The Construction of a Talent Training System based on OBE under the Concept of "Innovation and Sharing"

-- Taking the School of Science of North China University of Sincese and Technology as an Example

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Abstract

In order to improve the cultivation system of innovative talents in colleges and universities, and give full play to the function of curriculum cultivation of talents. Guided by the new concept of "innovation and sharing", through the analysis of the current situation of entrepreneurship and innovation and the own conditions of the Faculty of Science, according to the OBE teaching concept, by building a shared online teaching platform of high-quality resources, and creating high-quality innovative practical activities offline, A talent training system for innovation and entrepreneurship has been established with the goal of improving students' "three-digit ability". This system effectively conforms to the current development trend of "mass entrepreneurship and innovation", stimulates the participation and enthusiasm of college students, and reflects the needs of cultivating talents to adapt to the era of big data.

Keywords

1. Introduction

In the context of "mass entrepreneurship and innovation", innovation and entrepreneurship education has become an important reform in colleges and universities in recent years. The State Council and the Ministry of Education have actively introduced policies and measures to encourage and support college students' innovation and entrepreneurship. In October 2019, the Ministry of Education issued the "Opinions on Deepening the Reform of Undergraduate Education and Teaching to Comprehensively Improve the Quality of Talent Cultivation". : "Continue to promote the national college students' innovation and entrepreneurship training plan, improve the overall level of the National College Students' Innovation and Entrepreneurship Annual Conference, and run the China's 'Internet Ten' College Students' Innovation and Entrepreneurship Competition". With the advent of the era of big data[1,2], massive data has become a huge potential wealth. Big data has penetrated into all walks of life, and its role is immeasurable. Innovation and entrepreneurship education in colleges and universities has faced new challenges in the era of big data, one of which is how to cultivate innovative and entrepreneurial talents with the ability to use data to meet the requirements of the era of big data[3].

Data application ability in the context of big data includes not only data thinking ability and data literacy ability, but also the corresponding data extension ability, hereinafter referred to as three-digit ability". Data thinking ability refers to the establishment of a thinking mode in the era of big data, that is, all Do not sample (full data thinking), be efficient but not precise (fault-

tolerant thinking), and use correlation to understand cause and effect (correlation thinking), this ability is the basic content of "three-digit ability". A continuation and extension of information literacy capabilities, including sensitivity to data, data collection capabilities, data analysis and processing capabilities, the ability to use data to make decisions, and the ability to think critically about data, which can be simply summarized as knowing "numbers" The ability to develop this ability is the main content of the current data analysis series courses. Data extension ability refers to the ability to use existing resources or obtained data for analysis and processing in solving practical problems, including data acquisition ability, data Management ability and data cross-application ability, etc.[4], this ability is the key content that determines the success of "three-digit ability training. The current innovation and entrepreneurship education model for data analysis talents focuses on the cultivation of data literacy ability, which cannot meet the talent training requirements of innovation and entrepreneurship education in the era of big data[5].

Based on the above analysis, this paper intends to carry out the research and practice of the dual-creation talent training model under the concept of "innovation and sharing" oriented to "three skills" on the existing basis.Under the premise of formulating the expected "learning output" [6,7], students' "three-digit ability" is improved through scenario-based practical research, case-based shared curriculum reform, and the combination of subject competitions and mass entrepreneurship and innovation projects, so that students can master the essentials in the era of big data. data analysis and application skills to promote the further development of innovation and entrepreneurship education in colleges and universities.

2. The Meaning and Characteristics of OBE Education Concept

In 1981, Spady in the United States first proposed the concept of OBE, which focuses on the actual demand for talents and focuses on the teaching design around the learning output. The OBE concept emphasizes output. The so-called output is the learning outcome achieved by students through the educational process, and this learning outcome is the goal of instructional design and instructional implementation. The advantages of OBE are clarity, flexibility, comparability, and participation. OBE requires students to have the ability to solve open-ended problems, not just those with fixed answers, and focuses on cultivating students' practical skills[7].

The OBE-based educational model takes improving the quality of school education as the main goal of teaching. The teaching process must ensure that students can acquire operational skills and have substantial successful experience in solving problems, that is, what students can do after graduation. The OBE educational philosophy emphasizes: what are the learning outcomes that teaching wants students to obtain, why do they want students to obtain these learning outcomes, how does teaching effectively help students achieve such learning outcomes, how does teaching know that students have achieved learning outcomes, and how does teaching protect students able to obtain learning outcomes[8].

The "Three Numbers Ability" dual-creation talent training system is to improve students' data application and practical operation ability. This training goal is very consistent with the core focus of OBE's educational philosophy on final and meaningful outcomes.

3. Analysis of the Current Situation of Talent Training for Innovation and Entrepreneurship in the School of Science, North China University of Technology

3.1. Existing Advantages

The college has long been committed to the innovation and entrepreneurship education and talent training of college students, and has accumulated rich practical experience and teaching achievements.

3.1.1. Curriculum Construction and Teaching Activities

The college has long offered courses such as Python programming, data mining and application, big data application and training, machine learning principles, and deep learning, and has accumulated a large number of course resources and practical cases. In addition, in recent years, the college has carried out training for all students in mathematics, statistics and data science competitions, and has completed hundreds of lectures, which has a good teaching foundation. .

3.1.2. Organizing and Guiding Students in Various Innovation and Entrepreneurship Practice Activities

The college has established the Mathematical Modeling Association of North China University of Technology and the Mathematical and Data Science Association of North China University of Technology to be responsible for the promotion, organization, registration, training and other activities of various competitions. Train students' teamwork and communication skills. Guided by the OBE concept, carry out innovative experimental practice activities related to various courses, such as college students' innovation and entrepreneurship training programs, college students' scientific research projects, teachers' scientific research projects, teachers' school-enterprise cooperation projects and other extracurricular practical activities, while taking into account various discipline competitions, For example, the American College Students Mathematical Contest in Modeling and the domestic modeling competitions at all levels, the "Teddy Cup Data Mining Challenge, the National College Student Market Research and Analysis Competition, the World College Student Supercomputer Competition, etc., have achieved excellent results and have a certain practical foundation.

3.2. Deficiencies

3.2.1. Curriculum Continuity is Limited

The improvement of data ability requires the teaching of multiple courses. At present, the data analysis series courses are scattered and scattered, even scattered in multiple grades, which breaks the correlation between courses and is not conducive to students' centralized learning. It is also difficult to give a comparative analysis of data analysis models. When students actually apply them, they are confused about the choice of models, which is not conducive to the improvement of students' ability to "three numbers".

3.2.2. Lack of Shared Teaching Resources

Most of the online resources of the data analysis series courses are built by the teaching teachers, and are only open to the classes they teach. There is a lack of online resources for the majors that offer some data analysis courses. It is necessary to realize the "three-digit ability of the students in the whole school." ", it is urgent to build sharable online teaching resources.

4. Construction and Practice of the Dual-creation Talent Training System in the School of Science of North China University of Technology

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4.1.   Optimization of College Departments

In order to strengthen the "entrepreneurship and innovation education," the college plans to set up a "entrepreneurship and innovation" office, which is specially responsible for the organization and planning of students' entrepreneurship and innovation activities, and is directly managed by the leaders of the college.

4.2.   Compiling and Publishing "Internet" Innovative Sharing Teaching Materials

According to the characteristics of the series of data analysis courses, the online sharing teaching platform and offline high-quality innovative practice activities based on the OBE education concept, using the advantages of the Internet, adopting innovative teaching concepts and writing modes, using teaching materials as the carrier, and using high-quality case combat analysis Relying on, using electronic equipment as a tool to compile "Internet" innovative sharing teaching materials. Through QR code links and three-dimensional three-dimensional models, the knowledge is fragmented and visualized to enhance students' interest, initiative and classroom participation. Through the Internet, the pictures, texts, videos, online Q&A, and 3D models of each knowledge point are integrated into the teaching materials, so as to achieve the effect of "entertaining teaching and learning, and applying learning".

4.3.   Build an Online Sharing Teaching Platform for Data Analysis Series Courses

Relying on the Ministry of Education's industry-university cooperation and collaborative education project, it cooperates with Beijing Dongfangaixue Company to jointly build an online teaching platform. Following the connectionist teaching design model and the OBE concept, taking students as the center and taking students' learning output as the orientation, construct a multi-course data analysis teaching system, covering data analysis model, programming and case analysis practice, and realize all course content online sharing.

The course is set in the spring semester of each academic year. Course requirements: The basic output requirements of the course, such as papers, patents and software copyrights, are put forward to students, and they are included in the course scores; through scene-based practical training in the class, students can fully understand the project From data collection, data migration, big data mining, special application, data visualization and further cross-application, to cultivate and improve students' three-digit ability"; after class, students are required to participate in at least one innovation and entrepreneurship practice activity to further cultivate Students' "three-number ability", and use this as a way to test the effect of reform.

4.4.   Create Offline High-quality Innovative Practice Activities

For students of different grades, different arrangements of practical activities are set up, among which the high-quality innovative practical activities focusing on the mathematical modeling competition are shown in Figure 1.

For example, after completing advanced mathematics or mathematical analysis courses in the spring semester, freshman students organize school-level mathematics competitions and participate in provincial and national college students' mathematics competitions through selection. Students who have spare capacity can also choose to study a series of data analysis courses and try to participate in the school-level modeling competition to lay the foundation for the senior grades to participate in the mathematical modeling competition. Sophomore students need to complete a series of data analysis courses in the spring semester, and participate in the school-level modeling competition. They are recommended to participate in provincial and national modeling competitions through selection, and the results of the competition are sorted out and further processed, and college students are encouraged to apply

The innovation and entrepreneurship training program guides students to diverge their thinking, design their own follow-up plans, and then complete the transformation of results to achieve the output of the predetermined results in the OBE concept. Third-year students can choose to participate in at least one innovative practice activity according to their majors and their own hobbies, and third-year students are encouraged to participate in teachers' scientific research to further enhance their innovative ability. Select outstanding senior students to go to Beijing Xinda Jiading Company for internship training, test the results of talent training for innovation and entrepreneurship, and further improve the talent training system based on feedback.
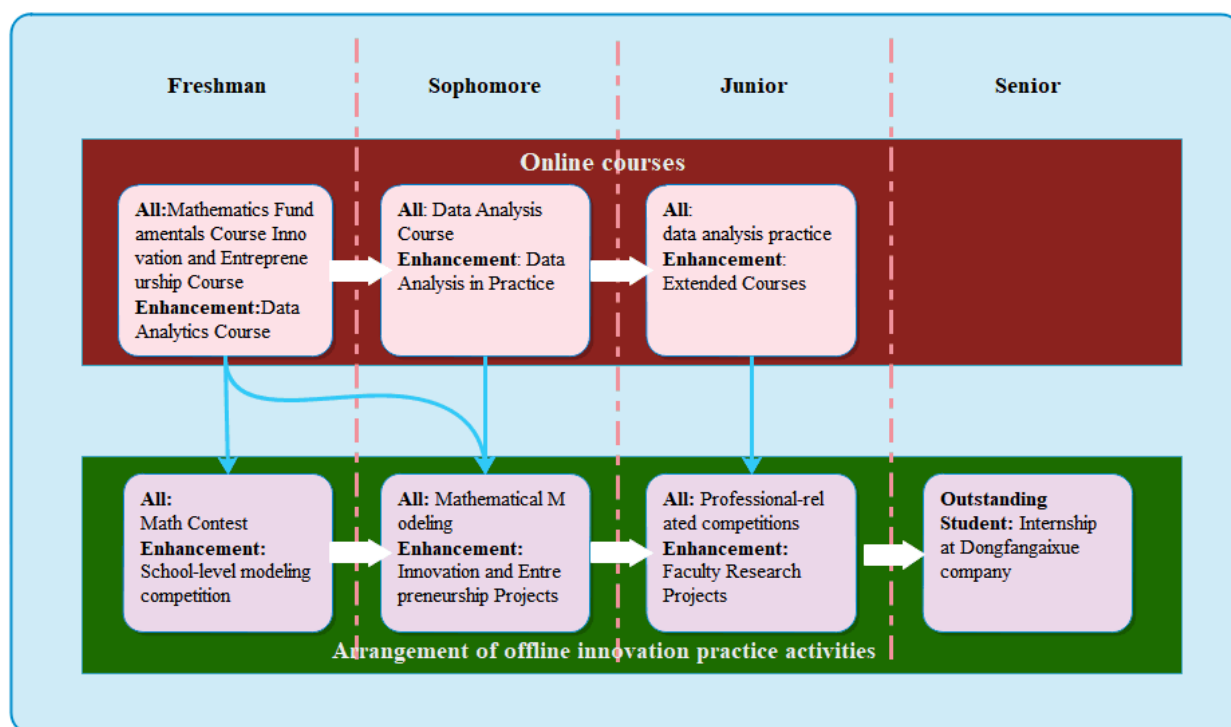
Figure 1. Grade-by-grade curriculum and arrangement of innovative practice activities

5. Conclusion

Guided by the concept of "innovation and sharing, this paper closely follows the background of the era of big data, is based on the reform of innovation and entrepreneurship education in colleges and universities, uses the OBE teaching concept, and focuses on "discipline competition and "innovation and entrepreneurship training" to explore innovation and entrepreneurship education in colleges and universities. The way to improve the ability of talents in the three numbers in the reform. By building a resource sharing platform for online courses and training systems under the OBE teaching concept, it integrates "students' innovation and entrepreneurship practice, innovation and entrepreneurship education and teaching, innovation and entrepreneurship academic research training, and creates a high-start innovation and entrepreneurship platform for students, forming a A new talent training system that can be used for reference by other universities and enterprises.

Acknowledgments

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