

## Exploration of "Wisdom Workshop" in the Practical Training of "Craftsman" Talents in Local Agricultural Colleges and Universities in China

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| Received: 10.01.2019 | Accepted: 20.01.2019 | Published: 30.01.2019

DOI: [10.36347/sjebm.2019.v06i01.005](https://doi.org/10.36347/sjebm.2019.v06i01.005)

### Abstract

### Review Article

Based on the analysis of the current situation and existing problems of practical training mode in local colleges and universities, taking Heilongjiang Bayi Agricultural University as an example, this paper discusses the interdisciplinary practical training mode on the basis of the established interdisciplinary theoretical teaching system, and puts forward the construction strategy of "intelligent workshop" for the practical training of "Craftsman" talents.

**Keywords:** Craftsman; Training; Wisdom Works.

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## INTRODUCTION

"Craftsman Spirit" is the key to the development of China's manufacturing power, and it is also the inevitable requirement for the cultivation of innovative talents. Local colleges and universities located in resource-based cities are the main front of "Craftsman" talents urgently needed by regional economic industries. The training base is an important practical teaching facility for talent cultivation, which is of great significance to the cultivation of excellent craftsmen. In the context of big data and local economic transformation, it is of theoretical significance and important application prospect to explore the practical training mode of "Craftsman" talent training, combine qualitative research with quantitative analysis, and construct the practical training "Smart Workshop" of "Craftsman" talent training in local colleges and universities in China from an interdisciplinary perspective.

### Comparison of training modes at home and abroad

Facing the "Industry 4.0" era, engineering technology plays an increasingly important role, and its application has penetrated into every economic and social field. The world's major developed countries have always regarded engineering as the future of the country, engineering talents as the guarantee to give full play to the country's potential, and engineering

education as an important part of higher education. The distinctive training pattern for overseas are formed, as shown in table 1, including "Cooperative" mode and "Return to the project" of the United States, the "Sandwich" model and "Company teaching" mode of United Kingdom, the "Dual System" mode of Germany, "technology and continue education" mode in Australia, Singapore's "teaching factory" and so on [1,2].

### Engineering Education in American

The achievements of undergraduate engineering education in the United States were formed after more than 20 years of transformation. From the late 1980s to the early 1990s, the American engineering education began to change. The teaching plan and curriculum system returning to the essence of engineering education were reconstructed [3]. They implement a large structure of the teaching system, the content of the course has been refined, the main teaching curriculum knowledge system and core concepts. The specific implementation methods of American colleges and universities are different, but the goal and direction of the reform have certain orientation, that is, through the reform of the existing teaching methods, curriculum system and content, make it better oriented to interdisciplinary, curriculum integration and students' engineering practice, teamwork, innovation and creativity. Hole in ice, an associate professor of Zhejiang University and other

people looked at us through the network of the Massachusetts Institute of technology, University of California, Berkeley, Britain's imperial college at the technical university in Munich, Germany, and Japan's Kyoto university, and summarizes the characteristics of engineering undergraduate, engineering education and teaching reform in colleges and universities: centering

on the problem, guide the students to participate in research projects of the teacher, and the interdisciplinary study. With practice as the purport, they strengthen the teaching implementation of engineering design, comprehensive experiment, enterprise practice and other links.

**Table-1: Comparison of practical training modes in different countries**

Country	Practical Education Mode
American	Returning Project, Cooperative Teaching
Canada	Cooperative Teaching
United Kingdom	Sandwich Mode, Teaching Company model
Germany	Dual-Mode
French	Large Scale System
Australia	Technology and Continuing Education
China	Combination between School and Enterprise
Singapore	Teaching Factory

### Engineering Education in Europe

In Europe, the bologna agreement has been adopted and the bologna process is being pressed forward. It is hoped that the European degrees will be unified and the academic system will be basically unified. They think to cultivate a qualified engineer. It will take about seven years or so, is divided into three major stages: the first stage is the university three years of study, the second phase is to have a year of engineering training, the third part is at least two years of practical experience, the last one year, according to need to add it to any of the foregoing stages. With these seven years of study, training and engineering experience were applied for the engineer title.

The curriculum reform of German engineering professional, also has a characteristic very much to Borussia Dortmund university of science and technology enterprise control and planning of professional, for example, the professional course is divided into three major types: basic course practice lessons and practical lessons in recent years, the school has carried on the optimization of the related courses, mainly teaching contents of refining teaching content from the previous 12 modules to now seven modules, including from the second module to the 6th module was designed to fit into the whole process of enterprise, basic course parallel to practice class, every week is ongoing. In addition, courses arrangement for the industry related enterprise partners opinions and suggestions, recognized by a French engineering education especially attaches great importance to the formation of students' comprehensive quality and the cultivation of engineering practice ability, the government enterprises in colleges and universities students and the third party intermediary organizations together, constitute a attaches great importance to the system of training and engineer training students in addition to the school the basic experiment of engineering practice, and for half a year's internship program students can not only to the domestic

enterprises and multinational company internship, also can go to abroad to participate in the project and the enterprise practice. With the deepening of European integration and the bologna process, also some changes have taken place in recent years, mainly emphasizes the liquidity after integration, the engineering training before the school year is abate, until 4~5 years, that is the graduate student stage, enhancement from the point of the teaching reform of undergraduate engineering education abroad, its characteristic mainly includes: paying more attention to the extension of the engineering training content, and paying attention to the reform of teaching methods. Pay attention to the integration of students' knowledge. Pay attention to inter-school cooperation and school-enterprise cooperation to cultivate talents. Pay attention to humanistic and social science education in engineering education. Focus on engineering ethics education, etc.

### Engineering Education in China

Engineering education has brought up a large number of engineering talents and made great achievements for China's economic development and social progress. At the same time, due to the limitations of China's education system, talent training mode and other reasons, engineering education also has many problems. Engineering science and technology talents cultivated by colleges and universities can hardly meet the needs of transforming China's economic development mode, establishing an innovative country and participating in international competition [4]. There are some problems in practical teaching in China, such as unclear training objectives, absence of practical teaching, imperfect design of practical training system, lack of innovation in engineering talent training, relatively backward teaching methods, curriculum system and teaching staff. At the same time, the current talent training mode is closed, and the training between disciplines and majors is relatively independent, which cannot meet the requirements of the "Industry 4.0" era for the training of high-skilled engineering talents [5].

Especially according to current situation of local university practice teaching mode, based on "Innovation 3.0" construction open training workshop of "Smart" platform, is to improve the high skill the urgent needs of the engineering talents cultivation level, with employment as the guidance, with professional skills and innovation as the core of the need of engineering talents training mode, but also comprehensively enhance agricultural colleges service the needs of the transform and upgrade manufacturing industrial ecology in our country.

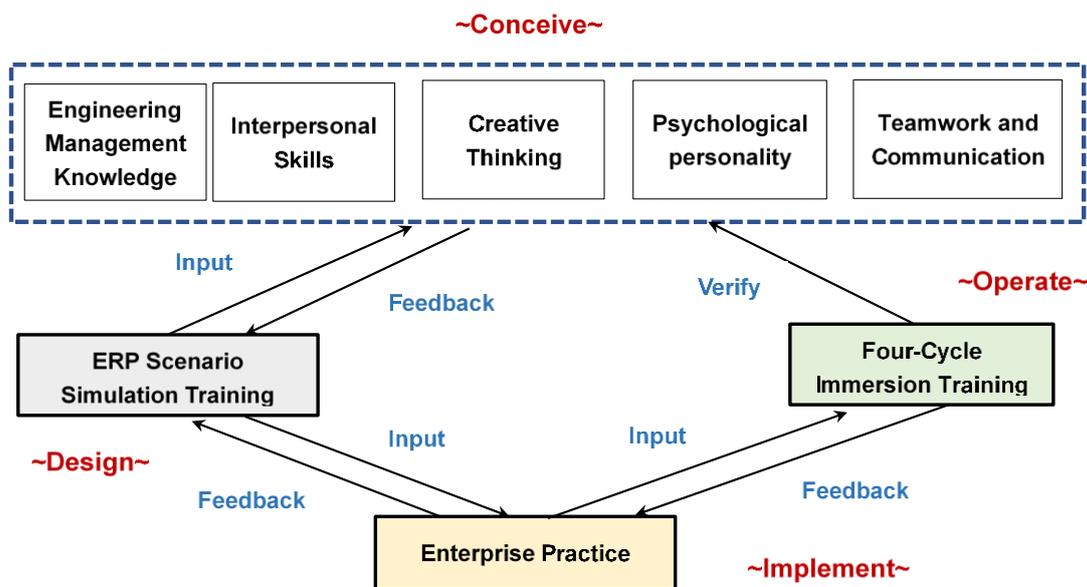
**Construction of "wisdom workshop" for "Craftsman" talent training**

According to the analysis of training mode at home and abroad, combined with a digital platform development in today's society and enterprise talent demand, put forward the "Craftsman" type talents training workshop of "wisdom" of the design idea, in Heilongjiang August first land reclamation university, for example, training system reform carried out a series

of exploration research, aimed at "Craftsman" type personnel training for local colleges to construct training workshop of "Wisdom" to provide a certain basis [6].

**Content and thinking of practical training reform**

According to CDIO mode, the whole training process is divided into four sub-modules: conception, design, implementation and operation [7]. Each sub-module carries out practical training for different stages of service outsourcing project process. Complete projects of practical training platform introduced by enterprises are divided into sub-projects of different submodules according to CDIO. "customizable" CDIO practical training is adopted for students with different educational background, ability, work experience and enterprise needs. According to their own foundation and training progress, students will participate in one or more submodules in CDIO, so as to truly achieve the goal of on-demand training covering multiple levels, as shown in fig.1.



**Fig-1: Practical training framework of "Smart Workshop" under CDIO mode**

**Implementation process**

**(1) Conceive**

According to agricultural colleges own characteristic and the development of regional economic transformation, based on the talent training objective, theory and practice teaching system analysis and the graduates working conditions, the investigation of graduate research ability, the system summary of internationalized talents cultivation of architecture, engineering excellence talent cultivation in China are put forward a preliminary assumption 3.0 "innovation" training mode.

**(2) Design**

The Design for graduate students, and employment survey and research ability, analyses the problems existing in the engineering talents cultivation. From the perspective of TPACK, the existing theoretical and practical teaching system is updated and optimized by applying the interdisciplinary integration method.

**(3) Implement**

To realize the goal of cultivating high-quality innovative engineering and Implement the interdisciplinary talent as the goal, through the cross-training platform to build scientific and systematic engineering which accords with the situation of China's outstanding talents training mode.

#### (4) Operate

In the process of implementation, based on the "ABC - KAQ Dual Mode" training platform, establish a comprehensive quality and practical ability education for multi-disciplinary overlapping comprehensive orientation "Craftsmen" talent evaluation system, ensure the agricultural colleges and society needs a win-win goal.

#### Exploration and practice of "wisdom workshop", the practical training of "Craftsman" talents in local agricultural colleges and universities

Through the implementation of information and computing science, applied chemistry, biological engineering and other pilot professional 2016 student's talent diversion education. It advocates that teachers and students should conduct interdisciplinary and interdisciplinary research by taking cooperative research on projects at all levels and solving practical problems as the entry point to promote discipline integration. With the help of modern teaching methods - MOOC, Micro-class and SPOC, flipped classroom is implemented to actively explore the construction and exploration of "Smart Workshop" under the collaborative and innovative classroom teaching mode.

(1) The 4~6 modern enterprises selected in Harbin and Daqing cities shall establish standardized practice teaching bases and intelligent manufacturing training bases. According to the course characteristics of three types of innovative talents, in the student internship and practical activities, by the school and practice base in each selection experienced teachers, high level of ability and all the staff to be responsible for the student's internship practice, implement professional skills and innovative "Spirit" to foster the precision coupling, the formation of the government to promote, market guide, social participation, the industry enterprises and local colleges and universities "Multiple main body education, Double teachers teaching" the characteristic of the practice of the new system.

(2) Through field visits, we increase the internship and practice base, try to equip each student with double tutors from the enterprise and the school, attach importance to the training of practical ability in various links, such as curriculum design, graduation design, professional practice, graduation practice, etc., and combine these links with practical topics of the enterprise. Teachers are encouraged to take cooperative research projects at all levels as the entry point for cross-disciplinary and cross-disciplinary research, and teachers are encouraged to exercise in enterprises, farms and other temporary positions. Social service professional skills training.

(3) On the basis of this platform, the school of science added the Gabo Yingnuo Innovation and Entrepreneurship Collaborative Education project in 2017 and the Neusoft Ruidao New Engineering

Construction Collaborative Education project in 2018, three students cultivated with Shanghai Honglida order, participated in the "3+1" school-enterprise cooperation of 29 people, and added the Harbin oracle cooperative enterprise. To participate in "3 + 1" university-enterprise joint training of students by import industry technical personnel, and promote university-enterprise joint design teaching, research teaching, explore the project teaching, scene teaching, teachers teaching together with the enterprise technical personnel and the way of education, trying to multilateral cooperation with the practice of talent training "Low Cost".

(4) To solving practical problems, we introduce enterprise projects for students to practice, increase the opportunities and frequency for students to carry out practical activities and innovation and entrepreneurship, effectively improve students' innovation and entrepreneurship ability and comprehensive quality, and lay a good foundation for "Close" and "Zero Distance" employment. Interdisciplinary -the school of life has launched the second phase of the career experience camp and promoted it to all the colleges in the university. One provincial virtual simulation experiment project was constructed. Complete the line capacity increase project of the campus edible fungus practice teaching base, and ensure the smooth development of students' practice. Actively encourage and support innovation activities, won 6 first prizes, 7 second prizes and 2 excellent organization prizes in the national college students life science innovation and entrepreneurship competition.

#### CONCLUSION

The practical training platform of "smart factory" based on the CDIO theory can not only meet the practical teaching needs of Heilongjiang Bayi Agricultural University, but also provide diversified practical training for the vast majority of cross-major engineering majors at present, so as to cultivate students' all-round practical work skills. At the same time, through this training platform, teachers cooperate with enterprises in technology development, and assign teachers to enterprises for post holding or temporary post training, which not only improves teachers' scientific research and practice ability, but also solves technical problems for enterprises, thus achieving a win-win situation for students, enterprises and schools.

#### Acknowledgements

This work was supported by Key Project in the 13th Five-Year Plan of Education Science in Heilongjiang Province (GGB1318087); Youth Special Project in the 13th Five-Year Plan of Education Science in Heilongjiang Province (GJD1318025); Teaching Research Project of Heilongjiang Bayi Agricultural University (NDJY1638); Research Project on Teaching Reform of Degree and Postgraduate Education in Heilongjiang Bayi Agricultural University (YJG201802); Key Project in the 13th Five-Year Plan

of Education Science in Heilongjiang Province (GBB1318088).

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