Analysis on the Characteristics of the Training Mode of Applied Talents under the Background of "Educational Training Plan for Excellent Engineers"

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Abstract: The purpose of the "Education and Training Plan for Excellent Engineers" is to train a group of high-level engineering and technical personnel, who are innovative and can well meet the needs of economic and social development. Effective promotion of college students in professional courses "learning for application". This paper mainly studies and analyzes the curriculum design and practice links of the plan. This paper explores how to develop the ability of college students to solve practical problems in the context of the plan, and how to promote college students to adapt to the corporate environment faster and better, and thus improve the quality of personnel training.

1. Introduction

At present, the main teaching task of engineering application-oriented undergraduate colleges is to improve the engineering practice ability and engineering quality of contemporary college students. At the same time, this is also one of the hotspots, difficulties and key points in the teaching reform of engineering application-oriented undergraduate colleges. In response to this situation, the Ministry of Education launched the “Excellent Engineer Education and Training Program” (“Excellence Plan”), whose main goal is to train all types of outstanding engineers and their reserve teams for all walks of life in the future. At the same time, it is also an important strategic deployment for taking the road of new industrialization with Chinese characteristics and building an innovative country and a powerful human resources country. It is also a major reform plan for higher education put forward for the implementation of the National Outline of Medium and Long Term Education Reform and Development (2010-2020) and the National Outline of Medium and Long Term Talents Development (2010-2020) [1].

2. Implementation of the Plan of Excellence

Since 2010, "Excellence Program" has been implemented in some key universities. Beijing Institute of Petroleum and Chemical Technology is one of the first universities to implement the "Excellence Plan". So far, eight majors have joined the Ministry of Education's Excellence Program. These eight majors are automation, chemical engineering and technology, mechanical engineering and automation, mechanical and electronic engineering, communication engineering, computer science and technology, polymer materials and pharmaceutical engineering. Over the past few years, these majors have made great progress in the construction of training bases for national demonstration schools and enterprises, cooperation between production and learning, and practical teaching links. They have played a demonstration and radiation role in the reform of Higher Engineering Education in China [2]. However, there are still some problems in the implementation of the plan. These urgent problems also reflect some of the essential issues of the "excellence plan" on the road to far-reaching development. For example, how to achieve the "learning to apply" of professional courses, how to effectively cultivate the ability of college students to solve practical problems and how to make college students adapt to the environment of the enterprise as quickly as possible. If these important problems cannot be solved in time, it will hinder the promotion of the "excellence plan", and it will seriously hinder the improvement of teaching quality and the realization of the training objectives. In view of these problems, this paper conducts practical research from the aspects of curriculum construction and practice, and analyzes the existing

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problems, in order to better complete the training mode of excellent engineers, and then improve the quality of the "excellence plan".

3. Achieving the strategy of “learning to use” in professional courses

At present, the four-year undergraduate teaching under the “Excellence Plan” mainly adopts the 3+1 model, that is, it takes three years to study relevant theoretical courses in the school, and then use the accumulated one-year time to complete in the enterprise. Practice and graduation design. In our practice research, 81% of the students thought that although the theoretical course of the original three and a half years was reduced to three years, it was able to adapt to the difficulty and progress of the current "Excellence Program" course. In other words, our “excellence plan” is reasonable in the overall design of the course. However, there is still a problem, that is, although the “Excellence Plan” is in the training goal relative to the regular class, it enhances the practicality of the excellent class. However, 37% of the classmates of the class still believe that the professional production courses they have learned are not close enough to the actual production links of the company. At the same time, 44% of the classmates in the class think that their theoretical knowledge is lacking in the process of enterprise practice. Therefore, a very important and realistic question is placed in front of us. How can we achieve the "learning to use" of professional theory courses in practice? Or more directly, how to make students use the knowledge points in textbooks in the production practice of enterprises is the difficulty of the current curriculum reform of "Excellence Plan". In this regard, the practices of other countries provide us with a model for reference. For example, the model of "Excellence Program" in the United States is to organize curriculum teaching according to the sequence of production process; while in Europe, a complete teaching system is composed of several modules, and the distinct feature of this teaching system is that it clearly reflects the needs of enterprises. These two modes seem to be independent individuals, but they have a common feature, that is, the teaching of professional courses and the production of enterprises are organically combined, and at the same time, they are not confined to the classroom or enterprises in the teaching place [3]. This teaching mode has achieved good teaching effect. Therefore, it also reminds us that we should change the current domestic excellent curriculum system to separate classroom teaching from enterprise practice. Although this kind of teaching arrangement meets the requirements of time, it neglects the cross and integration of theoretical courses and practical links. As a result, the curriculum system and engineering practice are disjointed, which obviously goes against the original intention of the training plan for outstanding engineers.

Through practical research, the author finds that this kind of curriculum arrangement, which is convenient for teaching time and space, is essentially due to the time when the teaching plan is formulated. Neither has it entered the industry enterprises (employers) to make detailed investigations, nor has it guided the enterprises to intervene in the process of curriculum reform and syllabus formulation. That is to say, the current curriculum reform of excellence is usually implemented unilaterally by schools. Although enterprises sometimes participate, they do not have the right to speak, which leads to the lack of content needed by enterprises in the curriculum. Therefore, it has seriously hampered the enthusiasm of enterprises to participate in the “excellence plan” and hindered the development of the “excellence plan”. Therefore, in the teaching of excellence courses, we must break through the limitations of existing teaching time and teaching space, and establish a scientific, diversified and flexible science curriculum system to promote the organic connection between professional courses and practice. In addition, it is necessary to vigorously introduce enterprise engineers and managers with rich engineering experience to conduct professional course teaching, participate in the preparation of syllabus and study the curriculum plan. In this way, it can not only coordinate the time and space of enterprise practice, but also truly promote the combination of theoretical and practical teaching level, thus promoting students to truly “learn to use”.

4. Cultivating the specific strategies of college students' ability to solve practical problems

In the process of “excellence plan”, students must conduct business practice and graduation design for not less than one year. The author learned through practice research: more than 95% of students are satisfied with this teaching arrangement. Because, they think this is a good opportunity for them to learn and practice through the school into the enterprise. In the process, they have deepened their understanding of the corporate system and management model by understanding internships, internships, and graduation design. We also have a deep understanding of the actual production situation of enterprises, and at the same time, we can combine the theoretical knowledge we have learned with the actual production. This is a good opportunity for the practical application of book knowledge. However, another 36% of the students think that the ability of college students to solve practical problems has not been well trained at the stage of enterprise practice. Many times, they feel helpless when they encounter practical problems.

From this point of view, in the process of enterprise practice training, students' learning time in the enterprise has been prolonged, but they have not paid attention to the "quality" of practice. There are many reasons for this result, such as the weak engineering practice ability of school tutors and the low theoretical level of enterprise tutors. Teachers in schools and business tutors do not cooperate effectively, so when students encounter difficulties and problems in practice, they can not guide students correctly. In addition, from the perspective of the students, in the process of participating in practice and internship activities, because there is no clear learning goal, the students are perfunctory. Therefore, it is impossible to find problems and solve problems in time. Therefore, the quality of practical teaching is greatly reduced. In view of this, to cultivate the awareness and ability of college students to solve practical problems, we must start from the following two aspects.

4.1. Improve the Engineering Education Ability of University Teachers

As a teacher, having a strong educational ability is a necessary basic quality [4]. At the same time, teachers have a high level of engineering education ability is an important guarantee to train students to solve practical problems. At present, there are three main types of college teachers in China: teaching, teaching and research, and scientific research. What is missing is the engineering faculty with business experience. Therefore, this seriously restricts the cultivation of College Students' ability to solve practical problems. Therefore, in the process of implementation of the "Excellence Plan", schools should take policy as guidance, on the one hand, actively guide and encourage teachers to join cooperative enterprises for on-the-job training, so as to effectively enhance their engineering practice ability. On the other hand, we should change the original evaluation mechanism and incentive mechanism in the system, and pay attention to the process and results of teachers' training students' practical ability and scientific and technological innovation ability. We should not only pay attention to its theoretical research.

4.2. Paying Attention to the Links of Practice Training

Emphasis should be placed on the link of practical training on the basis of imparting theoretical knowledge. Teachers should guide students to conduct group discussions in the process of recognizing internship and on-the-job internship. At the same time, heuristic teaching can be carried out for students, leading students to analyze specific cases, and then teachers to explain. While concretizing knowledge points. We should also give students specific explanations of the hot spots, problems and difficulties in the development of the industry, and encourage them to have the courage to hold their own opinions and discuss them, so as to cultivate students' thinking ability, discriminating ability and exploring and seeking knowledge ability [5]. In addition, students should be guided to match the production practice of the company on the topic of graduation thesis, and encourage students to complete non-academic papers such as research reports, case studies and engineering data analysis during the internship process. Therefore, students are encouraged to form a good atmosphere in which everyone values practice, everyone participates in practice, and promotes the improvement of students' innovative practice ability.

5. Strategies to promote students to adapt to the corporate environment more quickly

Through a series of research and practice, the main reasons why students cannot adapt to the enterprise are twofold: First, they cannot adapt to the huge difference between the corporate environment and the school environment. Many companies have poor working and living conditions, and students lack the necessary mental preparation and adaptability. Second, the working environment of the enterprise is a huge constraint for the students. The students are constrained in their thoughts and behaviors, and thus there are psychological and ideological fluctuations. Especially when these psychological fluctuations cannot be promptly resolved, students may have resistance to the work and life of the enterprise. And as a result, the practice activities are affected. At the same time, students do not understand the rules and regulations of the enterprise and staff's behavioral norms very well. They do not carry out a lot of specific work in place, and violate many rules. This also causes disharmony between the enterprise and employees, communication difficulties and so on. In fact, one of the fundamental reasons for the above problems is that students lack the cultural identity of enterprises. Therefore, schools, teachers and enterprises should work together to enhance students' adaptability to enterprises, enhance students' understanding and education of enterprise culture, and then promote students to adapt to the enterprise environment faster.

6. Conclusion

To sum up, the "Excellence Plan" is an important strategy to train comprehensive talents combining theory with practice in our country. Over a period of time, great progress and achievements have been made. Especially under the training programs of various pilot colleges and specialties, scientific teaching plans and objectives have been formulated. At the same time, the practice exploration and practice learning in the Industry-University-Research base with the cooperation of enterprises enrich teachers' thinking on the reform of higher engineering education, thus promoting teachers to think about the future orientation of students in accordance with advanced educational concepts. Of course, as the training plan for outstanding engineers is a complex and systematic project, it is a brand-new and important subject facing colleges and universities in the context of the new era. And it is a long-term task, so it is inevitable that there will be such problems in the implementation process. Therefore, each university should, in light of the specific conditions of its own development, carry out vigorous reforms in terms of teaching content, curriculum system, teacher team building, experiment and practice teaching, and school-enterprise cooperation in light of the existing problems. Efforts are made to cultivate students' innovative spirit and innovative ability, so as to mobilize the enthusiasm of students and enterprises to participate in the “excellence plan”, so as to ensure the stability of school-enterprise cooperation and the effect of the enterprise learning stage.

Acknowledgement

1) (2017, Hubei Provincial Department of Education, The project of "excellent talent of Jingchu" Synergistic Education Plan).

2) Key topics of Hubei Educational Science Planning in 2018：《Research on the reform of training mode of excellent engineers in information security specialty of Police Colleges under the guidance of “Beijing Guide”》（2018GA041）.

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