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Research on cultivation of engineering practice ability of civil engineering students in application-oriented local colleges

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Abstract
Cultivation of engineering practical ability is one of the most important training objectives for higher civil engineering education, while it is also the weak link for current engineering education especially for some application-oriented local colleges. Affected by local economic and industrial development, application-oriented local colleges encounter a lot of difficulties in the way of cultivation of engineering practical ability for civil engineering students. Through in-depth investigation, the paper analyzes the status and main problems of the training on engineering practical ability for civil engineering students in local colleges, and some suggestions are put forward on how to counter such problems.

Keywords: civil engineering, engineering practical ability, application-oriented local colleges, practical teaching

1. Introduction
With the rapid development of infrastructure construction in China, the good employment situation prompted more than 300 colleges and universities to set up civil engineering major, the enrolled students scale is more than half a million, and the local college students has reached 84%.Civil engineering graduates of local colleges has become the main force of China's modernization [1]. But as the industry development for civil engineering talent rising and some limitations of local colleges compared to the subordinate universities of Ministry of Education, there is quite a lot of difficulties for the cultivation of engineering practical ability for civil engineering students in local colleges [2]. How to train the engineering practical ability is the urgent actual issue for this type of application-oriented undergraduate colleges. Through in-depth investigation, the paper analyzes the status and main problems of the training on engineering practical ability for civil engineering students in local colleges, and some suggestions are put forward on how to counter such problems.

2. The Status and Problems with the Engineering Practice Ability in Current Civil Engineering Education
In general, civil engineering specialty in local colleges is newly established, and running time is shorter. Limited by the city economic and developmental conditions, they cannot be compared with the subordinate universities of Ministry of Education on teaching resource. At the same time, with the continuing "enrollment expansion" of Chinese higher education, existing teaching resources become relatively modest. Under this influence, the training of engineering practice ability for civil engineering students in local colleges exist the following questions:

2.1 Course system is more heavy theory of light practice, Curriculum content is distributed, lack of engineering coherence between the courses
In terms of curriculum system, some local colleges usually draw on the research-oriented universities of similar professional, too much emphasis on the systemic integrity, course contents are wide-ranging and course system is more heavy theory of light practice. In terms of training plan implementation, it is usually divided simply according to the content of the course teaching units, the students have no clear realistic goals in the process of learning, and lack of landmark intermediate link. Conventional practice mode, such as experiment teaching and curriculum design, is set in separately for specific teaching knowledge or specific courses practice target, and limited itself in fixed classroom theoretically, as the result, it results in the lack of consistency in practice process. In practice, either the goal or the content, the student is one-sided, and the system of practicing is not coherent, it is out of the question for gearing to the employment or for gearing to the practicing training.

2.2 Lack of the practical engineering training, be weak to practice
Engineering training is essential for civil engineering students. Ministry of education called for strengthening practice teaching, and provisions: the accumulated credits (hours) of practice teaching, should not be less than the total credits (hours) 25% for engineering specialty [3]. Although the colleges have taken a lot of measures to strengthen practice teaching, (e.g., compression of theory teaching hours, increase of capital input), but in recent years, the practice teaching of many local colleges is weakened in varying degrees for increase of number of students and limitation of teaching resources. Experimental teaching for example, as the number of students increased, the opportunity for the students to practice is reduced. Graduation practice is another example, it is a great opportunity to improving the ability to analyze and solve practical engineering problems for civil engineering students, due to shortage of practice base (enterprises enthusiasm for college student internship is not high), most students can only visit cognition practice. these all make the engineering training could not reach the minimum requirements, and seriously affect the cultivation of engineering practical ability of civil engineering students.

2.3 Teachers lack of the experience and ability of engineering practice

Affected by the restriction of local economic development, local colleges usually have some difficulties to attract top talent with highly degrees, rich engineering experience. Currently, the typical teachers for engineering education are lack of practice of engineering and production experience, and there is not much engineers with rich practical experience to teach in the university. Many teachers of engineering colleges mostly come from graduate student, and many of them walk up to the podium after graduation, directly go from the student to the teacher. although these young teachers with higher academic qualifications and deep professional knowledge, because of scarcity with practice experience, they cannot take the actual problem with the industry to enrich the course content, or quote from the engineering example to elaborate basic theory and principle while teaching professional lesson, these disadvantages against to affect the cultivation of engineering practical ability of students.

3. Some Countermeasure to Training Engineering Practical Ability

Aimed at the above-mentioned main problem, some countermeasure can be taken in several areas such as curriculum, training projects and team building:

3.1 Reform talents training model, adjust the content of curriculum

As a kind of Application-oriented undergraduate colleges, Local colleges should determine the mode of talents training and content according to the social needs and the future development of the industry, emphasizes comprehensive and holistic quality education for students, pay more attention to the cultivation of ability of analyzing and solving problem, enhance students' ability to adapt to future work. In the process of amendment of talent training program, acquaintanceship Practice, experiments, curriculum design, social practices, production practices, graduation practices, graduation design, and so on, all of those should be taken into consideration and arrangement as a whole, to build a relatively independent of the practice teaching system.

For the content of course, combining the character of civil engineering specialty, we can build the modular curriculum which based on the enterprise actual duty construction, and form project-oriented teaching mode [4]. Take the demand of project as the target to design the teaching content, carry out the principle with duty actuation and project oriented. Establish the curriculum standards with technical personnel of enterprises, develop the corresponding task module, re-build and integrate the teaching content. Break the traditional teaching content of each module, distribute the overall curriculum task to teaching, learning, doing of the modular teaching, and create the "project" class. Encourage the students to complete every task actively, master the course points and technical points in the sense of achievement.

3.2 Strengthen the practice teaching, increase the intensity of engineering training

Practice teaching play an important role during the training of students' engineering ability. Provide students with a good way of learning theory with practice, we can make up for lack of theoretical teaching. The practice that we demand is complete in the whole process of projects, rather than be content with the commonplace, fragmented learning tests or technical training. However, it is heavily influenced by the economic situation of local colleges and the educational strength of the objective factors in the implementation, and difficult to provide students with training opportunities and conditions. Therefore, we can make use of existing resource, strengthen practical teaching and increase the intensity of engineering training as follows:

1. **Attach importance to experiment teaching**

Change experiment and teaching methods. Change traditional experiment model of experiment teacher designing plan and arranging experiment steps, students only observing the phenomenon and recording data, replaced by new method of training ability as main line. For comprehensive and designed experiments perform open system to provide relaxed learning environment, fully play their initiative and creativity, put experiment teachers' main energy on guidance, supervision and inspection, improve students' learning initiative and curiosity and train their innovative abilities and innovate awareness.

2. **Encourage students to participate in real research projects.**

College should guide and encourage students to actively take part in the teacher's research project, cultivating students' creative spirit and practice ability relying on the project. Participation in research projects is to carry out the process of research training, it can train the students with the capability of identifying problems, asking questions and solving problems, and improve the students practical ability and innovation ability with integrating theory with practice. Through participation in research projects, students can learn subjects of the latest research trends in time and recognize own search direction as early as possible according to the interest.

3. **Organize the students to participate in engineering practice, continuously broaden their horizons by this way.**

Let the students learn something other than textbooks in the contacting with the front-line personnel, experience their dedication, innovation and professionalism, develop the student's engineering consciousness and professional qualities, stimulate their desire to take the initiative to improve themselves, and make their thoughts be sublimated in the fulfillment [5]. Local colleges should create "production, study and research" platform as much as possible, provides students with such an opportunity.

4. **Attach importance to graduation design**

Gradation design is the last important practical teaching link in the Undergraduate Program in Civil Engineering [6]. It is an integrative consolidation and innovative use of knowledge learn during the whole period of one's college study. It is an important carrier by which the students'

overall quality, practical competence and innovative capability are trained.

Besides, it is also an important link in carrying out the engineering training practices on the part of the students. Thus, graduation design lies at the core of the meaning of the undergraduate practical teaching system. In the process of completing the graduation design, students are required to read a lot of professional journals, extensively access to relevant literature, and the instructor can provide students some valuable advice about the design idea or design methods, guide students to improve their innovation capabilities in the practicing.

3.3 Construct the high-quality teaching staff with the capability of integrating theory with practice

Train high-quality engineering talent requires high quality teachers as guarantee. As to the question that young teachers in local colleges are lacking of engineering fulfillment training and lacking of innovation consciousness, we should strengthen the construction of the teacher. On the one hand, efforts to attract a large number of social production personnel with experienced engineering practice to enrich teachers; Colleges should also cooperate with the enterprise, send teachers to visit, practice or research with the construction site and project, all of these will enhance the teacher with practical ability and engineering technology applications, improve the relevance and application of teaching, and help to train the “double-quality teachers”. On the other hand, requires teachers to change the concepts of education, foster innovative education, personally stand at the forefront of innovation to educate and guide students.

4. Conclusions

Strengthening the construction of infrastructure to boost demand is current economic development policy of our country. It provides a wide range of jobs for civil engineering students. Application-oriented local colleges which have set up civil engineering specialty should grasp this opportunity, try to improve students engineering practical ability, integrating local resources and social needs, adjusting teaching plan, to train senior civil engineering talents, so as to promote the development of Chinese civil engineering to a new level.

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