

Study and Exploration on Cultivation Mode of Innovative Practical Ability of College Students of Emerging Engineer Supported by Chenglong Valley Incubation Park

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Abstract—In this paper, it briefly introduces the practices and challenges of maker space of colleges and universities on the innovative and entrepreneurial education on students against the background of emerging engineer, highlights the important significance of the innovative practice ability on the undergraduate education of emerging engineer, and also introduces the situation of entrepreneurship Incubation Park of Chenglong Valley B area of Chengdu University. Moreover, depending on the space advantage, it establishes three service zones including the second classroom, discipline competition, as well as innovative and entrepreneurial team, providing a cultivation platform of innovative and practical ability at three levels for the students majored in the emerging engineer of our college, and constructing the cultivation mode of innovative and practical ability of multiple parties participating including the work-based teachers, full-time teachers, as well as off-campus enterprises.

Keywords—incubation park; emerging engineer; innovation; ability; cultivation mode

I. INTRODUCTION

In the economic strategic transformation, the country transfers its emphasis to the development of the innovative-driven economy. The institutions of higher education are the frontiers for cultivating the innovative and applied talents demanded for economic construction. While driven by the innovative and entrepreneurial wave, each college and university start to construct their own innovative and entrepreneurial spaces. Meanwhile, the Ministry of Education issued Notice on the Development of Emerging engineer Research and Practice, which marks that “emerging engineer” has become the major choice of the engineering education reform under the current new economic normal, and already generated the profound influence on the direction and routine of engineering course talent training, and it urgently needs to speed up the reform and innovation of the engineering education, thus it puts forward a higher requirement on the development of the maker space in colleges and universities in China. [1] Nowadays, there are the problems such as incomplete system, high degree of

homogeneity and operational and service models to be optimized in maker space of colleges and universities. [2] There are scholars put forward that we shall combine the needs and development of “emerging engineer”, the development of maker space of colleges and universities shall fully play the advantage of comprehensive integration of disciplines in colleges and universities, and through the STEAM mixed education, enhance the innovative education of makers; it should also establish the maker space system of three level pyramid structure, establish the online management platform, optimize service, and improve the efficiency of the innovation and practice of the emerging engineer. [1]

The study on the cultivation of innovation and practice ability of the students of emerging engineer is the hot issue of the reform of education and teaching in colleges and universities. Some colleges and universities tried starting from the course system, course teaching mode as well as course teaching contents; [3] While a conventional effective carrier of the cultivation of innovative and practical ability is the innovative and entrepreneurial competition of university students, and therefore, some colleges and universities cultivate the innovative and practical ability of applied engineering talents based on discipline competition; while SJTU (Shanghai Jiaotong University) puts forward the cultivation mode of integrating the mid-end carrier by scientific research studio, completing the back-end support by science and technology competitions, and constructing the practice platform by high-quality advisers, which is worth learning and drawing lessons from.[4]

However, it is still a relatively brand-new research topic of how to conduct the cultivation of innovative and practical ability of university students of under the support of innovative and entrepreneurial Incubation Park. The innovative and entrepreneurial Incubation Park of colleges and universities is included into the management of innovative and entrepreneurial college in organizational structure, and there are also innovative and entrepreneurial Incubation Park of colleges and universities are managed

directly by the students' affairs office or Chinese Communist Youth League (CCYL) committee, and it is for serving the innovative and entrepreneurial education of the whole school. As for local comprehensive universities, innovative and entrepreneurial space's service and guidance toward the students of emerging engineer are still need to be enhanced.

II. INNOVATIVE PRACTICAL ABILITY OF COLLEGE STUDENTS OF EMERGING ENGINEERS

Wang Guilin et al. put forward that the students of emerging engineer shall possess ten abilities such as complex engineering problem solving ability, multi-disciplinary teamwork, innovation and entrepreneurship, dynamic adaptability, engineering leadership, as well as global competence. [5] Long Fenjie et al put forward that the students of emerging engineer shall possess the abilities including engineering thinking ability, cooperative learning ability, cross-border integration ability, integrated innovative ability, internet thinking ability, ethical thinking ability, global thinking ability, as well as lifelong learning ability. [6] They all repeatedly highlight the cultivation of students' innovative and practical ability. The innovative and practical ability includes two aspects of innovative ability and practical ability. The innovation mainly shows as the training of thinking, while the practice mainly shows as the training of the manipulative ability and the improvement of professional skills.

III. THE CULTIVATION MODE SUPPORTED BY CHENGLONG VALLEY INCUBATION PARK

The role of Incubation Park of colleges and universities mainly shows as the personnel innovation cultivation and team entrepreneurship incubation, and its advantage is the site, and also some entrepreneurship funding and policy supports, as well as the introduction of all kinds of entrepreneurship resources. Chenglong Valley of Chengdu University is constituted by four areas including A, B, C and D, and they respectively locate in innovative and entrepreneurial college, school of information science and engineering, school of mechanical engineering as well as normal college. Chenglong Valley B area is constructed in school of information science and engineering, with the total area being more than 2,000 square meters, over 700 stations, with roadshow hall, meeting room, reception room and other public service area. In this subject, it is mainly based on three teacher-student service areas of Chenglong Valley B area (the second classroom, discipline competition, as well as innovative and entrepreneurial team), exploring the effective mechanism and approach of integrating all kinds of teachers and teaching resources in school and outside school and constructing the team of teaching and study by taking maker space as the platform. Because of the characteristics of Incubation Park, it puts forward the cultivation platform of innovative and practical ability at three levels including the second classroom, discipline competition, as well as innovative and entrepreneurial team. Its core philosophy is to cultivate students' habits of independent study, construct the learning and cultivation mode of transferring, helping and replacing, and depending on the innovative and entrepreneurial team, it further conducts the cultivation of

high-end innovative and practical ability. Construct the cultivation mode of innovative and practical ability of multiple-party participating such as work-based teachers, full-time teachers as well as off-campus enterprises.

A. The Second Classroom

The freshmen are all very confused about the study contents and the future employment direction of the major, and therefore, the college establishes the second classroom. Chenglong Valley B area provides the college freshmen with 4 rooms and 80 stations as the studio of the second classroom, managed by the college's teachers of student affairs office. The studio of the second classroom recruits the freshmen, and regularly arranges the senior students to conduct the theme training such as professional courses and career planning, and cultivates the study interests of the freshmen by taking the mode of old students leading the freshmen. It allows the old students to serve as the teachers to cultivate the freshmen, and as for the old students, it also possesses a great promotional role. Meanwhile, freshmen can rapidly enter into the study status by the second classroom, providing the preliminary basis for entering into the competition team and start-up team to conduct the cultivation and innovative and practical ability in the future, reaching the purpose of cultivation of primary innovative and practical ability.

B. Discipline Competition

Depending on the space advantage, Incubation Park can guide a part of students to join in all kinds of discipline competition of the campus start-up teams, and can also provide an appropriate space for the teams who participate in the discipline competition. Chengdu University Chenglong Valley B area provides at least 300 stations and 5 rooms for the discipline competition of the student teams. The team recruits the new members facing to the second-year students in every October and November, and recruits some excellent freshmen. By the training of the discipline competition, it can effectively cultivate nine abilities of university students of emerging engineer, including the innovative thinking ability, global thinking ability, dynamic adaptability, teamwork ability, interdisciplinary collaboration ability, cooperative learning (team learning) ability, ethical thinking ability, communication and exchange ability as well as document writing ability.

The competition project has a very high demand on the creativity. The competition team may check lots of documents and discuss repeatedly for creativity. This is very helpful for cultivating students' innovative ability. While the competition project normally requires high completion degree, and it needs to change a project from concept to the ultimate demonstrable system, and it is also very helpful for training students' practical ability. Moreover, the competition process demands students to conduct team learning and independent learning for a common goal, and it also demands the old team members to lead the new team members, so as to realize the rapid growth of new team members. By the training of disciplinary competition, it realizes the middle level cultivation effect of the innovative and practical ability.

C. Innovative and Entrepreneurial Team

The core working content of innovative and entrepreneurial Incubation Park is to cultivate and incubate the innovation and entrepreneurship team, and the entrepreneurship incubation is its ultimate goal. Therefore, in Chenglong Valley B area, a total of over 300 stations and more than 20 spaces are divided for innovative and entrepreneurial teams. These entrepreneurial teams include the scientific innovation and entrepreneurial teams of campus teachers and off-campus enterprises. Incubation Park demands innovative and entrepreneurial teams to accept a certain number of students to join in the innovation and entrepreneurial projects, while innovative and entrepreneurial teams also have a certain requirement of primary technical personnel, and therefore, it is win-win. The students who can enter into the innovative and entrepreneurial team are basically in the second year and above, with a certain professional skill. Students can fully participate in the innovative and entrepreneurial team, and have a full understanding on the cultivation goals of emerging engineer such as new technology and new form of industry. By training of the actual projects of the innovative and entrepreneurial teams, students can further improve their professional skills, innovative skills as well as development and practice ability, realizing the goal of high order cultivation of innovative and practical ability.

IV. CONCLUSION

In virtue of the space advantage of Chenglong Valley B area, Incubation Park is divided into three service zones including the second classroom, discipline competition, as well as innovative and entrepreneurial team, providing a cultivation platform of innovative and practical ability at three levels from primary to senior, and constructing the cultivation mode of innovative and practical ability of multiple parties participating including the work-based teachers, full-time teachers, as well as off-campus enterprises. By students' propaganda model role, it drives more students to recognize and participate in the innovation practice, so as to further expand the effect of the cultivation of innovative and practical ability of Incubation Park.

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