

Professional Graduate Degree Options in China: How to Meet Future Needs for Innovation and Higher Efficiency in the Cellulose-based Industries

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The education system for professional graduate students is still incomplete in China nowadays, and this can lead to a lack of fit of their ability with the needs of modern enterprises and society. With the development of technology and the change of social needs, many traditional pulp and paper industries are being forced to transform. Thus, the cultivation of sophisticated versatile talents with preferable engineering and innovative ability is urgent in cellulose-based industries.

Keywords: Professional degree; Innovation; Cellulose-based industries

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Postgraduate Education Status-in-quo in China

A characteristic of professional degree education is the integration of academic with professional aspects. Currently, there are three different categories of graduate students in China. The academic degree education aims for the cultivation of teaching and scientific research personnel; the part-time professional degree education aims for the cultivation of high-level professional personnel in specific fields; and the full-time professional degree education aims to cultivate sophisticated technical and management talents with extensive theoretical and professional knowledge in a certain field, which is in urgent demand.

The current education mode for the academic and professional master's degree in China is not distinctively categorized. This leads to a professional master's degree with lower practical ability, and this outcome is maladjusted with social demands. Therefore, it is important to attach importance to the engineering skills and innovative ability of professional graduate students.

Improvement Measures and Proposals

In order to improve the quality of the Chinese professional master's degree and make it be suitable for the cellulose-based industries, several suggestions are proposed here dealing with five aspects.

Firstly, it is proposed to enhance the social recognition of the professional degree through policy incentives and guidance of public opinion. If the government or universities establish incentive policies, such as appropriate subsidies to the enterprises (like the measures taken by the U.S. government to promote production of fuel ethanol), then their participation in cultivating talents will be stimulated. The media, such as newspaper, TV, and networks can be utilized to enhance social recognition, including

candidates, parents, enterprises, and universities, making them recognize the superiority of a professional degree compared to an academic degree in career development.

Secondly, it is proposed to reform and optimize the curriculum system, and advocate team or group teaching modes. With a goal of combining the development and talent demand of cellulose-based industries with the development orientation of the College of Light Industry and Energy at Shaanxi University of Science & Technology, some courses related to material science, chemical engineering, biochemistry, energy, and power, *etc.* should be added as partial replacement for certain traditional courses. The courses should focus on engineering and application, and the ratio taught by enterprise mentors should be increased, while the theoretical courses should be appropriately reduced. It is proposed that the required courses of chemical engineering should be added, such as unit operations, process control, and the use of simulation software (Aspen plus, Win/GEMS), and chemical drawing software (CAD), all of which are quite helpful for process modeling and economic analysis. Furthermore, along with trends favoring increased internationalization, business enterprises are requiring better English for their employees. Thus, the number of English teaching courses should be increased.

Thirdly, there is a need to achieve a real co-culture and joint-supervision of professional master's degrees by universities and commercial enterprises. Although there are co-construct laboratories, such options should be really open to the enterprises. The goal is to stimulate the cooperative enterprises to offer scholarships as a means of awarding and encouraging excellent students with better engineering and practical ability who can resolve practical problems. As well as setting goals for higher requirements for the professional graduate students, such measures will stimulate them to strengthen their own practical and innovative abilities.

Fourthly, it is proposed to clarify the responsibility of the enterprise advisor and strengthen the development of teaching staff. A contract is needed before the students' preliminary defense of their thesis work, which refers to the specific responsibilities of both advisors. The university should set up rules or regulations for selecting excellent professional talents with abundant practical experience and strong theoretical basis, who are qualified for supervising postgraduate students. Meanwhile, a motivation system for wage and performance appraisal is needed, which will arouse the enthusiasm of enterprise mentors in their work of guiding graduate students.

Finally, there should be a better system for evaluating the quality of professional graduate students. The form of academic dissertation can be various, such as research report, program design, product development, case study, project management, *etc.* The publication required can be in the form of journal articles or patents. In addition, their entrepreneurial propensity should be strengthened through entrepreneurial education.

Expectation

The proposals above are expected to provide references for the universities to set up a particular professional degree education program of their own. Such a system will be beneficial for the cellulose-based industries in providing qualified professional master talents with better innovation and practical ability.

Acknowledgements

The authors are grateful for the financial support from the Education Reform Program at Shaanxi University of Science & Technology (No.15XJG066 & No.J201403).