

Innovative & Entrepreneurial Ability Training of Students Majored in Mechatronic Engineering under the Emerging Engineering Education

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Abstract—Emerging engineering education requires engineering colleges to explore the innovative & entrepreneurial education mode and strengthen the innovative & entrepreneurial education to engineering college students. To address the poor adaptation of innovative & entrepreneurial ability of engineering college students to actual social demands, this paper practiced innovative & entrepreneurial ability training of students majored in mechatronic engineering, and improved their participation enthusiasm, teamwork ability and employment competition by combining the Witkey mode.

Keywords—*emerging engineering education; mechatronic engineering; innovative & entrepreneurial ability; Witkey mode*

I. INTRODUCTION

Recently, China's higher education of engineering has achieved significant progresses in education quality, comprehensive development of students, entrepreneurial ability and employment of graduates, and service for the national modernization construction. Nevertheless, practice shortage and teachers' poor consciousness and ability in engineering education often bring difficulties to the reform and development of engineering education. Hence, China's engineering colleges respond to the national strategic demands and are constructing emerging engineering education [1]. Emerging engineering education requires engineering colleges to explore the innovative & entrepreneurial education mode, strengthen innovative & entrepreneurial education to engineering college students, probe more modernized application courses, and train engineering technicians with innovation capability [2,3].

Witkey mode is the knowledge transaction platform that solves problems of users through the reward mechanism [2]. It is composed of knowledge requestors (enterprises), knowledge suppliers (Witkey) and market manager (websites) [4]. Introducing the Witkey mode into the innovative & entrepreneurial ability training has some advantages: (1) the practice teaching contents are extended by the direction matching between the Witkey platform and the market

demands as well as the timeliness of Witkey task. (2) It drives students to participate in practice activities by authenticity of Witkey task and reduce difficulties in students' entrepreneurial ability.

In this paper, the Witkey mode is introduced into the project-driven teaching method to support teaching, learning and practice integration and support the innovative & entrepreneurial training of students according to market demands.

II. INNOVATIVE & ENTREPRENEURIAL ABILITY TRAINING MODE OF THE STUDENTS

The innovative & entrepreneurial training mode of the students is shown in Fig.1. Some parts are introduced as follows.

(1) Students' innovation team: this team is formed by students under the organization of teachers. Students form studios and each studio accepts projects or tender Witkey tasks according to their characteristics. Students are grouped by interests and each tutor is responsible for one group of students. Each group of students accepts project tasks or tender Witkey tasks according to their characteristics. It emphasizes that tutor guides students in innovation and entrepreneurial training in projects.

(2) Project-driven innovation training: innovative & entrepreneurial training courses are set to train students' innovation ability in classrooms. In course teaching, project-driven teaching is applied. Real tasks on the Witkey platform are reconstructed into actual innovation projects and assigned to different students' innovation teams.

(3) Task-driven entrepreneurial practice: students are organized to undertake the real enterprise demand projects through the Witkey platform in extracurricular practices. Teachers and students shall cooperate in project bidding, tendering, summarization and improving students' entrepreneurial ability based on authenticity of Witkey tasks.

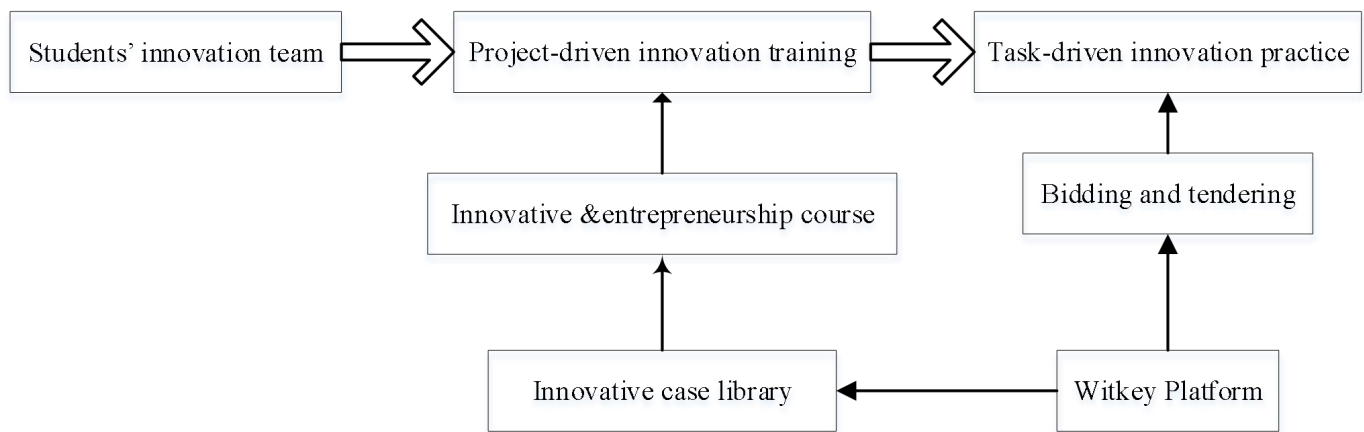


Fig. 1. Innovative & entrepreneurial ability training mode of the students

III. APPLICATION PRACTICES

A. Construction of Witkey platform

The aerospace yunwang Hengli mold cloud special area (<http://muju.casicloud.com/>), which belongs to the INDICS platform (<http://intl.indics.com/>), is the internet platform of cloud zone orienting to the mould industry and it is constructed and managed by Dongwan Hengli Mould Industrial Development Co., Ltd. It serves for supply and demand matching in the mechanical mould industry. Enterprises can issue projects on the platform and students' innovation teams could accept projects as an independent user. The project team chooses the aerospace yunwang Hengli mold cloud special area as the Witkey platform. The Witkey platform was constructed with reference to our previous researches [5]. The INDICS platform is shown in Fig.2.

B. Construction of the innovative case library

The innovative case library is shown in Fig.3. The innovative case library consists of case projects and practice projects. The Completed Project could be used to train

students' knowledge and the practice projects could be used to train innovation ability of students. The Completed Projects are composed of accomplished Witkey tasks in the cloud zone and teachers can introduce appropriate case projects to students according to needs of courses. For practice projects, teachers could screen real demands of relevant enterprises and guide students to accomplish it.



Fig. 2. The INDICS platform

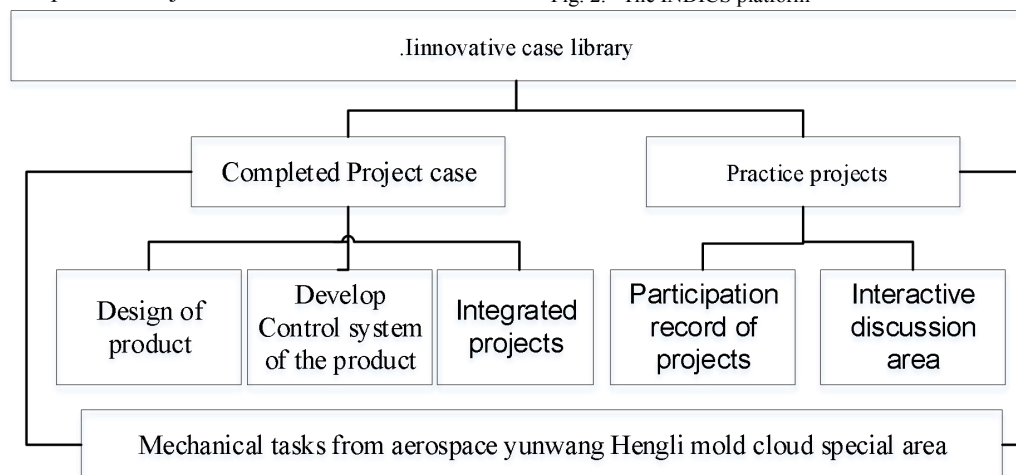


Fig. 3. Innovative & entrepreneurial ability training mode of the students

C. Construction of innovative & entrepreneurial training course

The innovative & entrepreneurial training course requires students to be equipped with essential innovative thinking, ability for independent learning and cooperative learning as well as necessary intellectual property protection ability, comprehend the relationship between entrepreneurial ability and development of professional career, obey to entrepreneurial training laws conscientiously, and devote into entrepreneurial practice positively. The innovative & entrepreneurial training uses the project teaching and cooperative learning.

(1) Project teaching: tutor teaches innovation methods to students through actual cases in the innovation project library, which helps students to be familiar with the whole process and have experiences for them to consult with in future innovation practices.

(2) Cooperative learning: tutor offers actual cases on the Witkey platform. Students design specific project schemes after each group of questions under the guidance of tutors and then implement manufacturing practices.

Students make dissertations to their project schemes and experts are organized to evaluate their schemes. Excellent schemes are selected as feedback of students' learning fruits. The relevant project organizes students' innovation team to apply patents and increase students' enthusiasm. In same time, entrepreneurial tutors are invited to give lessons, so that students acquire a preliminary understanding and thinking on financing, production, management, marketing and risk control in the entrepreneurial process. The Training course is shown in Fig.4, and the production of the training course is shown in Fig.5

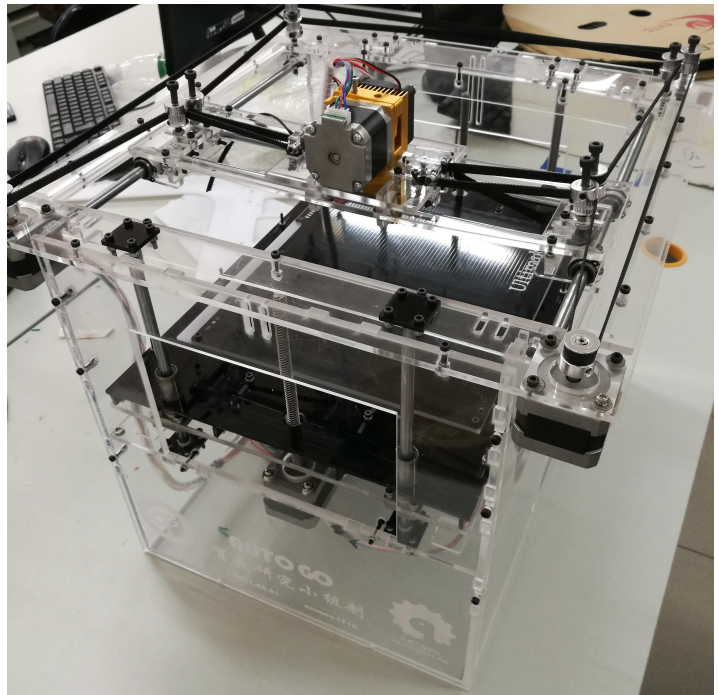


Fig. 5. The production of the training course



Fig. 4. Training course

D. Task-driven entrepreneurial practice

Based on innovation ability training, the students' innovation team participates in the bidding of complicated Witkey tasks according to their interests and professional skills. This is beneficial for students to be close to real entrepreneurship and strengthen their entrepreneurial ability.

IV. CONCLUSIONS

This paper designs a preliminary feasible scheme to innovative & entrepreneurial training of students majored in Mechanical & Electrical engineering department. It provides references for further practices. In future, education practices will be performed based on research fruits in this paper.

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