

# Research on the Collaborative Innovation Practice Model of School Enterprise Based on College Student Practice Base

Zhongyong Wang<sup>1,a</sup>, Yingjing Xu<sup>2,b,\*</sup>

<sup>1</sup>School of Automation, Guangdong University of Petrochemical Technology, Maoming, China

<sup>2</sup>Foreign Language School, Guangdong University of Petrochemical Technology, Maoming, China

<sup>a</sup>383858484@qq.com, <sup>b</sup>38205321@qq.com

\*Corresponding author

**Abstract:** Based on the cooperation between schools and enterprises, college student practice bases play an important role in enhancing the practical and innovative abilities of college students. The construction of practice bases requires schools and enterprises to cultivate talents that meet the needs of the industry and society from the perspective of being responsible for society. It is necessary to build an effective management system and establish a multi-dimensional shared college student practice base.

**Keywords:** Practice base; Practical ability; Innovation

## 1. Introduction

In the era of the Internet, professionals and industries have put forward the requirement of "composite", that is, we need to make industry more intelligent. Therefore, "traditional engineering" will not decline, but will be revitalized by the integration of new technologies such as the Internet.

In the new era of development, higher requirements are placed on the practical and innovative abilities of engineering professionals. The new engineering curriculum system emphasizes practice, and the composition of the curriculum system is diversified, such as in course projects, course group projects, multidisciplinary team projects, research practice projects, and graduation project research and development projects, forming a closely related whole. New engineering emphasizes the practical application of what is learned, encourages students to create and start businesses, and enables graduates to support the development of emerging industries and even create new fields of industry <sup>[1]</sup>.

## 2. Problems and Reflections on Cultivating Practical Abilities of College Students

Currently, practical teaching remains a weak link in the education of engineering college students. As far as the construction of practice bases is concerned, it is influenced by various factors, such as personal understanding, current management system, practice venues, and internship funds. These factors seriously lag behind the construction of practice bases, and there are generally problems such as limited bases, difficult execution, and poor results. The practice bases cannot meet the needs of talent cultivation and internship, resulting in weak practical and innovative abilities of students, which makes it difficult to truly achieve the close integration of educational practice <sup>[2-3]</sup>.

At the same time, due to the insufficient understanding of the status and role of social practice among students, the initiative to participate in practical base teaching is not sufficient. Some students, in order to complete tasks, do not effectively combine practice with improving comprehensive quality and employment competitiveness.

## 3. Enhance Construction of Practice Bases

The quality of engineering students needs to be developed through practice. In the process of education and teaching, various practical teaching links are particularly important for cultivating students' practical and innovative abilities. In recent years, various universities have been continuously

strengthening important links such as professional learning and graduation internships, promoting the reform and innovation of experimental content and models, cultivating students' practical skills, problem analysis and problem-solving abilities. They should continue to work with society, industries, and enterprises to consolidate, expand, and develop off campus internships and practical bases. Many universities, regardless of improving or optimizing their practical teaching models, reform and innovate their practical teaching and talent cultivation models, continuously concretize them, and increase the construction of practice bases<sup>[4]</sup>. They collaborate with enterprises and other social forces to establish practice bases, promote the construction of new engineering disciplines, and enhance the practical and innovative abilities of college students.

### ***3.1. School Enterprise Cooperation to Jointly Build a Practical Base for College Students***

In order to cultivate and enhance the practical ability of college students, universities should actively introduce social resources and expand their practical bases. For example, they can deepen connections with local enterprises and establish a model of school enterprise cooperation. By utilizing the unique advantages of enterprises, college students can gain practical skills and enhance their abilities in practical bases, and deepen their absorption of theoretical knowledge in practice, Give full play to the important role of collaborative education between the two.

Universities need to continuously innovate and improve the training mode of new engineering talents. Universities need to select and establish a number of stable practice bases, strengthen school enterprise cooperation, establish a sound management system, and achieve effective management of practice bases. At the same time, it is necessary to maintain close contact with employers, enhance understanding, pay attention to timely collection and analysis of feedback information from student internships, adjust professional settings and teaching content according to industry needs, so as to better match professional settings and teaching content with employment needs, and better connect with social needs<sup>[5]</sup>.

Cooperative enterprises should attach importance to the construction of practical bases, while carrying out normal production, pay more attention to social benefits, actively implement various policies issued by government departments, create a good atmosphere and environment for college students to intern, transform their business and management concepts, increase employment opportunities and positions, and serve and repay society. And students should actively participate in internships at the base, develop their abilities through internships, and improve their abilities through exercise. They can play a good role as a bridge and link between higher education institutions and enterprise units, and to organically integrate industry, academia, research and application; accurately evaluate and understand themselves, cultivate professional interests, make rational career choices, innovate ideas, actively explore, and continuously improve practical and innovative abilities.

### ***3.2. Strengthen Guidance and Give Full Play to the Initiative of Practical Learning***

In the context of new era and new requirements, social development has put forward better requirements for the practical ability of college students, and it is necessary to guide students to actively participate in the process of practical innovation ability.

Firstly, fully tap into the self-directed learning ability of college students. Interest is the best teacher. Only when students are interested in cultivating practical abilities and enhance their self-learning ability, can they better cultivate their practical abilities. Therefore, it is necessary to help college students understand the importance of practical abilities in the context of innovation and entrepreneurship through various forms<sup>[6]</sup>, pay attention to their professional and practical activities in daily teaching and life, actively participate in practical activities to exercise their practical abilities, master rich practical experience, and improve their core competitiveness.

Secondly, it is crucial to strengthen guidance, as the role of teachers in guiding students is crucial. The level of teacher's ideological level and practical ability to a certain extent affects the future development space of students, and also has a direct impact on the effectiveness of cultivating students' practical ability. Therefore, it is necessary to strengthen the transformation of teaching philosophy, the improvement of professional abilities, and the strengthening of practical abilities of teachers, in order to play an effective guiding role in cultivating students' practical abilities. While improving their own teaching level, it is also necessary to guide students to continuously improve their awareness of innovation and entrepreneurship practical abilities through students in practical bases.

Thirdly, provide training programs that students are interested in and can learn practical skills. The practice base needs to be equipped with engineers with rich practical experience as off campus guidance teachers, who work together with on campus guidance teachers to provide guidance for students' graduation comprehensive practice reports. This can enable students to receive pre-job skill training while completing practical activities and professional comprehensive practice reports.

For example, the college student practice base established in cooperation between the Electrical Engineering and Automation major of Guangdong University of Petrochemical and Foshan Robotics Technology Co., Ltd. can provide short, medium, and long-term practical and internship plans according to the needs of various professional teaching plans. Taking a short two-week period as an example as seen in Table 1:

*Table 1: Two week practical training plan for Electrical Engineering and Automation major:*

<b>Two weeks of practical training and internship training content</b>			
Time	Practice Teaching Content	Teaching Curriculum	Teaching Requirements
1 day	visit Foshan China (Guangdong) Robot Integration Innovation Center	Visit robot exhibition halls	Learn about cutting-edge technologies in China
		Xinpeng Factory and Training Venue	Introduce training content, objectives, and practical training process
	Project Case Analysis	Company Project Cases/Electrical Fundamentals/Installation Software/Engineer Experience Exchange	Understand the development and project situation of the industry
5 days	PLC Project Fundamentals	Fundamentals of PLC and Electrical Components	Computer operation and engineer guidance Theory+practical operation on computer&engineer guidance
	PLC practical operation project	PLC programming	
6 days	Industrial robot project	Robot programming and related technologies	

### **3.3. Building an Effective Base Management System**

To fully utilize the role of college student practice bases and ensure the cultivation and improvement of their practical abilities<sup>[7]</sup>, it is necessary to first have a good operational and management system. Specifically, as follows:

(1) While universities and cooperative enterprises jointly establish and improve management systems, management systems include assessment, evaluation, feedback, and other aspects.

(2) Establish and improve a practical ability assessment mechanism, comprehensively manage and evaluate the cultivation of practical ability, and ensure that the cultivation of practical ability is reflected in the entire teaching process.

(3) By adopting various forms, college students can have a systematic approach to cultivating practical abilities, creating a positive atmosphere. With the help of computer and internet technology, big data, artificial intelligence, and other technologies can be applied throughout the entire process of cultivating practical abilities.

(4) Establish an effective assessment and evaluation mechanism to ensure the evaluation of the teaching process, effectively achieve process oriented assessment of teachers and students in the cultivation of practical abilities, and achieve full process evaluation.

(5) Establish a feedback mechanism. Through practice and evaluation, provide accurate problem analysis reports for teachers and students, provide targeted suggestions for subsequent work, and better promote the cultivation and improvement of practical abilities.

### 3.4. Build a Practical Ability System for School Enterprise Integration

Through the construction of practical bases, we aim to extract the needs of students for innovative practical abilities, integrate them into the practical teaching process of universities, promote curriculum and teaching reform, adhere to and develop the ability oriented applied talent training model, and cultivate various types of intelligent manufacturing engineering technology applied talents.

The practical teaching coverage of the base is extensive, adhering to the alignment of professional settings with industry needs, curriculum content with professional standards, and teaching and production processes. More than 80% of the production internships and comprehensive professional practices in the talent training program can be conducted at the base, and teachers can engage in practical training and joint scientific research work with a wide coverage. More than 60% of teachers have participated in the base's practical training and scientific research cooperation. It mainly involves the following aspects:

(1) Promote the integration of multiple disciplines and specialties, actively promote the construction of "new engineering disciplines", closely meet the needs of national development, deepen comprehensive professional reform, optimize professional structure, transform traditional majors, and create distinctive and advantageous majors.

(2) Practical teaching drives curriculum construction, focuses on the reform of applied undergraduate professional courses, constructs a teaching philosophy of integrating theory and practice, and constructs practical teaching course materials that meet industry needs.

(3) Innovative talent cultivation model. Adapting to the development trend of new engineering disciplines, continuously improving applied talent training programs, implementing the teaching system, assessment system, and management system of engineering practice in talent training, and realizing the reform and innovation of applied talent training models.

(4) Strive to create a model of integrating practical teaching with scientific research innovation, providing assistance for student innovation and teacher research.

### 3.5. Establish an Open Sharing Mechanism

In addition to undertaking the task of extracurricular practical education for students, college student practice bases should also have a sense of the overall situation. At the same time, they should be open to other universities, actively release relevant information about the practice base, and accept students from other universities to study in the practice base based on their acceptance ability.

Electrical Engineering and Automation Speciality of Guangdong University of Petrochemical Technology has cooperated with Foshan Xiling Robot Technology Co., Ltd. (as seen in Figure 1) to actively carry out the construction of off campus college student practice bases, achieving good construction results and promoting the construction of society and related universities.

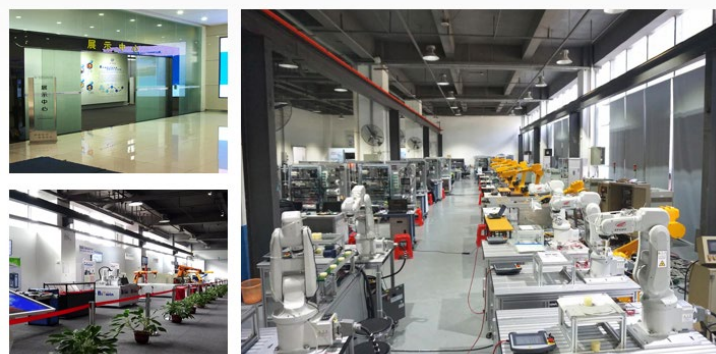


Figure 1: Guangyou Xiling Robot College Student Practice Base.

Foshan Xiling Robot Technology Co., Ltd. was established in 2013 and is now listed as a subsidiary of the third batch of robot backbone enterprises in Guangdong Province by the Guangdong Provincial Department of Industry and Information in 2020. The current practice base has a training venue covering an area of approximately 2000 square meters, equipped with basic facilities such as training rooms, classrooms, and dormitories. It can accommodate 100 people for simultaneous training and has

an annual training capacity of over 1500 people. The existing practical training projects include robot basic knowledge training equipment, industrial robot application competition training equipment, robot multifunctional and multi application training platform, robot intelligent production line area, and so on.

Both universities and practice bases should negotiate and formulate a scientific and reasonable internship base construction plan based on the characteristics and advantages of the discipline, professional development planning, practical teaching needs, and the specific situation of the internship base supporting unit and its location<sup>[8]</sup>. The goal, content, and process of the construction should be clearly defined, and a system for co construction and sharing of college student practice bases should be established and improved through organizational and management systems to avoid the hollowing out of practice bases and promote the institutionalization, standardization, and long-term effectiveness of co construction activities.

#### 4. Conclusion

In the process of cultivating new engineering talents, improving the practical ability of college students is an important link that requires joint efforts from universities, teachers and students, and society. While transforming traditional teaching concepts, it is necessary to achieve deep cooperation between universities and society, take effective measures, and use modern technological means to establish a training base for college students' practical ability. This fully leverages the synergistic effect of universities and enterprises on the cultivation of college students' practical ability, and cultivates talents with innovative consciousness and practical ability for comprehensive development.

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(4) New Engineering Construction Projects of Guangdong University of Petrochemical Technology.

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