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Course Construction of Local Universities in the Era of "Internet + Education": A Case Study of Biopharmaceutical Process

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Abstract: Sichuan University of Science & Engineering (SUSE) is one of the first universities in China to set up biopharmaceutical major, and is also a university in western China. "Internet + education" is an educational development form with the internet as the infrastructure and innovation elements, and is the new normal of education with the deep integration of educational innovation and technological progress. The content and form of traditional offline course education in local universities face the challenge and opportunity of "Internet + education". With "Internet + education" as the background, Sichuan University of Science & Engineering has carried out a series of innovations in course content and teaching mode around professional certification of biopharmaceutical major, made full use of information technology, and flexibly integrated ideological and political elements and network materials into the teaching content. Sichuan University of Science & Engineering has explored a teaching model that breaks through the limitations of time and space, which is efficient and convenient, also has various forms, combining "online + offline". Finally, the paper puts forward the optimization path of professional curriculum education in local universities from the perspective of "Internet + education", hoping to provide references for the reform and innovation of curriculum education in local universities.

Keywords: Biopharmaceutical Process; Internet + Education; Local Colleges and Universities.

1. Introduction

The new generation of information technology represented by internet technology has subversive characteristics, which changes all aspects of human production and life while improving human productivity. Human beings are moving from the original dualistic space dominated by physical space and human social network to the triadic space dominated by physical space, human social space and information space[1]. This major change is exerting a significant impact on all aspects of human production and life, promoting the reform of the educational ecosystem, and bringing both opportunities and challenges[2]. With the application and development of big data and artificial intelligence technology, the Internet as an important platform for sharing factors of production and life, has been comprehensively embedded in social and economic life, and is deeply integrated with various industries in the form of "Internet +", promoting the development of human life, production and productivity[3]. "Internet + education" is an educational development form with the Internet as the infrastructure and innovation elements, and a new normal of education with the deep integration of educational innovation and technological progress. The integration of Internet and education provides the reform direction for education in the new era[4].

Sichuan University of Science & Engineering (SUSE) is located in Chengdu-Chongqing economic circle, based in Sichuan, serving the southwest, and conveying a large number of talents for regional economic development. SUSE is one of the first local colleges to set up biopharmaceutical major in China. In recent years, the biopharmaceutical industry has developed rapidly, especially after the outbreak of the COVID-19 epidemic, the biopharmaceutical industry has shown a new climate of rapid change. Biomedicine is a strategic emerging industry in China. The quality of biopharmaceutical teaching is directly related to the quality of training of national biopharmaceutical talents, especially in the context of the changing international political and economic situation and the huge competitive pressure of domestic industries, the importance of higher biopharmaceutical education is becoming more and more prominent. Biopharmaceutical Process covers the upstream and downstream knowledge and technology of biopharmaceutical, and can provide students with a good knowledge and technical structure for the development of the field of biopharmaceutical, and is a compulsory course for biopharmaceutical majors. At the same time, under the internet environment, the content and expression form of offline traditional curriculum education are facing transformation. Therefore, promoting the course construction of Biopharmaceutical Process, making full use of information technology, and carrying out teaching reform in the context of "Internet + education" are the basis for further enhancing the training effect of biopharmaceutical major.

2. Course Construction of Biopharmaceutical Process in Local Universities in the Context of "Internet + Education"

The new education form of "Internet + education" is both a challenge and an opportunity for the course construction of Biopharmaceutical Process. In order to better cope with the challenges, and make the traditional offline teaching mode of "Biopharmaceutical Process" reasonably digest the new education form of "Internet + education", we take "educating people for a hundred years and aiming at bright morality" as the goal, and clarify the professional positioning of local college in western China, with "Internet + education" as the background, adhere to the people-oriented, guide by

engineering certification, the course of Biopharmaceutical Process has been upgraded from teaching content to teaching mode.

2.1. Integrate Ideology and Politics Elements into the Curriculum, Putting Soul into the Written Teaching Content

The teacher team of "Biopharmaceutical Process" of SUSE actively explores the methods and paths of combining ideological and political elements to the course content to the requirements of professional engineering certification. For example, in the first chapter of the introduction to "the history and current situation of the biopharmaceutical industry", by teaching Sun Simiao's treatment of sparrow eyes with sheep liver - Academician Tu Youyou got inspiration from Ge Hong's "Tuo Reserve Emergency Prescription" about the ancient prescription of artemisia annua anti-malaria - "One grasp of artemisia annua, soak with two litre of water, twist and collect the juice, and take it all", and found the anti-malaria effective drug artemisinin - Traditional medicine is extensive and profound. It is a precious medical treasure of our country - Students should make reasonable use of it in the future. Through professional knowledge background, introduce the life stories of relevant scientists, and guide students to learn the rigorous, serious and indomitable spirit of scientists. Through such ideological and political construction of "Biopharmaceutical Process" course, the teachers re-wrote the curriculum teaching implementation outline, teaching syllabus and other teaching materials, reasonably and flexibly integrated the ideological and political elements into each class, and carried out the educational practice of the silent ideological and political influence on the students.

2.2. Break the Whole into Small Classes, Teach While Discussion and Interaction

As early as 1971, Simon pointed out that in an information-rich world, the only scarce resource is attention[5]. We are in an era of information explosion, which corresponds to the scarcity of people's time and attention, and attention resources become the most precious resources[6]. The Internet has become the most important space for consuming individual attention resources. According to the China Network Audiovisual Program Services Association, netizens will spend an average of 6.3 hours per day online on mobile phones in March 2021, an increase of 1.7 hours over 2017. As of December 2020, the average daily use time of short video, comprehensive video, network live broadcast and network audio is 120 minutes, 97 minutes, 60 minutes and 59 minutes, respectively[7]. Many college students are glued to their mobile phones and pay attention to being consumed by the Internet. The teaching effect of traditional offline courses based on teacher teaching is unsatisfactory. Therefore, in the course of Biopharmaceutical Process of SUSE, more than 100 students in this major are divided into four classes for small-class teaching, and the proportion of classroom interaction time is increased to about 50% by means of group discussion and question-selflearning-and-answer. For example, in teaching the knowledge point of the preparation method of immobilized enzyme (absorbing immobilization, embedding immobilization, cross-linking immobilization and covalent linkage method), by asking "which of the four methods immobilized the enzyme is the most firmly, which method is the least firmly, which method has the least effect on the enzyme activity", the students were guided to group discussion after self-study, and finally answered the question.

2.3. Actively Introduce Online Resources, Practice the Teaching Mode Combining "Online + Offline"

Through the construction of "Online and offline hybrid first-class courses" of "Biopharmaceutical Process" and the school-level teaching reform project of "Construction and Implementation of Characteristic Practical Education Training System with High end Biomedical Equipment Design as the Core in the New Engineering Background (JG-2217)", the course of "Biopharmaceutical Process" has applied online course platforms, and also introduced actively reference online course resources since 2020. While using online knowledge point principle animation video, SUSE make full use of information technology, explore a variety of forms, carry out "online + offline" combination of teaching mode. For example, in the teaching of the principle and structure of preparative HPLC in Chapter 12, the animated video on the bilibili website is used to let students see the internal situation of preparative HPLC in the separation operation directly, which is helpful to stimulate students' interest in learning and improve their mastery of knowledge points. With the integration of a series of teaching modes and the updating of teaching materials, the teaching mode of biopharmaceutical courses has realized the transformation from the traditional single offline teaching mode to the combination of "online + offline", with a wide range of resources and diverse assessment methods.

2.4. Strengthen the Connection between Theory and Practice to Solve the Problem of Weak Innovative Design Ability of Students

The biopharmaceutical major has actively built three practice integrating production bases, that is Chengdu Yingde Biopharmaceutical Equipment Co., LTD., Sichuan Bohaoda Biotechnology Co., LTD., and Sichuan Luzhou Buchang Biopharmaceutical Co., LTD. The agreements allows corporate mentors to give lectures to students on campus, and selecting outstanding students to further study in the companies, so as to bridge the gap between corporate practice and school teaching, and to promote high-quality employment for students. In 2023, 6 students have go to bases to complete their graduation projects, and 4 enterprise mentors have teach students in the college and guide students to participate in competitions. At the same time, full-time teachers also guide students to participate in various professional competitions, such as life science competition, pharmaceutical engineering design competition, "Internet +" innovation and entrepreneurship competition, so that students have the opportunity to deeply participate in teachers' scientific research projects, strengthen the connection between theory and practice, and cultivate students' innovative design ability from multiple angles. Over the years, the biopharmaceutical major has formed school-enterprise cooperation, established a training system combine academic mentors and enterprise mentors integrating scientific research practice and competition.

2.5. Participate in Virtual Teaching and Research Section to Promote Teachers' Teaching Innovation

In 2021, the notice of the ministry of education on the pilot construction of virtual teaching and research section decided to carry out the pilot construction of virtual teaching and research sections. In 2022, the biopharmaceutical teaching and research section of Wenzhou Medical University was approved for the pilot construction of the national virtual teaching and research section. The biopharmaceutical major of our university has also joined the virtual teaching and research section of biopharmaceutical. Through organizing key teachers to participate in the teaching and exchange meetings of the virtual teaching and research room, we strengthened the research and exploration on the implementation, teaching content, teaching methods, teaching means, teaching evaluation and other aspects of Biopharmaceutical Process, condense and apply the research results.

2.6. Strengthen the Construction of Teaching Materials and Encourage Teachers to Write High-Quality Professional Teaching Materials

In 2020, the ministry of education issued the measures for the management of teaching materials in universities, proposing that to effectively promote the construction of teaching materials in universities. Universities need to play a major role in the research, compilation and publication of textbooks. The compilation of teaching materials is the professional responsibility and core work of colleges and universities to carry out the fundamental task of cultivating virtuous people and promote the training of innovative talents. Teachers of biopharmaceutical major in SUSE are encouraged to edit professional textbooks. At present, the "Experimental Guidance for Biopharmaceutical Major" edited by teachers of this major has been published, and there are also textbooks related to Biopharmaceutical Process that have been funded by SUSE.

3. Teaching Achievements in Recent Years

Under the background of "Internet + education", the teaching team of "Biopharmaceutical Process" in SUSE has focused on the construction project of online and offline courses of "Biopharmaceutical Process", promoted teachers to improve teaching materials, flexibly integrated ideological and political elements into course content, prepared professional textbooks, and participated in virtual teaching and research section exchanges to promote teaching innovation. We has built a three-dimensional practical teaching training system integrating curriculum ideology and politics, school-enterprise cooperation, discipline competition, online and offline resources. At present, the course of Biopharmaceutical Process has updated its teaching materials, students are deeply involved in teachers' scientific research projects. Teachers' teaching evaluation scores are increasing year by year. A professional textbook is planned to be published. And the construction of first-class courses of Biopharmaceutical Process has been approved as a school-level project.

4. Summary

Education needs to be based on educating people, and higher education is even more so. To become a good teacher and friend for students, it is necessary for every teacher in the teaching team to constantly strive to improve their teaching level and deepen teaching reform. We share this with all of you.

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References

[1] Yunhe Pan. Artificial Intelligence 2.0 and the development of education. Distance education in China. (2018) No. 5, p. 5-8, 44, 79.

[2] Li Chen, Xueping Tang. Policy-oriented analysis of the national "Internet + Education" strategy. Audio-visual education research. Vol. 7(2023) No. 44, p. 5-12.

[3] Heping Gou, Yongxia Jing, Lan Wu, et al. Exploration of innovation and entrepreneurship education for computer majors under the background of "Internet +". Journal of Lanzhou Institute of Education. Vol. 10(2019) No. 35, p. 3.

[4] Jiaoli Liang, Xue Li, Dan Feng. Research on the teaching of Structural Chemistry in remote universities under the background of "Internet +". Guangzhou Chemical. Vol. 3(2020) No. 48, p. 3.

[5] Kevin Kelly. Necessity. Translated by Zhou Feng, Dong Li and Jin Yang. China Industrial Information Publishing Group, 2018 edition, p. 203.

[6] Yilong Yan. Attention economy, attention poverty and information flows empower poverty reduction. Theory and reform. Vol. 6(2023), p. 99-114, 159-160.

[7] China Network Audiovisual Program Service Association: 2021 China Network Audio-visual Development Research Report. Http://www. cnsa.cn/ attach/0/2112271351275 360. 2023. 10.29.