

PAPER • OPEN ACCESS

Study the Status and Path of Reform of Innovation and Entrepreneurship of Civil Engineering Education System

To cite this article: Guang-xing Zhu *et al* 2019 *IOP Conf. Ser.: Earth Environ. Sci.* **267** 052053

View the [article online](#) for updates and enhancements.

Study the Status and Path of Reform of Innovation and Entrepreneurship of Civil Engineering Education System

ZHU Guang-xing^{1*}, MA Hong-jie², HAN Yan³

¹ School of Civil Engineering, Baicheng Normal University, Baicheng Jilin, 137000, China

² Baicheng Haiming Primary School, Baicheng Jilin, 137000, China

³ Department of Building Engineering, Taishan Polytechnic, Taian Shandong, 271000, China

*Corresponding author's e-mail: 935500969@qq.com

Abstract. Innovation and entrepreneurship education in colleges and universities has been comprehensively deployed and promoted and the top-level policy document of “mass entrepreneurship and innovation” has been launched at the national level. The document of “opinions on deepening the reform of innovation and entrepreneurship education in institutions of higher learning” has been published especially for higher education, which specially deploys the education of innovation and entrepreneurship in the field of higher education. The ministry of education carries the comprehensive layout on the innovation and entrepreneurship education when colleges and universities make the regulations of cultivate virtue and the vocational reform and other top policy documents. The higher education must be adapted to the society development of economy, politics, technology and culture. The relatively complete engineering education system has been established in China in 1950s in accordance with the model of former soviet-union. But in general, it cannot meet the needs of engineering technical personnel with high-quality in the construction market. It starts early and develops rapidly in foreign countries in the aspects of research and practice of innovation and entrepreneurship, which has become more and more mature for colleges and universities in the construction of educational system of innovation and entrepreneurship. So, it has rich experience and is worth learning.

1. Introduction

It is urgent to strengthen cultivation of practical ability and innovation ability for civil engineering students. But, the problems have been emerging in the aspects for many civil engineering institutions, which include the relatively lag education concept of innovation and entrepreneurship and the emphasis on the theoretical for the knowledge transmission. Ignore the cultivation of innovation and entrepreneurial spirit and ignore the cultivation of innovation. As a result, the innovation and entrepreneurship education has left the strong support of professional theoretical knowledge, and the college students have more passion for innovation and entrepreneurship but less stamina. At the same time, the understanding of the connotation of innovation and entrepreneurship education is not accurate enough, and the orientation of innovation and entrepreneurship is not clear. So, it often only focus on the results of entrepreneurship, which is difficult to cultivate college students to really form a targeted knowledge structure and ability. In recent years, the teaching resources are increasingly tight



because of the expansion of enrollment. The teaching ideology emphasizes theory over practice, emphasizes knowledge imparting over ability cultivation, emphasizes inner class teaching over extracurricular activities. Particularly, the links of practice teaching and practice training become mere formality, which leads the problems of cultivation of engineering practice ability and innovation and entrepreneurship ability becoming more and more prominent for the civil engineering major students. So, it needs to explore the ways of reform and system construction.

The rapid development of China's economy puts forward higher requirements for the cultivation of talents for colleges and universities. Therefore, colleges and universities should pay great attention to the cultivation of spirit and improvement of abilities of innovation and entrepreneurship for college students. To avoid detours, it should sum up and learn the successful experience of innovation and entrepreneurship education in foreign universities. It should coordinate the efforts of government, society, enterprises and schools, and should actively explore and build up the education model of innovation and entrepreneurship for colleges students in the "internet +" era. So, it can do a good job in educating the college students on innovation and entrepreneurship. The research direction and content of this subject come from teaching practice. The subject insists on the principle of combing theory with practice and combing research with exploring, which is beneficial to cultivation students to have strong engineering practice ability, innovation ability and entrepreneurship spirit.

The most fundamental task of higher learning institutions is to cultivate high-quality talents with innovation ability, practical ability and entrepreneurship spirit. Engineering majors are the cradle to cultivate engineers in the colleges and universities. The large characteristics of project are to have very strong practicality, which puts forward higher requirements for the cultivation of engineering practical ability for the engineering college students. That can be seen from recent years trend of civil engineering major in college and universities, the innovation ability, practical ability and entrepreneurship spirit cultivation for college students are an important practical link in the level evaluates index and rank level of ministry ordinary colleges and universities undergraduate teaching job except the most employed the production and management in the construction enterprises. Compared with the evaluation index, making clear the main content of practical teaching reform is the important link to ensure the cultivation of high-quality talents with innovation ability, practical ability and entrepreneurship spirit, which can effectively guide the reform of practical teaching.

Pay attention to the combining of theory with practice for cultivating students' ability, in which, the practice teaching is the bridge which unifies the theory and practice and is the main link of cultivation student' ability. Practical teaching play an important role in cultivating excellent talents, so it should pay more attention on the practical teaching research.

2. Experience practice of innovation and entrepreneurship education in colleges and universities home and abroad

Innovative and entrepreneurship education is not the trend of china, but also the hot spot and colleges and universities paid attention together. Based on the students, teachers and other members' development, have the mentality of globalization, and show the adaptability and flexibility to the different values and cultures. The "strengthen consciousness" mode of Babson college in United States, the "systems thinking" mode of Stanford university, Harvard University "work" mode as the representative mode for innovation and entrepreneurship education of college and universities emphasis on students as the main body for the new innovation and entrepreneurship education. The collaborative model of universities, academic and government and entrepreneurship education model in Japanese specially emphasis on the integration of production and education and innovation and entrepreneurship for students.

Try to draw lessons from theoretical results and practical experience of education quality assurance at home and abroad. Theoretical research and systematic practice explore practice teaching system in depth for ordinary institutions of higher learning which engineering subjects arc dominant. In the studies, the research focus on the combination of teaching contents and curriculum system of civil engineering in regular institutions of higher learning. Emphasis on the engineering practice ability and

innovation ability training in the classroom teaching. Strengthen the practice teaching link, perfecting the mechanism and strengthening teachers' engineering practice ability training. Achieve cultivating the students' innovation spirit and innovation consciousness, improving of engineering practice ability and improving the comprehensive quality of students.

Because civil engineering is a practical major, it demands that cultivating talents not only have broad basis of knowledge and the solid operation skills but also have strong ability of innovation. If have professional competitiveness it must prominent application and according with our college specialty orientation. Not only should embody the teaching experiment, course design, teaching practice and graduation design in the teaching program, but also requires docking with the national construction system qualification system. The course of knowledge structure set up should meet the needs of the corresponding qualification job. Emphasis on applied should have innovation at the same time, because only innovation can survive and have development. The transformation of school is in the growth stage but there is a big gap with some strength and a long history of school. So, get out of the road having a distinctive high-level university it is particularly important that strengthening practical education and improving the innovation ability.

3. Innovation and entrepreneurship education reform practice

For the characteristics high practice for civil engineering specialty, high demand for students' engineering consciousness and innovation spirit, it should various investigate, research, formulate measures for implementation, teaching practice, which mainly reflects in the following respects.

3.1 Integrated with teaching contents and curriculum system

Expand the content of the practice teaching link in training plan which make the civil engineering undergraduate engineering quality and innovation ability training process formed step by step, the completeness wide-ranging education link. Classroom teaching reform work includes learning training through organizational, seminars, workshops and other activities to strengthen teachers' consciousness of educational reform. Conducted online and offline teaching, flip classroom, large class combine small class discussion, discussion-based teaching and so on the new teaching model.

3.2 Emphasis on engineering practice ability and innovation ability training in the classroom teaching

Form the atmosphere pays attention to the engineering practice in classroom teaching and strengthen engineering consciousness practical ability of students and close to the practice in the practice teaching. Deeping reform of the personnel training mode include practice the five docking, work-integrated learning and field practice, project teaching, case teaching, oriented engineering process teaching, 3 + 1 teaching mode.

3.3 Strengthen the practice teaching link reinforcement engineering practice ability and innovation ability training

Laboratory renovation and update laboratory equipment which change the students of demonstration experiment to the operation type and open type. Construct and perfect all kinds of practice base and innovation base to improve the students' ability to innovate and conduct all kinds of innovation activities. The transformation development work includes set up the practice and employment base with both 32 enterprises including China resources building, Shaanxi construction group, Northeast forestry university supervision company and so on this year.

3.4 Perfect the mechanism, strengthen the teachers' engineering practice ability training

Only there is a strong consciousness of modern engineering faculty, that can be very good for modern engineering ability training for students. send teachers to participate in the project to every link of engineering unit in a planned way, which will improve teachers' ability of engineering practice.

Cultivating the “double division type” teaching team include that, practice at the enterprise field, get your professional qualification certificate, invite industry enterprise senior talents.

3.5 Build system construction based on the professional curriculum group including followings

Set up a shared curriculum, professional course divided and elect outreach programme. Create high quality shared professional teaching resource database including followings. Have been completing 2 field online open courses, civil engineering technology specialty cluster open 4 network professional elective courses to ensure students internship time.

3.6 Construction of open sharing training base

Complete the measurement practice, cognition practice, professional practice and practice teaching links such as graduation practice. Especially in professional practice, 146 students experience over six months, have more than 30 internship units, teachers overcome the practice long time and unit dispersing conditions to complete internship successfully. Through that link, the practice ability, employment ability and development ability to enhance after graduation for the students.

3.7 Innovation and entrepreneurship work

Encourage and guide the students to attend college students’ innovative entrepreneurial project. Participate in various competitions, improve students’ understanding of innovative entrepreneurial project, combine with the learning and innovation business. Employ senior technical personnel as visiting professor, held a variety of skills and technical training, build management laboratory and so on.

Take an active part in educational organization competition activities, which include structure design competition, engineering surveying competition, BIM application competition, graduation design contest. Among them, was awarded the provincial for 8 times, the second prize for 18 times, the third prize for 6 times, and complete the provincial big a project 10 items. Set up students’ innovative entrepreneurship center in civil engineering college, which include four studios as followings: Graduation design, engineering survey, BIM application, structure design. Held the first “anniversary cup” structural design competition which are the eighth structure design competition trials. Held the first BIM application of innovative undertaking competition. Held the pavilion on campus culture structure model competition and building sand table model design contest.

4. Conclusions

Setting up correct concept entrepreneurship education innovation and strengthening college students’ innovative entrepreneurial spirit are not only the essential qualities for entrepreneurs, but also the important factor of building an innovative society. Colleges urgently need to adapt to era development objective request and set up the innovation of the new concept of entrepreneurship education. Firmly reject the education concept that makes students into a crash entrepreneurial. Attach great importance to cultivate the students’ innovative and entrepreneurial spirit. Innovation and entrepreneurship education run throughout education, teaching and skill training. Based on the characteristics of college students themselves, cultivate college students’ unique entrepreneurial quality, innovative spirit and entrepreneurial ability. Understand innovation entrepreneurship education scientific connotation to improve college students’ innovative ability. The scientific connotation of innovative entrepreneurship education for education workers can’t just stay at the narrow level but carry out creative education smoothly coordinate all the government, enterprise, industry associations and other social resources in combination with the practical situation of the school and local. Solidly promote innovation entrepreneurship education reform and create new innovative entrepreneurial talent training modes for the growth of innovative entrepreneurial talent build fine ecological.

Acknowledgments

This work is supported by Jilin province education science 13th Five Year Plan subject: Innovation and entrepreneurship education system present situation and the reform path research (GH180568).

References

- [1] ZHANG Yong-gang. Strategy research on the present situation innovation and entrepreneurship education in colleges and universities in the new period[J]. Theory of China, 2019(01):215-216.
- [2] WEI Yong-tao, ZHANG Shu-mei. Empirical research on innovative entrepreneurship education into the undergraduate training scheme[J]. Journal of higher education, 2019(01):27-29.
- [3] WANG Hong-li, GE Xiang-wen, et,al. The reform and practice on college practical teaching model based on the "double gen" ability cultivating. [J]. Journal of higher education,2019(01):47-49.
- [4] YIN Ze-xi. Business incubation park construction explore on the education in colleges and university under the background of the new era.[J]. Economic and trade practice,2019(01):292+294.
- [5] XU Xiang-jian. The exploration and practice analysis on local colleges "double gen" education mode[J]. China's rural education,2018(24):29-30.
- [6] ZHOU Yu-qing. Shallow theory construction of college students' innovative entrepreneurial education mode[J]. Education modernization,2018(52):44-45+86.