Reform and Future Development of Printing Engineering Major—Take Beijing Institute of Graphic Communication as an Example

Yong-gang YANG\textsuperscript{1,a,*} and Li-zhen YANG\textsuperscript{2,b}

\textsuperscript{1,2}Beijing Institute of Graphic Communication, Beijing, China

\textsuperscript{a}2207063089@qq.com, \textsuperscript{b}yanglizhen@bigc.edu.cn

*Corresponding author

Keywords: Printing engineering, Specialty construction, First-class major, Printing civilization, Green development.

Abstract. Printing engineering is an undergraduate major of light industry category, which belongs to the niche majors. The printing engineering major of Beijing Institute of Graphic Communication is a national first-class undergraduate major under the "Double Ten-Thousand Plan" of the Ministry of education and the "key construction first-class major" in Beijing universities. In order to promote the construction of first-class major and improve the quality of personnel training, the reform measures from the aspects of professional orientation and characteristics, comprehensive reform of major, construction of curriculum team and teaching staff, teaching quality monitoring and guarantee, and tracking and evaluation of graduate training quality, which were mainly put forward in this paper, and it lists the work results. It also looks forward to the ideas of the next professional construction, and puts forward the requirements.

1. Introduction

Printing engineering major originated from the printing technology major of the Central Institute of Culture in 1958. It was incorporated into the Central Academy of Arts and Design in 1961. In 1978, Beijing Institute of Graphic Communication was established based on the printing technology major. In 1998, it was renamed as printing engineering major, with a history of more than 60 years. This major is a national characteristic specialty, a pilot major of excellent engineer training program of the Ministry of education, and the first batch of "first-class major" in Beijing, which has trained nearly 6000 undergraduate graduates for the industry.

Printing engineering major has distinct cultural and manufacturing dual attributes and ideological connotation. In the 60 years of school running practice, in the process of comprehensively serving the national "Four Civilizations", it has formed the new mode of personnel training named the "Three Combinations" that combination of printing civilization inheritance and media technology innovation, combination of professional quality education and innovation and entrepreneurship education, and combination of theoretical education and engineering practice education, and it has a first-class teaching team led by the chairman of the printing technology committee of the international organization for standardization, the national leader in the press and publishing industry, the winner of the Bi Sheng printing outstanding achievement award and the Beijing Great Wall scholars [1]. It has built five Beijing municipal science and technology innovation and engineering training platforms, which has made great contributions to the economic and social development of the country, the industry and the capital.
Focusing on the great needs of the national development strategy and the "four centers" function construction of the capital, based on Beijing, taking root in the industry, adhering to the concept of "collaborative innovation, Industry-college-institute cooperation, green development", inheriting printing civilization and innovating media science and technology, it would aim to build a leading domestic and internationally famous first-class undergraduate major, and cultivate the industry leading talents owning innovative spirit, practical ability and international vision [2].

2. The Main Measures and Effects of Deepening the Comprehensive Major Reform

Printing engineering has deepened the comprehensive reform in education philosophy, curriculum construction, classroom teaching and students' autonomous learning, based on the state development strategies of one belt and one road, China made 2025, and cultural development and prosperity, and it has carried out some very fruitful work.

2.1. Optimizing the Concept of Talent Training and Adjusting the Talent Training Program Focused on the Development of Students

We should learn and understand the spirit of the important documents of the Ministry of education on higher education, promote the implementation of "based on the foundation, four returns", and start the construction of "six excellence and one top-notch" plan 2.0; fully implement the fundamental task of moral cultivation, strengthen professional self-confidence education and Curriculum ideological and political construction, and strengthen the "three comprehensive education"; focus on the development of students, optimize and refine the talents of "Three Combinations" To cultivate new ideas and reasonably adjust the talent training program. Some achievements have been made in the aspects of specialty oriented setting, Bi Sheng excellent class construction, construction of teaching resources and improvement of teaching staff. One new engineering research and practice project of the Ministry of education was approved, and it was shortlisted in the first batch of "first-class specialty" construction list in Beijing, three teaching achievement awards of higher education in 2017, and the right to grant master degree program of light industry technology and engineering Young teachers are basically in charge of NSFC [2].

2.2. Carrying out the Concept of New Engineering Construction, Innovating Teaching Mode, Tamping Teaching Resources and Creating Golden Course

Under the guidance of the new engineering construction concept, the "three changes" education and teaching method of "talent training mode from unified classroom indoctrination to personalized and classified training, teaching method from single theory teaching to multi-level theory and practice teaching, and knowledge learning from mechanical acceptance to innovative application", the teaching mode and means are constantly innovated. With the support of municipal teaching team of printing engineering, we will continue to carry out the construction of high-quality teaching resources. All core courses have been built into school-level excellent courses, one of which is a municipal quality course, three courses have won the school level high-quality classroom award, and six national planning textbooks for the eleventh five year plan have been included in the construction of characteristic reprint; the printing process virtual simulation project is being carried out as planned, "Digital Interactive Media Design" has been completed and launched in MOOC China, "color science and technology" and "graphic information processing" Innovative teaching methods such as flipped classroom, rain class, micro class and online open course construction are being carried out for courses such as copying, information technology and cross media
communication, functional printing materials and application, and printing process engineering training [3]. It is expected to create gold courses such as offline, online and offline, and virtual simulation.

2.3. Strengthening Students' Independent Learning, Innovation and Entrepreneurship, Promoting International Communication, and Improving Students' International Communication Ability

We should build a comprehensive innovation practice base of printing and packaging, carry out the discipline competition of "creative printing", operate the maker space of "printing civilization inheritance experience center", strengthen students' independent learning and process management, and strengthen guidance and support for innovation and entrepreneurship. In the past three years, relying on international exchanges and cooperation and Beijing's "overseas training program", it has actively carried out professional exchanges with more than 10 overseas universities. More than 10 teachers have participated in international visits, and nearly 50 students have participated in exchange studies and overseas studies. There are three courses in Bisheng excellent class of printing engineering. Professors from foreign universities come to teach in pure English, which improves students' international awareness and foreign language communication ability.

3. The Main Measures and Effects of Strengthening the Construction of Teaching Staff and Basic Teaching Organizations

3.1. Paying Attention to Team Building, Introducing and Cultivating Academic Backbones, and Creating a "National Team" of Full-time and Part-time Professional Teachers

According to the needs of teaching resources construction and international education, we should strengthen team building, attach equal importance to the introduction and education, and improve the overall quality and level of teachers. One Swedish Chinese professor was introduced flexibly, and one professor from California State Polytechnic University and one professor from Leeds University were employed as academic tutors. To strengthen in-service training, 65% of the teachers have doctorates; they also have 2 Bi Sheng printing awards, 3 National Leading Talents in press and publication, 11 winners of the National Natural Science Foundation, 2 Great Wall scholars in Beijing, 3 famous teachers in Beijing, and more than 10 teachers visiting or exchanging abroad, forming a professional "national team" with reasonable structure, innovative ability and international vision.

3.2. Focusing on Quality Engineering, Innovating Organization, Management and Operation, Activating the Power of Teaching Research and Reform at the Grassroots Level

Taking the municipal teaching team of printing engineering as the core, and school-level teaching teams such as color vision and printing education internationalization as two wings, a three-level management structure of specialty, curriculum group and curriculum is established, and the innovation of teaching mode and method is vigorously explored. Through the ways of lecture presentation, discussion and joint preparation, new ideas are learned, new problems are found, and the organization and operation mode is constantly innovated to improve the teaching quality; The "three systems" of "one person, three courses" and "one lesson, three persons" should be implemented to improve teachers' knowledge reserve and teaching control ability of multiple courses; the classroom teaching norms and evaluation system should be formulated, basic teaching skills competition, tutoring of famous teachers, cross listening to classes, and encouraging teachers to carry out research on teaching reform projects are gradually stimulated and released [4].
4. The Main Measures and Effects of Strengthening the Construction of Professional Teaching Quality Assurance System

4.1. Establishing a Closed-loop System of "Monitoring, Guidance, Feedback, Improvement" to Improve Teaching Quality

Through the means of students' evaluation, teaching supervision and peer listening, the evaluation results can be timely fed back and improved continuously to form a closed-loop system of "monitoring, guidance, feedback, improvement"; Through effective supervision of classroom teaching, practical teaching and graduation design at the beginning, middle and end of the period, the teaching order of the course can be standardized; Through the tutorial system of young teachers, teaching skills training, teaching basic skills competition and one-to-one help, teachers' teaching level can be improved. The multi-level, multi-stage and multi-channel teaching quality monitoring, evaluation and improvement methods have effectively improved the classroom teaching effect. Many teachers have achieved good results in teaching competitions at all levels, and the number of awards for professional teachers' excellent course award ranks first in the whole school.

4.2. Improving the Teaching Management System, Strengthening the Quality Assurance System, and Strengthening the Construction of Teaching Style and Study Style

We should establish a standardized management system for teaching supervision, teaching process, practice management, teaching style and study style, promote the construction of teaching quality standardization, ensure the teaching and learning promoting each other, consolidate the quality assurance system, and effectively promote the normal operation of teaching [5]. Further implement the system of statistics and publicity of quality information such as the collection and feedback of teachers and students' opinions, the analysis and feedback of academic achievements. Carry out theme class meeting, discussion and social practice, so that teaching and learning can benefit each other, teaching style can guide the style of study, and form a good style of examination. In recent years, the passing rate of CET-4 has stabilized at 60%, and the postgraduate entrance examination examination rate has reached 20%. The rate of going abroad and employment has steadily increased. The number of academic warning and transfer out of major has gradually decreased, and students' confidence in their major has continued to increase.

5. Following up Survey Results and External Evaluation of the Quality of Graduates' Training

The students have achieved good results in all previous printing industry occupation skills competitions, national digital art competitions and China Internet plus innovation and entrepreneurship competitions, and the spirit of innovation and practical ability have been fully exercised. According to the data of third-party institutions, in recent three years, the average major employment rate was 89%, teaching satisfaction was 88%, alumni satisfaction increased from 89% to 94%, and the enrollment rates at home and abroad were 13%, 16% and 21%, respectively. The enrollment institutions include famous European and American universities such as New York State University, Rochester Institute of technology, California State University of technology, and Wuhan University, Chinese Academy of Sciences, Beijing University of Aeronautics & Astronautics, Communication University of China, South China University of technology. Graduates of this major mainly focus on publishing media institutions and related enterprises, such as the national publishing and printing management institutions, government agencies, industry associations,
publishing institutions (publishing houses, magazines, etc.), industry media and e-commerce platforms, education and scientific research institutions, joint-stock printing enterprises, etc., and rapidly grow into the backbone of management and technology or enterprise leaders. It has made indelible contributions to the development of national cultural industry, industry transformation and upgrading or the function construction of "four centers" in the capital [6].

Through enterprise visits, campus special recruitment, school enterprise cooperation and exchange, it is known that employers have a high recognition of graduates of this major, and have a high evaluation of their professional knowledge, engineering practice ability, communication and expression ability, and the overall satisfaction is good. Graduates can provide greater intellectual support for enterprise product innovation and market development, and 90% of employers are willing to accept students' internship and employment.

6. Conclusion and Expectation

Based on the concept of new engineering construction, considering that there is a large number of intelligent demand in the field of printing communication and manufacturing, as well as the dual attributes of "cultural communication" and "product manufacturing" of printing itself, this major intends to shape students' compound application-oriented ability in the two modules of "digital cross media communication" and "printing intelligent manufacturing", and cultivate industry leading talents. Facing the future development, in addition to the original color science, material science, information science, mechanical and electrical engineering pillars, artificial intelligence technology will become the new support of printing engineering. Through the adjustment and setting of professional modules, and integrating the course and practical teaching links of intelligent science principle and its printing related application, the talent training scheme is continuously optimized, and the complete curriculum system and teaching resources are gradually constructed, so that the students of this major can adapt to the development of the industry in the future.

Taking the implementation of the national "double ten thousand plan" as an opportunity, and based on the construction of "first-class specialty" in Beijing, we should strengthen reform and innovation, and strive to achieve breakthroughs in national practice and innovation platforms and demonstration projects, national quality online open courses, high-level teaching teams, cross regional specialty groups and collaborative training of Beijing, Tianjin and Hebei, high-end international exchange and personnel training. To build a solid foundation and improve the standard, so as to make the printing engineering professional achieve a full range of domestic first-class and international well-known.

Acknowledgement

This work was financed by 2019 key projects of teaching reform research of Beijing Institute of Graphic Communication.

Reference

[1] Xiao Hai, Tian Jing, Zhang Jin, et al. Thoughts on development of medical programs in local medical schools under the background of “Double Ten-Thousand Plan”—a case of program development in Harbin Medical University[J], Medical Education Management, 2020(5):466-470.
[2] Dong Ying-bo, Lin Hai. Curriculum Reform and Practice of Offline Course under the Background of "Two 10000-Plan"—Taking the Course of Mining Environmental Pollution Control Engineering as an Example[J], Education Teaching Forum, 2020(10): 277-279.

[3] Zhang Gaoxing, Zou Dan, Wang Hong. Thoughts on Construction and Development of Surveying and Mapping Major in Local Universities under the “Double First-Class”[J], Journal of Longyan University, 2020(5): 123-128.

[4] Li Xiaozhou, Shao Feng, Wu Guangyuan, et al. Challenges and opportunities of talent training in printing engineering from the perspective of media convergence[J], Journal of Higher Education, 2019(15):75-79.

[5] Zhang Chuanxiang, Huang Xinguo, Zhong Yunfei. Research on the development on of printing engineering major in the light industry major enrollment[J], The Guide of Science & Education, 2020(7):25-26.

[6] Li Xiaozhou, Liu Jingjing, Li Xuelin, et al. Research on upgrading construction of printing engineering major under the background of new engineering[J]Journal of Higher Education, 2020(31): 80-82.