

Construction of Engineering Practice Platform based on Innovative Competition Model

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Abstract

In the context of the construction of "New Engineering", cultivating diversified and innovative engineering talents is the main task of construction, however, there are still many students who lack innovation and practical ability. In order to encourage and attract students' curiosity and interest in learning, and to improve students' scientific and technological innovation, Miami College of Henan University has set up a practice community based on "Engineering Workshop" under the guidance of the construction task of New Engineering, which provides information on the opening of laboratories of each major, the research projects of tutors, experimental training and excellent mentors of each major in the form of questions and answers, articles, instant laboratory information and instant project information of tutors. The "Engineering Workshop" is an open engineering practice platform that provides students with a practice environment related to their interests and majors by providing Q & A, articles, instant lab information, instant tutor project information, lab skills training, and excellent seniors of each major sharing their successful experiences. The practice results show that students can adapt to the university life faster, improve their independent innovation ability and obtain practical results by participating in science and technology innovation activities in the base, which is conducive to the cultivation and development of senior applied technology talents.

Keywords

Practice Platform, New Engineering, Project Practice, Open Type, Innovative Talent Cultivation.

1. Introduction

The basic task of the construction of "New Engineering" is to cultivate diversified and innovative engineering talents with the concept of responding to changes and shaping the future, and the main ways of inheritance and innovation, crossover and integration, coordination and sharing. The important means to cultivate innovative talents is to encourage and attract students' curiosity and learning interest through innovation competition, and to change the traditional operation mechanism of experimental teaching. In-depth thinking and research are conducted for the construction of existing education system and practice platform, summarizing the common problems in the reality of innovation and entrepreneurship education in colleges and universities, exploring how to properly play the guiding power of cultivating innovative and entrepreneurial talents, the cohesive power of effective integration of resources, the attractive power of curriculum content innovation and the competitive power of outcome output index, so as to build a system that includes professional construction-curriculum system construction-faculty team construction-practical teaching system construction. It is important for the deepening reform of innovation and entrepreneurship education to create a closed-loop education system that includes professional construction-curriculum system

construction-faculty team construction-practical training platform construction-results incubation platform construction for the whole process of dual-creation practice education.

Miami College of Henan University, as a Sino-US cooperative engineering college, introduces the high-quality educational resources of Miami University and provides students with advanced engineering education, aiming to cultivate international senior engineering talents with global awareness and vision. However, Miami College of Henan University, or even Henan University, is not well known nationwide. In addition to some objective reasons, the low opportunities for students to participate in international and domestic innovation competitions, the low grade, and the low gold content of their works are also important factors limiting the increase of popularity. Therefore, it is necessary to make full use of the internal and external resources of the college to create a reasonable platform for students to manage innovation competitions and practical experimental teaching platform, especially to take advantage of the external opportunity of cooperation with Miami University to provide more help for our students to participate in innovation competitions. Through the combination of experimental center and practice base, we use online and offline methods to build the public platform of "Engineering Workshop". We will explore the new environment of students' life and study with the characteristics of "New Engineering", student-led approach and personalized development, and build a new environment for students' life and study by combining hardware and software, and establish the "Engineering Workshop" innovation base (hereinafter referred to as "Engineering Workshop"), which serves students who love IT practice and aims at the basic practice of science and technology innovation. The "Engineering Workshop" innovation base (hereinafter referred to as "Engineering Workshop") is established to serve students who are interested in IT practice and aim at the basic practice of science and technology innovation. At the same time, the construction and implementation of the "Engineering Workshop" also provides a good foundation for the research of "practical teaching" by the subject group. 2020, the subject group has researched and explored the practice of open subject competition teaching which is managed by students independently. In 2020, the subject group has conducted research and practice exploration on how to conduct the practice teaching of open subject competition with independent management of students. How to provide students with a good environment for application practice is crucial to the cultivation of senior applied talents. "In the fall of 2020, the group adjusted the original venue for students' extracurricular learning activities and established the "Engineering Workshop", which has been continuously improved, and every year, a group of students who are interested in IT practice are engaged in project practice learning activities in it. Students use the project practice as a platform to participate in academic competitions and further improve their results. Students use the project practice as a platform to participate in academic competitions and further improve their achievements. Students build a solid foundation during their freshman year, learn knowledge and skills in practice, and promote the learning of theory with practice, which plays an exemplary role in the cultivation of applied talents.

2. About "Engineering Workshop"

Engineering Workshop is a public platform built by Miami College of Henan University focusing on various discipline competitions, and is a courtyard-level platform that brings together mainly national university competitions at all levels, supplemented by activities and practice communities. At present, around the ranking of national general university discipline competitions (Henan University directly recognized the national level competition directory), Engineering Place provides more than one hundred competitions for college students of various majors, covering various branches of science, engineering, art, culture and sports, business, etc.; based on the in-depth operation of competitions, the platform opens an activity section, providing online and offline activities of event release, promotion, registration and management of complete In order to provide more perfect services and enhance the complete user experience, Engineering Workshop has set up a practice community, which provides the opening status of laboratories of each major, projects under research by tutors, experimental skills training and a stage for outstanding seniors of each major to share their successful

experiences and growth history in the form of questions and answers, articles, instant laboratory information and instant tutor project information, aspiring to become a platform for Miami students of Henan University to High-quality subject competition content production, exchange community.

2.1 Establishment of "Engineering Workshop"

The "Engineering Workshop" was established based on the constructivist learning theory to provide a basic environment for freshmen students to learn and practice, so that they can change from the original learning style of high school to the independent learning style of university and adapt to the university life as early as possible. In addition, as the first stage of the "four-step process", students can learn some basic knowledge and improve their ability, so as to lay a good foundation for the subsequent stage of practical project teaching activities. It is a good environment for students to learn and practice in the college, and promotes students' independent learning.

2.2 Operation Measures of "Engineering Workshop"

The laboratory takes the landed entrepreneurial practice projects and high-level discipline competition entries as the export to test the quality of innovation and entrepreneurship education practice training. First, the laboratory relies on the discipline characteristics of the college to create a discipline competition group. The disciplinary competitions have achieved full coverage of majors. The competitions include "Internet+" National Student Innovation and Entrepreneurship Competition, "Youth Creation" National Student Entrepreneurship Competition, National Student E-commerce "Innovation, Creativity and Entrepreneurship" Competition, National Student Marketing Creativity and Entrepreneurship Competition. The competitions include "Internet+" National Student Innovation and Entrepreneurship Competition, "Youth Creation" National Student Entrepreneurship Competition, National Student E-commerce "Innovation, Creativity and Entrepreneurship" Challenge, National Student Marketing Creativity and Practice Competition, National Student Energy Economy Academic Creativity Competition, International Business Management Challenge (GMC), and National Business Simulation Challenge, etc., which have achieved full coverage of disciplines and are all national-level competitions, "promoting learning through competitions" The second is to carry out innovative projects for all students. Secondly, we carry out innovation and entrepreneurship skills training and project guidance for all students in the university. Efforts are made to explore technologies, products and services with entrepreneurial intent in various subject areas, and targeted entrepreneurship cultivation is carried out for project characteristics. Combining resources from all aspects of the university, teachers and students create enterprises together and provide professional guidance and consultation on business models, marketing models, policies and regulations for a number of college students' entrepreneurial enterprises. Thirdly, we actively contact relevant enterprises outside the university to set up a private board, promote the integration of executive coaching, action learning and deep socialization, and bring together the wisdom of cross-industry entrepreneurial groups to solve the more complex and realistic difficulties in the operation and management of startups. Strengthen school-enterprise communication, actively participate in seminars on enterprise development paths, and expand student internship and employment channels.

2.3 Management Model

(1) Independent management of students in the innovation base. The "Engineering Workshop" is managed by the students themselves. The "Engineering Workshop" is located in the school, and it is convenient for students to conduct basic practice in it, but there are certain difficulties in the management process. A student management team is formed for daily management to guarantee the daily operation of the innovative practice base. The seniors who have served as the management team before serve as advisors, and help guide remotely online some equipment technical and management problems that cannot be solved in the management, and counselors and deans regularly check and guide the operation of the practice base to help deal with problems that the management team cannot handle in the base management.

(2) Management of base project practice. In the process of practice, students can find their own practice instructors or the former "Engineering Workshop" student assistant instructors for technical guidance, and teachers and student instructors will guide students to complete their project practice tasks through The teachers and student mentors will guide the students to complete the project practice tasks through the practice.

3. Features and Roles of "Engineering Workshop"

3.1 Features of "Engineering Workshop"

The competitions are mainly based on the 41 events provided by the National Ranking of Subject Competitions in General Colleges and Universities (Henan University is directly recognized as a national level 1 competition directory), supplemented by a number of professional events that engineering students can participate in, and divided into 25 major categories. These include: ACM, mathematical modeling, robotics, electronics & automation, computer & information technology, engineering machinery, traffic & vehicles, civil engineering, materials & polymers, environment & energy, business, entrepreneurship, Challenge Cup, youth creation, vocational skills, sports, environmental protection & public welfare, singing, dancing, painting & photography, speech & debate, mathematics, physics, social integration, UI design, industrial & creative design, foreign languages. It covers most of the fields of college study and life. The public number is not only the most comprehensive platform for event information and activity release, but also has the function of registration system.

Activities is based on the operation of discipline competition, providing online and offline activities of the event release, promotion, registration, management of complete consulting services to increase students' understanding of all kinds of campus and off-campus activity announcements. The activities section mainly releases online and offline activities such as sharing professional lectures, competition skills, practical skills, presentation sessions, and creative calls.

When students participate in various competitions, instant access to information is essential, including the valuable experience of seniors, the careful guidance of mentors, and the open information of experimental platforms. Therefore, Engineering Workshop has collected a large amount of information about subject competitions in the basic operation of competitions and released it instantly to provide reference for students. It provides an exchange platform for competition bigwigs with rich experience, mentors with scientific research projects, and competition novices who lack practical platform and mentor information, so that they can form effective interaction, thus improving competition skills and exchanging competition experience. The community will build a high-quality vertical elite community around competitions and activities, so that high-quality content can be deposited in the form of Q&A and articles to help more students who are willing to participate in competitions, and expand to become the first brand of extracurricular learning community for students in our college.

3.2 The Role and Effect of "Engineering Workshop"

3.2.1 The Role of "Engineering Workshop"

The "Engineering Workshop" takes the form of innovation competition and practical projects, with the majors of electronic information engineering and technology, automation, environmental science and civil engineering as the main subjects, and the discipline competition, college students' innovation and entrepreneurship projects and independent experiments as the main practice. As an engineering practice platform, it can lay a certain foundation for the subsequent practice of students' innovation cultivation stage, and also plays the role of cultivation, demonstration, promotion and radiation of on-campus practice base.

(1) Cultivation role. It mainly aims at cultivating students' practical ability, mobilizing their enthusiasm and stimulating their active and independent practical learning in the practice base, and laying a good foundation for the subsequent project practice and new team establishment.

(2) Demonstration role. The "Engineering Workshop" adopts the form of student-directed management of the base and the process management of practical projects, which guides students to participate in scientific and technological innovation and strengthen their practical ability, providing a new method for the cultivation of engineering applied talents, adding competitive power for students' future employment and graduate school, as well as setting an example for students and promoting the construction of academic style.

(3) Promoting effect. It makes students practice actively in the environment of "Engineering Workshop", which increases students' confidence in the subsequent stage of independent practice and promotes the "Practice Platform".

(4) Radiation effect. Students practicing in the "Engineering Workshop" have influenced other students of different majors and played a radiating role. The students of "Engineering Workshop" formed new teams after they entered the second year of undergraduate study, and encouraged students of their own majors to participate in open project practice activities. They have participated in the project declaration with high success rate, good quality of project completion, and a great breakthrough in cross-disciplinary projects.

3.2.2 The Effect of "Engineering Workshop"

The main purpose of the "Engineering Workshop" is to improve the basic skills of students. Through some simple projects, students learn to use development tools, write project proposals, design and develop simple projects, and improve their teamwork skills, practical base management skills, and project management skills.

Over the past year, nearly 200 students from different majors have participated in all or some of the projects in our "Engineering Workshop", and more than 100 of them have completed their science and technology innovation projects in the Engineering Workshop. From 2 projects in the first year, there are now more than 10 projects each year, and there are also several unsuccessful projects and independent practical projects. The practice of these projects has laid a solid foundation for the students to establish projects at national and provincial levels after entering their sophomore year, and more students have won discipline competition awards, patents, software publications and theses on the basis of these practical achievements. The "Engineering Workshop" is the fastest building, more efficient learning and practice, and more fruitful among several innovation bases with the background of science and technology culture.

It has benefited more than 800 students, who have achieved great results in various discipline competitions and innovation and entrepreneurship projects. Since the implementation of the project, our students have been approved 28 projects of innovation and entrepreneurship training program for college students, including 6 national and 2 provincial projects; more than 50 awards at provincial level in various competitions; 20 papers published by students as the first author in professional journals; 18 utility model patents approved. In the competition, students perceived the charm of learning and creation, deepened their understanding of engineering disciplines, were brave in innovation and creation, were determined to struggle hard, and cultivated noble character. In the future, this program will benefit more students, who will grow up in the competition, enhance their core competitiveness, realize the true meaning of learning, exert positive influence, form a good learning atmosphere with their classmates, and work together with teachers and students to create a new business card of Miami College.

4. Conclusion

The "Engineering Workshop" emphasizes the organic integration between talent cultivation orientation, curriculum setting and practical platform construction, and the multidisciplinary joint innovation and entrepreneurship laboratory mainly takes the targeted excavation, cultivation and guidance of innovation and entrepreneurship projects as the fundamental task, realizes the cross-fertilization of general education and special education, and builds a practical platform with project orientation to promote It also builds a project-oriented practice platform to promote the

implementation of projects and transformation of results, forming a closed loop of innovation and entrepreneurship practice education in the whole process of discipline construction-curriculum system construction-practice training platform construction-transformation of results.

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