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The Improvement of Students' Computer Innovation Ability Based on Competitions

−A Case Study of Computer Design Competition for Chinese College Students

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***Abstract*—"Innovation" is the theme of today, we have no choices but to develop the all-around talents in order to meet the needs of the social development. Therefore, it has become a strategic task to cultivate students' innovative ability for college and universities. It proves that the competition and practical teaching is of great significance to teaching students' learning and reforming ability. Taking the computer design competitions as an example, the article focuses on how Jilin International Studies University improves students' computer innovation ability based on competition, meanwhile, it offers some references of application oriented universities.**

Keywords—college students' computer design competition; innovation ability; the practice teaching; teaching mode

I. INTRODUCTION

With China's economic development entering a new normal, innovation has risen to the level of national strategy that bears on the overall situation. General Secretary Xi Jinping stressed that implementing the innovation-driven development strategy is to promote comprehensive innovation with scientific and technological innovation as the core. The outline of the national program for medium - and long-term education reform and development (2010-2020) clearly states that efforts should be made to improve students' innovative spirit of exploration and practical ability of solving problems. In the information age, scientific and technological innovation and innovation in all fields are inseparable from computer and information network technology. All walks of life need a large number of talents with innovative spirit and innovation ability. The country's current demand for innovative talents and determination to cultivate them has reached an unprecedented level. College students are a fresh force in informationization innovation. They are active in thinking, full of innovation enthusiasm and have strong demand for innovation.

Jilin international studies university is positioned as an application-oriented undergraduate university. Application-oriented undergraduate university focuses on cultivating application-oriented and inter-disciplinary talents, shoulders the important mission of cultivating talents for regional economic development, and is the main soil for cultivating innovative talents. There are many ways of innovation education, and competition is an effective way to improve students' computer innovation ability. This paper mainly expounds how Jilin international studies university implements innovative talent cultivation based on the platform of Chinese college students computer design competition.

II. THE CURRENT SITUATION OF THE COMPETITION IN OUR SCHOOL

Application-oriented universities have always paid great attention to the cultivation of students' innovative ability. In recent years, competition has become a very important practice platform for schools to cultivate students' innovative ability. The computer education in application-oriented universities has gone through a long reform process. The training objectives range from enabling students to master basic application to comprehensive application, from solving problems proficiently with computers within the scope of their own majors to using information technology to solve problems innovatively in their careers.

As an application-oriented foreign language university, Jilin international studies university has established the goal of computer education in liberal arts colleges by combining its own characteristics: to cultivate application-oriented talents with "solid theoretical foundation, proficient office skills, strong practical ability, high practice level and certain innovation consciousness and ability". However, the early computer courses lacked scientific guidance for college students' practical innovation, and failed to create a positive, free and relaxed innovation atmosphere. There was a certain gap between the innovation education environment provided and the innovation needs of students. Therefore, there was a bottleneck in students' innovation motivation and ability, and certain resistance appeared. In 2015, the computer teaching team began to pay attention to the "computer design competition for Chinese college students". The competition is jointly sponsored by the ministry of education and the ministry of education. The purpose is to stimulate students' interest and potential in learning computer knowledge, technology and skills, so that students have the comprehensive ability to use information technology to solve practical problems, to serve the needs of social employment, the needs of the profession itself, and the needs of innovation and entrepreneurship personnel training. The competition started in 2008 and has been held for 12 times since 2019. More than half of the undergraduate universities in mainland China have participated in the competition. The competition provides a good platform for the cultivation of innovative talents and has become one of the most popular computer competitions in China.[1]

From 2015 to 2018, Jilin international studies university has participated in this competition for five consecutive years, winning 2 first prize, 2 second prize and 6 third prize. There were 10 first prizes, 19 second prizes and 4 third prizes at the

provincial level. As shown in the figure below, national awards were on the rise. The school took this opportunity to carry out a variety of computer science and technology competition activities in the school, and the spirit of competition, competition mode fully into the practice teaching classroom, in the success of training and leading students to participate in the competition, opened a new situation of computer innovation education.

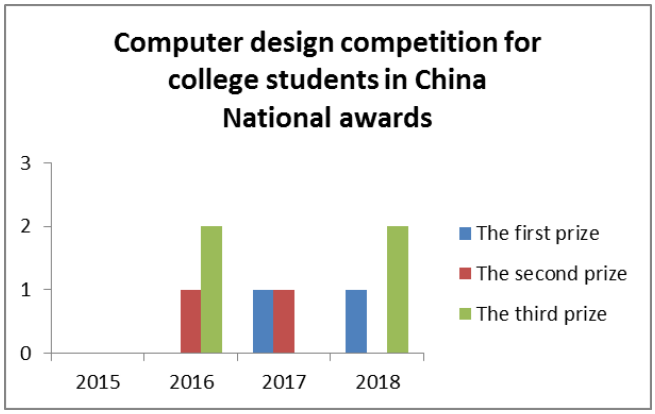

Fig. 1 Awards in national competitions

III. The Competition Promotes the Computer Practice Teaching Reform, Enhances the Student Innovation Ability

The research team studied the strategies of improving college students' innovative ability in the information field in the process of computer education and teaching. Based on the background of the college students' computer design competition, it proposed the computer practical teaching mode of "design-driven innovation" and extended it to the teaching of many computer courses, especially design courses. Aimed at all aspects of the computer teaching, each link into the "innovation" 2 words, firmly establish a students' innovative thinking, make the innovation to become a kind of thinking habit, cultivate students have based on the technology of the computer, the application for professional, industrial innovation design ability, make students in various disciplines and industries with the help of information technology can be independently, practice and creation.

Drive innovation "design" teaching model using computer design contest entry form, give students a relatively open design thesis, take the student as the main body, teacher as a guide, joint implementation to complete a specific products "design", students in group cooperation with teachers develop design target and technical indicators, and the target students subsequent throughout the learning process. Students search for materials and literature by themselves, apply the knowledge they have learned to design in the course of gradual learning, and reorganize the knowledge through application background. After accumulation, they can complete their own design goals at the end of the course, that is, the output of innovative works. Design drive innovation teaching method belongs to the exploratory teaching, students are selected after the design theme, to achieve the expected design goal, to enhance the subjective initiative in the learning process, and take the initiative to transform knowledge into design stage results in time, in the whole design process not only promoted the design innovation ability of students, and cultivate the team cooperation spirit.

The cultivation of students' computer practical innovation ability should be divided into levels and carried out orderly by stages. In freshmen's basic computer course, the teaching mode of "design-driven innovation" cleverly answers "what is the use of learning computer? To meet the learning needs of students from a low starting point, so that students get rid of the boring learning of basic skills, have the opportunity to expand their thinking, to apply what they have learned, this stage for the computer competition selection and training of talents; Sophomore, junior is the main force of the competition, this stage of the student had certain technical base, have mastered some computer design software, and computer with professional application of fusion, well drive innovation "design" teaching model driven by demand, stimulate students' interest in technology to explore and innovation, in order to complete the work, sometimes need to the integrated use of numerous software, students are even able to autonomous learning, flexible using new software; In the fourth year, the "design-driven innovation" teaching mode highlights the cultivation of "qualified professionals", requiring students to complete comprehensive design works to be in line with the society. In the competition, graduates choose the direction more inclined to social vocational needs, which lays a foundation for the employment of applied talents.

IV. Build a Student Innovation Team Based on the Competition and Stimulate Students' Enthusiasm for Innovation

College computer design contest opened the prelude of innovation team to participate in the competition, schools encourage students to take an active part in all kinds of information technology, such as multimedia design contest, computer integrated design contest, contest of auxiliary teaching courseware, micro class competition, office automation skills contest, etc., to promote building, to point with surface, give full play to the innovation team of radiation and leading role, participation and innovation drive, layer upon layer selection to the provincial and national games, the team's innovation ability in different direction and different level balanced lasting development.

In addition to computer teaching department found in the teaching process and selection of outstanding students, also with the school of modern education technology center, the campus network center, department of college students' innovative entrepreneurship center, all levels of the students' union joint type selection of outstanding technical and creative talent, computer teachers guide students to form a reasonable innovation team, improve the system of team, is helpful for students to communicate to new technology, to the design of the modern technology to achieve innovation works, thus enables the team to continuously explore consciousness.

The essence of innovation team building is core leadership, overall planning, effective communication, strong executive ability, division of labor and cooperation, common progress, so as to form a team with clear goals and combat effectiveness in the competition. During the creation of the competition works, the innovation team of our school adopts the management mode combining the tutorial system and the upper-class responsibility system. Take the student as the main body, teacher help teams scientifically set up a perfect combination: including technology, innovative ideas, art design capabilities, problem solving ability, collaboration ability, the team must give each member skill development opportunities, the team has the best skill sets complement each other. Once the team is built successfully, the tutor will be responsible for overall control, and the promotion of the team will be led by the seniors who have won awards in the competition, who have rich creative experience, good coordination and management ability and team building awareness. Senior students hold regular lectures to introduce the technology, creativity and experience of participating in the competition to team members, and promote the creation of the works in the old and new ways. The tutor gives overall guidance through the combination of online and offline. This model has gradually cultivated a number of active participants and activists of innovative activities and created a good innovative atmosphere.

In short, the competition mode of college students' computer design competition has been introduced into teaching. It has been implemented in several computer courses for three years in the form of "design-driven innovation", which has been widely recognized by students. The following figure is the survey result of students' satisfaction with school innovation education.

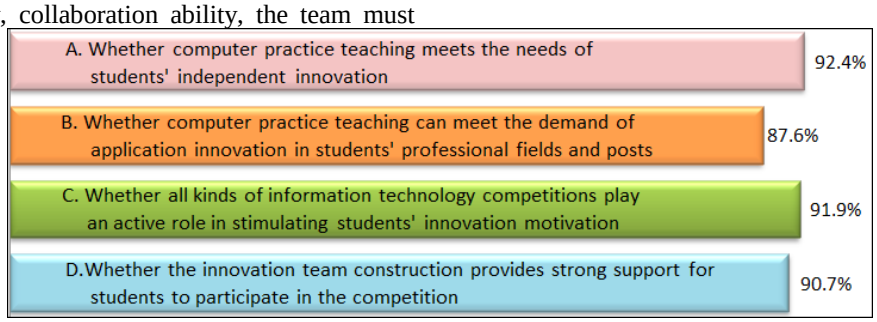

Fig. 2 Innovative education satisfaction survey results

V. CONCLUSION

College students' computer design competition is based on computer technology, service in the industry application of comprehensive practice model. Introducing competition pattern teaching, make the knowledge to teach more effectively, "design drive innovation" practice teaching mode in order to design as the core power of innovation, the students as the main body of innovation, help to improve students' innovative drive, urge students to understand the front of the computer technology, make its will subject learning and computer technology integration more effectively. In the process of guiding the design and competition, teachers constantly improve their own technical level, gradually have a broad vision, keen cutting-edge insight, and accumulate a lot of vivid teaching materials. The computer design competition provides a platform for teachers and students to compete with the national college teams and display all aspects. The practical teaching reform based on the competition effectively improves students' ability to use information technology to complete product innovation in their respective professional and industrial fields, and has positive significance for the cultivation of application-oriented and innovative talents.

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