

Multicultural Education

Research Article

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CHALLENGES AND THE WAY FORWARD: IMPLEMENTING SKILL-BASED LEARNING IN CHINESE ENGINEERING VOCATIONAL COLLEGES

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ABSTRACT

Skill-based learning is an approach, which allows the development of necessary skills and competencies from among learners. This approach aligns with the goals of internship programs for most colleges and universities. With the implementation of such, the gap between the academe and the industry may be bridged as students are immersed into the actual workplace and deal with opportunities that would require them to not only recall information, but more importantly, to execute skills needed to address specific workplace scenarios. In this paper, the authors explore the features and challenges of implementing skill-based learning in Chinese engineering vocational colleges. Through a narrative literature review, the authors present available information leading to an understanding of how skill-based learning is implemented and the challenges that confront its implementation.

ARTICLE INFO

Keywords:

Skill-Based Learning; Chinese Engineering Vocational Colleges; Internship Program

Article History:Received: 20th Dec 2023Accepted: 28th Jan 2024Published: 2nd Feb 2024

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1. INTRODUCTION

Internship programs are geared towards the development of competence necessary for future professionals to thrive in the workplace. Through the immersion of the student in the actual workplace, with limited scope of responsibility, students are given a safe space to practice the skills and knowledge that they have learned from their program. Despite being closely linked to the actual workplace setup, internships are still part of the learning program of the students, which they need to fulfill as part of their academic requirements. As such, teachers must ensure that the activities that students engage into are aligned with sound pedagogical practices. Skill-based learning aptly aligns with the expectations and requirements of the internship program.

In the context of Chinese engineering vocational education, skill-based learning is highly encouraged as it ensures the provision of learning opportunities for students to master skills and competencies. It provides them with the opportunity to actualize the theories and concepts that they have learned from their classroom sessions. The goal of this paper is to expound further skill-based learning as it is observed and practiced in Chinese engineering vocational schools. This paper argues that skill-based learning is key in bridging the gap between academe and industry as it allows the students to clearly experience the application of concepts in the actual workplace.

2. SKILL-BASED LEARNING IN CHINESE VOCATIONAL COLLEGES

In exploring skills-based learning for students in Chinese engineering vocational colleges during their internships, it is important to understand the essence of its effectiveness and practice. Skills-based classroom education, as a core component of the vocational education system, aims to provide students with the necessary

vocational skills and knowledge to ensure a smooth transition into the professional world (Heusdens, Baartman, & de Bruijn, 2019). This educational model emphasizes the development of practical skills and the close integration of theoretical knowledge with practical skills to ensure that students are able to apply what they have learned in real-world work scenarios, which they will encounter during internships and future careers.

In China, the implementation and development of skills-based learning has received widespread attention from the government, educational institutions, and industry. Policy makers recognize that with rapid economic development and increased industrialization, there is a growing demand for competent professionals. As a result, the vocational education system has been given the task of reshaping the content of education to meet the demands of the labor market (Liu, Ji, & Wu, 2019). In this context, skill-based learning has become a key path to train students in solving complex problems, adapting to new technologies, and improving occupational competitiveness.

The practical effect of the skill-based classroom is reflected in several aspects. First, it strengthens students' practical ability. By simulating real work environments and situations, students are able to experiment, commit mistakes, and learn how to improve in a safe learning environment. This type of learning helps students build confidence in the skills they have learned and also improve their ability to solve real-world problems (Yan, Deng, & Ku, 2019). Secondly, skill-based learning promotes a close connection between students and the industry. Many vocational colleges have established partnerships with companies to provide students with internship experience (McKinney, 2020), enabling them to gain valuable industry experience, understand industry needs, and combine classroom learning with real-world work experience.

However, there are challenges to the practice of skills-based learning. Keeping the course updated in terms of content and in sync with technological development is a major challenge (Ma, Weiwei, Zhang, Zhongming, & Liu, 2019). With the rapid development of technology, updating instructional materials and methods to ensure that students are learning cutting-edge knowledge and skills has become an ongoing task for education providers. In addition, the professional development of teachers is crucial (Garber et al., 2021). Teachers not only need to acquire specialized knowledge, but also need to be aware of the latest educational technologies and methodologies and how to effectively apply these to the teaching of skills.

The implementation of skills-based learning in Chinese engineering vocational colleges has had a significant impact on students' internships and career development. By providing a learning experience that combines practice and theory, this has helped students build the necessary vocational skills and knowledge base for their successful entry into the professional world (Mishra et al., 2022). Despite the challenges, through continuous curriculum review, professional development of teachers, and close collaboration with industry, skills-based learning is expected to further improve the quality of education and produce more competent professionals for China's economic development.

3. SKILL-BASED LEARNING CURRICULUM

Curriculum design and improvement in vocational education is essential to ensuring that students acquire the necessary skills and knowledge to adapt to the rapidly changing work environment. As the global economy and technology evolve, vocational education faces constant challenges and opportunities. In this context, engineering vocational colleges in particular, need to continually review and update their program content to meet the real needs of industry (Hanson et al., 2022). This process involves critical analysis of existing educational models, as well as innovations and improvements, based on the findings of empirical research. By taking a closer look at curriculum design and improvement in vocational education, there can be better understanding of how to prepare students to face the challenges of their future careers.

In vocational education, the core goal of curriculum design is to develop students' vocational competence, including specialized knowledge, skills, and attitudes (Tang, Dai, Jiang et al., 2019). This not only requires students to master specific technical skills, but also the ability to effectively apply these skills in changing work environments. Therefore, the curriculum must be dynamic and reflect industry trends and technological advances. This is particularly important because many occupational fields, especially engineering, undergo rapid technological advancements. Faculties need to work closely with their industry partners to ensure that course content meets both theoretical and practical requirements.

Effective curriculum design also needs to take into account the diversity of learning methods. Traditional classroom lectures may not be sufficient to meet the learning needs of all students. Therefore, it is becoming increasingly important to use a variety of teaching methods such as project-based learning, flipped classrooms,

online learning and internships (Javidinejad, 2022). These methods can provide a more hands-on learning experience and help students to integrate theoretical knowledge with real-world practice. For example, by participating in real engineering projects, students can learn project management, teamwork, and creative problem-solving skills under the guidance of a mentor. This type of learning experience not only enhances students' career skills, but also improves their employability (Hunt & Scott, 2018).

Program improvement is an ongoing process that requires regular assessment and feedback. This includes evaluating student learning outcomes, instructor effectiveness, and relevance of course content (Theodore et al., 2019). Collecting and analyzing this information can help educators identify the strengths and weaknesses of a course and make adjustments accordingly. In addition, colleges should also encourage faculty members to participate in professional development activities to keep their teaching skills and industry knowledge up to date. This is essential to maintain the quality of the curriculum and to ensure that education is aligned with the needs of the industry.

With the advancement of technology and the impact of globalization, the design and improvement of vocational education curricula also need to take into account internationalization trends. This means that colleges need to not only focus on the needs of industry in their own countries, but also incorporate international standards and best practices into the curriculum. This can be achieved through international collaborative projects, exchange programs for students and faculty, and the adoption of internationally recognized qualification systems (Liu, Yongjiang, Miao, Guo, Xiaomin et al., 2018). Such an international perspective not only expands students' horizons, but also improves their competitiveness in the global job market.

Curriculum design and improvement in vocational education is a complex but crucial task. It requires educators not only to keep abreast of industry developments, but also to adopt innovative teaching methods and assessment mechanisms to meet the needs of students and employers. Through continuous curriculum renewal and pedagogical reform, vocational colleges can provide students with the necessary skills and knowledge to help them succeed in their future careers. In this process, educators, industry partners and the students themselves all play important roles in driving educational progress and innovation.

4. INTERNSHIP AND SKILL-BASED LEARNING

Internship experience occupies an irreplaceable role in the development of vocational skills, especially in technology-intensive fields such as engineering. Through internships, students can not only apply the theoretical knowledge learned in the classroom to practical work (Jin, R., 2020; Qin, F., 2019), but also gain valuable work experience, understand the industry dynamics, as well as develop the necessary vocational skills and workplace literacy (Wu, B., 2020). Internship experience is both a means of validating learning outcomes and an important link in bridging schooling and workplace practice for the development of students' vocational skills.

Internships provide students with insight into the work environment of a particular industry and an understanding of the responsibilities and demands of professional roles. During internships, students are exposed to real-life work tasks that often require them to apply critical thinking, problem-solving skills, and specialized knowledge (Haiyan Luo, 2020). This practical experience not only deepens students' understanding of the specialized knowledge they have learned, but also promotes the overall development of their vocational skills. For example, in engineering projects, students may need to apply the design principles they have learned in the classroom, as well as learn how to use new technologies or software, which are indispensable skills for their future careers.

In addition to the enhancement of professional skills, internships provide students with the opportunity to develop soft skills such as teamwork, communication skills, time management, and the ability to adapt to change (Liu, Haiyan, 2021). These skills are extremely important in today's work environment and are often of particular interest to employers during the recruitment process. Through internships, students learn how to communicate and collaborate effectively in dealing with workplace challenges by interacting with coworkers and clients in real workplace environments. These experiences are essential for developing students' professionalism and enhancing their employability (Dong, Zhou, & Fang, 2021).

Internships also provide students with the opportunity to build a professional network, which is very helpful for their future career development. By networking with industry experts and peers, students can gain valuable advice on industry dynamics, career development opportunities, and career planning. In some cases, internships can even translate directly into employment opportunities, and many employers prefer to hire interns they are already familiar with because they have already learned how the company operates and demonstrated

their abilities.

However, the value of internships depends not only on the quality of the internship itself, but also on effective communication and collaboration between students, educational institutions, and employers (Li, Jun, and Yanqi, 2018). Educational institutions must ensure that internship programs match their curricular objectives and provide students with authentic and challenging work experiences. At the same time, schools and employers should work together to monitor the internship process to ensure that students' learning objectives are achieved. In addition, students should also take an active attitude and make full use of internship opportunities to improve their vocational skills and lay a solid foundation for their future career (Lu, 2018).

Internship experience is a key component in the process of vocational skills development, which not only helps students transform theoretical knowledge into practical skills, but also provides them with the opportunity to explore their career interests, develop their vocational literacy, and build their career networks. Through internships, students can better prepare themselves for the complex and changing workplace environment and enhance their employability. Therefore, educational institutions, employers and students themselves should emphasize the value of the internship experience and work together to ensure that internships effectively contribute to the development of students' vocational skills.

5. CHALLENGES IN ENGINEERING VOCATIONAL EDUCATION IN CHINA

The characteristics of and challenges facing China's engineering vocational education, as an important means of training personnel with technical skills and specialized knowledge, reflect the educational needs and trends in China's rapidly developing economic and technological environment. Against the backdrop of globalization and technological advancement, China's engineering vocational education system strives to adapt to the changing needs of the industry, while at the same time facing a series of challenges that require innovative educational strategies to address.

A distinctive feature of Chinese engineering vocational education is its emphasis on the cultivation of practical skills (Dong, 2018). This educational model emphasizes the integration of theory and practice, enabling students to learn and apply their technical knowledge in real or simulated work environments through laboratory work, internship programs, and cooperative projects with companies. This approach is designed to ensure that students are able to adapt quickly to the world of work and meet the immediate needs of the industry after graduation.

Another feature is the hierarchy and diversity of vocational education. China's engineering vocational education system offers multi-level pathways from secondary vocational education to higher vocational education, and even short-term training and continuing education. This structure is designed to meet the needs of students with different backgrounds and abilities, and to provide them with a variety of career development and learning opportunities (Xie, 2021; Lv, 2021).

China's engineering vocational education also faces a series of challenges. First, the disconnect with industry needs is a major problem (Wang, 2018). Rapid technological advances, especially in the engineering field, require that educational content and methods be constantly updated to keep pace with industry standards and technological developments. However, the pace of curriculum updating and teacher professional development often cannot keep up with the pace of change in the industry, resulting in graduates' skills that may not fully meet the actual needs of the workplace.

Uneven distribution of educational resources is also an important challenge (Ma & Li, 2022). China's engineering vocational education resources are unevenly distributed among geographic regions, and educational institutions in some regions may lack adequate teaching facilities and financial support, which affects the quality of education and students' learning experience. In addition, the shortage of good teachers, especially those with industry experience, limits the improvement of the quality of vocational education.

In addition, the challenge of social cognition cannot be ignored (Cao & Cheng, 2019). Although vocational education plays an important role in cultivating technical talents, vocational education is often regarded as the second choice to general education in the society, which affects the willingness of students and parents to choose vocational education. Changing this perception and improving the social status and attractiveness of vocational education is another challenge facing engineering vocational education in China.

In the face of these challenges, China's engineering vocational education is taking a variety of measures to reform and innovate. These include strengthening cooperation with enterprises, updating teaching contents and

methods (Lv, 2018), improving the distribution of educational resources, and raising the social recognition of vocational education. Through these efforts, China's engineering vocational education aims to better adapt to the development of economy and technology, and to cultivate technical and skilled talents that meet the needs of the future workplace.

Engineering vocational education in China plays a key role in cultivating technical talents and promoting economic development. Despite a series of challenges, through continuous reform and innovation, China's engineering vocational education is expected to overcome these challenges and provide students with more and better learning and development opportunities, while contributing to technological advancement and economic growth in China and around the world.

6. CONCLUSIONS AND RECOMMENDATIONS

The study presents an exposition of the role of skill-based learning in Chinese engineering vocational education. While it is widely accepted in the field that skill-based learning is a viable approach to learning essential skills relevant to the workplace, there are challenges in its implementation, which warrant further study and investigation. It must be noted, however, that while these challenges exist, they do not outweigh the opportunities provided by this approach. In the context of Chinese education, closing the gap between academe and industry is crucial to produce competent professionals, who are not only knowledgeable, but also skilled and prepared to integrate into the workforce as soon as they complete their education. This circles back to the initial proposition on the essence of vocational colleges. Through careful analysis of the manner by which skill-based learning is integrated into the internship program, teachers may be able to properly assess the fulfillment of target outcomes for their programs.

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