual operations, gradually deepening their understanding and mastery of technical specifications and procedures. Moreover, the demonstration and guidance provided by teachers are crucial for imparting craftsmanship, as teachers' professionalism and dedication can significantly influence students' learning attitudes and outcomes.

2.2. Educational and practical value of skills competitions

As an educational method, skills competitions play an irreplaceable role in stimulating students' interest in learning and their competitive spirit. Through competitions, students can test their skill levels in real-life scenarios, identify their weaknesses, and adjust their learning strategies accordingly. Additionally, skills competitions provide a platform for students to showcase their talents, gain industry recognition, and access more career development opportunities.

From a societal perspective, skills competitions can elevate skill levels across an entire industry, promoting technological exchange and innovation. Economically, the cultivation of highly skilled talents directly impacts the quality of products and services, thereby improving the competitiveness of enterprises and the economic development of regions. Thus, skills competitions are not only a part of skills education but also a significant activity that drives social and economic development.

2.3. Importance of engineering survey skills competitions

Engineering survey skills competitions simulate complex real-world engineering survey environments, providing participants with valuable opportunities to apply theoretical knowledge to practical problem-solving. This high-standard and high-pressure environment requires participants to rapidly improve their skills, especially in precise measurements, data analysis, and quick problem resolution. This process not only enhances their personal abilities but also accelerates the honing of their professional skills, laying a solid foundation for their future careers. Moreover, such competitions greatly promote collaboration between higher education institutions and industries. By designing competition tasks oriented towards actual industry needs, the educational content becomes more closely aligned with industry realities, improving its relevance and practicality ^[2].

Additionally, engineering survey skills competitions are not just about competing skills, as they are also about conveying and showcasing culture. The competitions celebrate the precision and rigor of the engineering field, which are essential aspects of craftsmanship. By participating in these competitions, the new generation of engineers can directly learn from the valuable experiences of their predecessors and innovate based on this knowledge, driving the entire industry's technological advancement. This experience not only enhances their professional skills but also significantly develops their thinking and innovation capabilities.

Furthermore, the organization of engineering survey skills competitions effectively raises public awareness of the importance of this field and enhances societal respect and support for professional talents in engineering surveying.

As the competition gains widespread publicity and influence, more people begin to recognize the professionalism and complexity of engineering surveying work, holding greater respect for the professionals involved. This societal recognition not only elevates the professional status of engineers but also brings more attention and resources to the field of engineering surveying, thereby promoting technological development and innovation.

3. The role and practice of engineering survey skills competitions in cultivating craftsmen in Chengdu

3.1. Overview of engineering survey skills competitions

The engineering survey skills competition originated from the need to improve regional engineering skill levels, aiming to inspire the professional enthusiasm and innovation abilities of engineering technicians through competition. The competition is positioned to promote the exchange and development of engineering survey technology and to enhance the standardization of engineering survey operations and the accuracy of results.

The Chengdu Engineering Survey Skills competition system includes the Engineering Survey Event of the Chengdu Secondary Vocational School Students Skills Competition, the Chengdu Secondary and Higher Vocational Skills Competition Engineering Survey Event, the Chengdu-Chongqing Twin City Economic Circle Vocational Colleges Engineering Survey Skills Invitational Competition, and the Chengdu Million Workers Skills Competition Survey Worker Skills Competition. The organizers include the Chengdu Education Bureau, the Chengdu Transportation Construction Union, and the Chengdu Construction Industry Association. Participants mainly include students, teachers, and practicing engineers, with competition content covering various aspects from field surveying to indoor data processing. Various city-level engineering survey competitions also serve as selection trials for provincial and national competitions ^[3].

3.2. Impact of the engineering survey skills competition on craftsmanship training in Chengdu

The engineering survey skills competition provides participants with a valuable practical platform where they can apply theoretical knowledge to handle complex engineering problems in a tense competition environment. This practical application in a competitive setting not only helps improve individual technical operation skills but also particularly enhances measurement accuracy and emergency handling capabilities. Through practice experience in such high-pressure environments, participants can solve problems more effectively in real work scenarios, improving their professional skills and market competitiveness.

Moreover, the competition creates a strong incentive mechanism. Outstanding participants can not only gain industry certification but also have opportunities for career advancement. These opportunities for certification and promotion greatly motivate participants to improve their professional skills and provide them with a broad platform for career development in the engineering industry. Through this mechanism, the competition not only raises individual skill levels but also promotes the overall skill level of the industry.

The engineering survey skills competition encourages participants to excel in precision operation skills and innovative solutions. Participants are encouraged to optimize traditional surveying methods, showcasing their creativity and technical proficiency while driving technological advancement in the entire field of engineering surveying. In this way, the competition fosters innovation within the industry, demonstrating the importance and foresight of engineering survey technology in modern engineering practice.

3.3. Interaction between the engineering survey skills competition and the craftsman education system in Chengdu

The engineering survey skills competition in Chengdu has formed a close interactive relationship with the local

craftsman education system, providing strong motivation for updating educational content and improving course methods. Higher education institutions and vocational-technical schools closely monitor the requirements and standards of the competition, adjusting and optimizing their teaching plans and methods accordingly to ensure that educational content aligns with the latest industry standards and technological developments. This connection between education and actual work requirements not only enhances the practicality of education but also ensures that students' skills are market-relevant and forward-looking^[4].

Furthermore, the competition promotes resource sharing and technical exchange between educational institutions and between educational institutions and enterprises. Through the competition, participants can access and utilize each other's teaching resources, research results, and the latest engineering survey technologies. This open environment for resource and information exchange not only strengthens cooperation among institutions but also significantly enhances the educational quality and technical level of the entire engineering survey industry, helping the industry as a whole move towards higher standards.

Real-world cases and problems from the competition are directly integrated into classroom teaching, forming a teaching model that closely combines theory with practice. This model greatly stimulates students' interest in and engagement with learning, enabling them to apply their knowledge in real-world contexts. By dealing with actual problems, students can deepen their understanding of engineering survey technology and enhance their ability to solve real engineering problems, better preparing them for their future careers. This teaching approach effectively bridges the gap between theoretical learning and professional practice, improving the overall effectiveness and application value of education.

3.4. Promoting the inheritance of craftsmanship spirit and social recognition through the engineering survey skills competition

The engineering survey skills competition plays a key role in inheriting the spirit of craftsmanship in modern society. Hosting high-standard competitive events emphasizes precision, professionalism, and innovation, which are the core elements of craftsmanship. In their pursuit of technical excellence, participants not only improve their professional skills but also achieve a modern interpretation of traditional craftsmanship. This pursuit of excellence and attention to detail is fully reflected and promoted in the competition, showcasing the perfect integration of craftsmanship spirit and modern engineering practice. For example, the Chengdu Million Workers Skills Competition is one of the important brand activities of the Chengdu Federation of Trade Unions. This competition aims to stimulate workers' enthusiasm for learning new skills and mastering new knowledge through competitive events, while also providing a platform for showcasing individual talents and professional skills.

Additionally, through extensive promotion and public engagement, the engineering survey skills competition increases public awareness and recognition of the importance of engineering surveying in urban construction and development. This increased awareness not only gains greater respect and support for engineering technicians but also creates a more positive social environment for the entire engineering industry. As public recognition of the importance of this field deepens, the social status of engineering technology also rises, providing a solid social foundation for the industry's continued development.

The engineering survey skills competition is not just a showcase of skills but also a display of the cultural and social value of the engineering industry. Through various activities, the competition enhances the public image of the engineering industry and increases societal emphasis on skilled talents, attracting more outstanding individuals to the field of engineering technology. This promotion of industry value and recognition of skilled talents further enhances the industry's appeal, laying a solid foundation for future technological innovation and

talent cultivation, thereby promoting the continuous development and prosperity of the engineering technology field ^[5].

4. Development recommendations for engineering survey skills competitions in Chengdu's craftsman training

4.1. Policy support and resource integration

To further promote the development of engineering survey skills competitions, it is recommended that government departments adopt proactive policy guidance, including providing financial subsidies, tax incentives, and innovative reward mechanisms. These measures can encourage more enterprises and educational institutions to invest resources and efforts in the preparation and implementation of the competition. Government support can ensure that the competition receives the necessary funding and policy backing, thereby improving the quality and impact of the event.

Additionally, promoting resource integration and platform construction is key to enhancing the competition's effectiveness. Educational institutions, enterprises, and government departments in Chengdu should improve resource sharing and collaborative cooperation. It is recommended to establish a centralized information and resource platform that integrates the technical equipment, professional talents, and training materials required for the competition. This ensures efficient utilization of resources and maintains transparency and openness of information. Such a platform not only helps optimize resource allocation but also promotes effective communication and collaboration among all parties involved.

Establishing and maintaining long-term cooperation mechanisms is an important strategy to support the sustainable development of the competition. Through deep cooperation with industry enterprises and higher education institutions, school-enterprise cooperation and the integration of production, education, and research can be promoted, continuously improving the quality of education and the practical application of engineering survey skills. Enterprises can participate in the design and implementation of course content, provide internship and training bases, and jointly develop training courses that meet market needs. This cooperation not only enhances students' practical operational abilities but also ensures that educational content aligns closely with industry demands, thus cultivating more professionals who meet modern engineering requirements ^[6].

4.2. Improvement of education and training systems

In terms of improving the education and training system, continuously updating and optimizing course content is key. With the rapid development of technology, it is necessary to regularly review and update courses related to engineering survey skills to ensure that the teaching content is synchronized with the latest industry standards and technologies. Introducing advanced practical technologies and software enhances students' practical operational abilities, covering not only the teaching of fundamental knowledge but also the training of advanced skills, thereby comprehensively improving students' professional abilities.

Meanwhile, professional training for teachers is equally important. Strengthening teachers' training in practical skills and modern teaching methods promotes their participation in industry practice and skills competitions. This participation not only improves their teaching quality but also enhances their practical experience, enabling them to guide students more effectively. Through such practice, teachers can continuously learn and progress from real-world work, providing students with more vivid and practical learning experiences.

Moreover, strengthening the practical teaching component is crucial for students' skill development. By expanding cooperation with local enterprises and projects, more real work scenarios can be provided to students, helping them understand the practical application of theoretical knowledge and effectively enhancing

their professional skills. Simulating competition scenarios during the learning period allows students to experience the competition atmosphere and pressure, preparing them thoroughly for future competitions. This approach significantly enhances students' coping abilities and confidence, laying a solid foundation for their future careers.

4.3. Sustainability and innovation of competitions

To ensure the sustainability and stability of engineering survey skills competitions, it is recommended to establish a dedicated organization responsible for the daily operation and management of the competition. This organization should not only organize and execute the competition but also monitor and evaluate the competition's effectiveness and make strategic adjustments and optimizations based on feedback. This approach ensures that the competition continues and evolves with technological advancements and participants' changing needs.

Simultaneously, introducing innovative competition modes is crucial to maintain the competition's attractiveness and challenge. Consider using virtual reality (VR) technology to simulate complex engineering survey scenarios, which increases the realism of the competition and enhances participants' immersive experience. Additionally, by setting diverse competition categories and difficulty levels, the competition can attract a wide range of participants, from beginners to advanced technicians, promoting skill level improvement and widespread technical dissemination.

4.4. Improving social impact and recognition

To improve the social impact and public recognition of engineering survey skills competitions, it is essential to increase public participation and interest. Utilizing media and social platforms for active promotion can significantly raise public awareness and interest in the engineering survey profession. Additionally, organizing events such as public open days and professional seminars allows citizens to experience and understand the complexity and professionalism of engineering surveying, thereby increasing the competition and the field's attractiveness and recognition.

Moreover, identifying and honoring outstanding talents in the industry through competition can effectively establish industry benchmarks and models. Promoting the achievements of these recognized technical talents and their success stories throughout the industry not only motivates other professionals to pursue excellence but also significantly improves the professional image and societal recognition of the entire industry. This recognition mechanism is a key means to stimulate internal potential and competitiveness within the industry, promoting its continuous development and innovation.

Finally, to further enhance the academic standing and practical value of the competition, it is encouraged to publish and showcase the excellent engineering cases and technical results generated during the competition. Collaborating with professional journals and academic conferences can strengthen the academic output and industry influence of these achievements. This strategy not only enhances the professional importance of the competition but also helps promote new technologies and methods, facilitating scientific progress and technological innovation in the engineering survey field.

5. Conclusion

This paper deeply analyzes the practical role of engineering survey skills competitions in cultivating craftsmen in Chengdu, revealing the positive effects of the competition on skill enhancement, educational innovation, and social impact. The competition effectively promotes the inheritance of craftsmanship and improves public

recognition of professional skills. Future research can further explore how to enhance the attractiveness and educational effectiveness of the competition through technological innovation and competition system optimization, while also considering how to extend this competition model to more vocational fields and regions to achieve broader educational and social value.

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