From Theory to Practice: the Experience of Sichuan Tourism University on Integrating Professional Education with Innovation and Entrepreneurship Education

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Keywords: innovation and entrepreneurship education; professional education; integrate professional education with innovation and entrepreneurship education; education reform; Sichuan Tourism University.

Abstract: Deepening the reform of innovation and entrepreneurship education is the breakthrough point of promoting the comprehensive reform of higher education. How to promote the organic integration of innovation and entrepreneurship education with professional education is a hot and difficult issue in higher education reform. Starting from the necessity and theoretical basis of integrating innovation and entrepreneurship education with professional education, and combining with the experiences of Sichuan Tourism University in the integration curriculum establishment, teacher training, model curriculum construction and practical activities, this paper analyzes methods which integrate innovation and entrepreneurship education with professional education in colleges and universities from theory to practice.

1. Introduction

The training mode of integrating professional education with innovative and entrepreneurship education is the most obvious theme in the undergraduate curriculum reform in European and American universities nowadays. [1] It integrates concepts, knowledge and skills of entrepreneurship into the process of imparting professional knowledge, so as to cultivate college students to become composite and innovative talents with both professional knowledge and certain entrepreneurial ability. [2] In May 2010, the Ministry of Education of China issued Opinions on Vigorously Promoting the Innovation and Entrepreneurship Education in Colleges and Universities as well as the Self-employment of College Students, and clearly put forward that “the setting of innovation and entrepreneurship courses should be organically integrated with the professional curriculum system”. The No. 36 document of the General Office of the State Council in 2015, Opinions on the Implementation of Deepening the Reform of Innovation and Entrepreneurship Education in Colleges and Universities (hereinafter referred to as Opinions for Implementation) further requires colleges and universities to promote the organic integration of professional education with innovation and entrepreneurship education, adjust professional curriculum settings, explore and enrich the innovation and entrepreneurship education resources of various professional courses, and strengthen the innovation and entrepreneurship education in the process of imparting professional knowledge.

Deepening the reform of innovation and entrepreneurship education is the breakthrough point to promote the comprehensive reform of higher education. How to comprehensively promote the deep integration of innovation and entrepreneurship education with professional education on the basis of features of different majors, is a hot and difficult point in higher education reform. Based on the practical experience of Sichuan Tourism University, this paper explores methods of integration from the perspectives of necessity, theoretical basis and further reform ideas.

  DOI: 10.25236/icrtpe.2019.135

2. The Necessity of Integrating Professional Education with Innovation and Entrepreneurship Education

Professional education refers to the process of cultivating students' abilities to engage in a certain occupation in the future. The subdivision of professional education in universities and the specificity of training objectives originate from the reflection of the “standardization, reproducibility, mass production and quality control” characteristics of western industrialized era on the education field. In the era of VUCA, the driving force of social and economic development no longer depends on the increasing number of production factors, but on the large number of creative and personalized talents. The Outline of the National Mid-and Long-term Talent Development Plan (2010-2020) points out that the gap between China and developed countries is mainly manifested in the lack of high-level innovative talents.

Imparting necessary professional knowledge and skills is not the only purpose of university education. Colleges and universities also need to help students understand the world they live in more profoundly, and tell them how to use their knowledge and skills to change the world and make contributions to the development of society while realizing their self-value. [3] Therefore, the cultivation and training of the innovative thinking ability is of great significance in professional education. Colleges and universities in our country take the cultivation of innovative and entrepreneurial ability and innovative thinking as training objectives in all specialties. Sichuan Tourism University has also established the principle of “focusing on training applied talents who can learn fast and have solid theoretical foundation, as well as strong growth potential and strong innovation abilities. “

3. The Theoretical Basis of Integrating Professional Education with Innovation and Entrepreneurship Education

3.1 The Triple Helix Theory

In 1995, American sociologists Henry Etzkowitz and Loet Leydesdorf first used the “triple helix” model to explain the relationship among universities, enterprises and the government. [4] The Triple Helix Theory emphasizes the cooperation among the government, enterprises and universities; the tripartite interaction forms a spiral upward driving force to jointly promote innovation and development. [5]

Under the framework of the triple helix theory, the motive force for the development of innovation and entrepreneurship education includes universities, enterprises and governments, thus forming three development forces: the academic chain formed by universities and other knowledge production institutions, the production chain formed by enterprises and investment factors, and the administrative chain formed by the local government and its subordinate organizations. The motive force of the triple helix of innovation and entrepreneurship education and its flow elements are shown in Figure 1. The three main innovators maintain their unique functions and roles and form an innovative environment conducive to knowledge production and transformation.

3.2 The Experiential Learning Theory

Dewey put forward the theory of experiential learning, advocating that the growth and transformation of experience are the basis of education. “Learning by doing” means “learning from activities”, “learning from experience” and learning through solving problems. First, learners are faced with some practical difficult situations. They need to analyze the question through reflective thinking, put forward possible solutions, use reasons to speculate on various hypotheses, and take actions in the reality check. [7] This kind of exploratory learning not only puts forward solutions to problems, but also discovers various relationships implied in the problem and provides a deeper understanding on the problem situation.

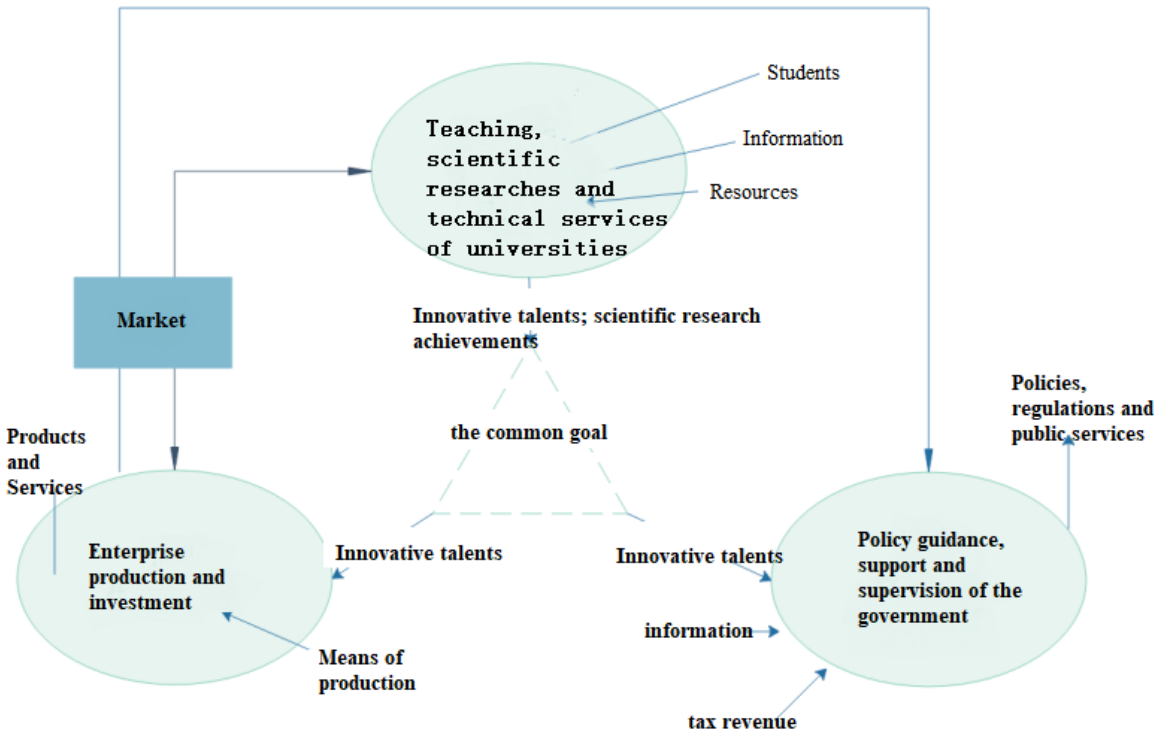

Figure 1. Triple Helix Theory of Innovative and Entrepreneurship Education [6]

3.3 The CDIO engineering education model

The CDIO engineering education model is the latest achievement of international engineering education reform in recent years. CDIO represents Conceive, Design, Implement and Operate. It takes the life cycle from product development to product operation as the carrier, and enables students to organically link project practice with theoretical courses. [8] It presents the teaching contents in the form of problems and projects, and then presents students with innovative methods through problem solving and hands-on practice. The CDIO talent cultivation thinking has two cores. The first is project-centered education and learning. The second is to emphasize innovation and practice, as well as the knowledge application and ability cultivation of learning by doing. [9]

4. The Experience of Sichuan Tourism University on Integrating Professional Education with Innovation and Entrepreneurship Education

4.1 Establishment of the integration course system

Sichuan Tourism University has set up a group of innovation and entrepreneurship courses in the existing professional training program. Students must take eight credits (128 hours) in the course group before they graduate. The course group consists of general courses of innovation and entrepreneurship with six credits and integration courses with two credits.

Among them, courses on the integration of professional education with innovation and entrepreneurial education are designed based on the professional background of each subject, and developed on the basis of combining industry, education and research. The school offers innovation and entrepreneurship courses with industry characteristics (including practical courses), such as professional courses, courses of subject frontiers and courses on research methods which are closely related to innovation, entrepreneurship and employment, as well as innovation courses and practical activities which can improve students' comprehensive practical abilities. The innovation and entrepreneurship education is integrated into the professional education. The Sichuan Tourism University combines the new curriculum with the old one by offering new courses and reforming the old ones.

Table 1. Innovation and Entrepreneurship Courses of Sichuan Tourism University

No.	Type of course	Name of course	Credits and hours	The organizational form
1	Compulsory general education course	Innovation and entrepreneurship education for college students	2 credits, 32 hours	Set up by the university
2	Compulsory general education course	Career development and employment guidance for college students (1)	1 credit, 16 hours	Set up by the university
3	Compulsory general education course	Career development and employment guidance for college students (2)	1 credit, 16 hours	Set up by the university
4	Elective general education course	The school sets up an innovation and entrepreneurship course template in the existing platform for elective general education courses; students shall choose at least one course to study	2 credits, 32 hours	Set up by the university
5	Professional compulsory courses or Professional elective courses	The name is determined by each college	2 credits, 32 hours	(1) within the professional compulsory courses, 2 credits of integration courses can be offered through construction or transformation; Or (2) in professional elective courses, the school offers multiple integration courses, and students shall choose at least 2 credits of elective courses.

Table 2. Innovation and Entrepreneurship Courses (in Specialty) of Sichuan Tourism University

major	the type of course	The name of course
Leisure Sports	Professional compulsory courses	Sports research methods; Sports event planning
	Professional elective courses	Management of natatorium and event planning; Badminton event planning; Sports events and leisure sports planning
Industrial Design	Professional compulsory courses	Design thinking and expression; User experience design; Product development and design
	Professional elective courses	Product packaging design; Tourism catering supplies design; Product improvement design; Tourism product interface design; Design of tourist facilities; Tourism features design; Product semantic design; Travel accessories design
Digital Media Technology	Professional compulsory courses	Computer game programming; Game development; Object-oriented programming; Scene design and performance; Game architecture design
	Professional elective courses	Planning, design and practice of digital scenic spot; Script and shooting design; Design and practice of TV program packaging;
Architecture Electric and Intelligent Engineering	Professional compulsory courses	Electrical control and PLC application design; Intelligent building electrical engineering design; network planning and design; Planning and design of intelligent community; Intelligent building system integration project design
Food Science and Engineering	Professional compulsory courses	Food plant design
	Professional elective courses	Engineering drawing and CAD design; Central kitchen design and management; Experimental design and data processing;

Food Quality and Safety	Professional elective courses	Central kitchen design and management; Experimental design and data processing
Cooking and Nutrition Education	Professional compulsory courses	Nutrition recipe and menu design; Food carving and dish decoration; wobble-plate craft
	Professional elective courses	Experimental design and data processing; Cold dish decoration; menu design and innovation; Catering planning and marketing
Landscape Architecture	Professional compulsory courses	Design expression; Garden plant modeling design; Public garden art
	Professional elective courses	Landscape design for agricultural leisure resort; Square landscape design; Development and management of scenic spots; Urban road landscape design; Scenic area planning and design; Residential landscape design; Urban waterfront landscape design; Planning for urban and rural land use; Protection and development of tourism resources; Urban theme park landscape design;
Information Management and System	Professional compulsory courses	Static web design and production; Information system analysis and design
Logistics Engineering	Professional elective courses	Logistics marketing and planning
	Professional practice session	Logistics center design and equipment configuration
Accounting	Professional elective courses	ERP sand Table simulation; Internet entrepreneurship
Management of Cultural Industry	Professional elective courses	Advertising creation and planning; Planning and management of festival activities; Tourism product creation and design
	Professional practice session	Research and analysis of cultural industry; Copywriting for cultural tourism projects; Market research and analysis of cultural tourism projects; Cultural tourism product design and development; Cultural tourism project activity planning and operation
Hotel Management	Professional elective courses	Hotel brand innovation and leadership management; Catering enterprise planning and design
Tourism Management	Professional compulsory courses	Tourism planning and development
	Professional elective courses	Festival activity planning and management
	Professional practice session	Design of special tourism activities; Planning of large-scale tourism projects
Exhibition Economy and Management	Professional compulsory courses	Display space design; Exhibition project planning and management; Festival activity planning and management
	Professional elective courses	Marketing communication planning; Planning and management of sports activities
	Professional practice session	Exhibition space design; Large-scale exhibition planning
Environment Design	Professional compulsory courses	Design thinking and methods; Visual communication design; Lighting design; Installation art
	Professional elective courses	Catering space design; Leisure and entertainment space design; Display design; Hotel design; Rural residential design; Urban housing design; Villa design; Landscape planning; Landscape facility design; Plant design; Public landscape design; Tourism landscape design

4.2 Teacher training for the integration education

Teachers are the most active element in the innovation and entrepreneurship education. Both general education teachers and professional teachers should enhance their innovative ability as well

as the ability of innovative and entrepreneurial education. Another powerful way to strengthen the integration of curriculum is to require every teacher to have the ability of combining innovate and entrepreneurship education with professional courses.

Based on the experiential learning theory and the CDIO engineering education model, Sichuan Tourism University actively initiates relevant training, advocates professional teachers to become innovative and entrepreneurial educators, and improves the teaching ability of professional teachers. Through training, teachers of professional courses have established the consciousness of integrating professional education with innovation and entrepreneurial education, and reformed the original professional courses with ideas and methods of innovation and entrepreneurship education. They have achieved the goal of integration education through changing the internal structure of professional courses.

4.3 Construction of model courses on integration education

The Sichuan Tourism University integrates professional, innovation and entrepreneurial education through the construction of model courses in the whole school. Through setting up the teaching reform program, pilot projects on curriculum-based integration are constructed in the whole school. The school provides financial supports to these projects. The model course on education integration includes online courses as well as online and offline integrated courses. Through the construction of high-quality courses and the establishment of typical examples, our school gradually explores a path suitable for features of the school, and gradually builds a set of model courses from the provincial level, the university level and the department level.

The design of model courses follows the five-step teaching method, which enables students to display creativity in the classroom. The classroom management becomes the process management of innovative research. Specifically, the five-step teaching method goes as following. The first step is to construct situations and set up questions, which come from industries and realistic problems. The second step is to carry out collaborative discussions. Both professional tutors and industry tutors are invited; classroom learning is combined with extra-curricular research. This step also includes deepened group communication and discussion. The third step is to guide knowledge construction and put forward to new questions. The fourth step is to test the ability of knowledge transformation, combine problem-oriented with project-oriented. The fifth step is to organize reflection and promote the internalization of knowledge. In the process of reflection, attention should be paid to the connection between employment, specialty, life and innovation.

4.4 Extracurricular innovative practice

The broad-sense integration education includes all kinds of educational activities which aim to cultivate students' innovative ability in professional education, including practical teaching, professional practices, the graduation design, internship, subject competitions, the integration of production and education, national innovation projects, Internet + contests at all levels, laboratory practice, independent experimental links, and students' participation in teachers' research projects.

The Sichuan Tourism University sets up an extra-curricular module on innovation and practice sessions to encourage students to carry out scientific researches, invention and creation, and take part in subject competitions, quality development, as well as innovation and entrepreneurship activities, so as to cultivate students' innovative spirit, practical abilities and the sense of social responsibility, and improve their comprehensive quality. The school stipulates that students must obtain at least four credits in extra-curricular innovative practice during their four-year stay in school in order to meet the graduation requirements.

4.5 Integration of professional education with innovation and entrepreneurial education; the combination of production and education

Scientific research and social service are the functions of universities. Promoting the ability of scientific and technological innovation is the basis for the connotative development of schools and the overall improvement of the school running quality. Based on the Triple Helix Theory, the Sichuan Tourism University has implemented the “Sichuan Tourism University Project 11123”.

The project means, each major in the school should establish relationship with at least one local government, so as to improve the contribution rates to the adjustment of local industrial structure as well as the transformation and upgrading of economic society; each major should establish financial relationship with at least one industry association and construct a shared personnel recruitment mechanism with industries, enterprises and practical departments; each major should establish relationship with at least one scientific research institute to construct a collaboration mechanism with science and education integration as well as mutual promotion, so as to promote the of "Double First-Class initiative". Each major should establish communication and cooperation platforms with at least two types of institutions at home and abroad (non-application, well-known undergraduate schools and application-oriented undergraduate institutions) to carry out interactive teaching and scientific research activities mechanism, so as to realize the connotative development of applied undergraduate education. Each major should cooperate with at least three types of enterprises at home and abroad (high-end enterprises in domestic and foreign industries, enterprises in the "West Triangle" region and alumni enterprises), responding to the needs of enterprise transformation and upgrading, dynamically adjusting school curriculum system and optimizing the allocation of teachers; Emphasis should be placed on the cultivation of practical ability as well as innovation and entrepreneurship ability.

The Sichuan Tourism University has now integrated high-quality educational resources of 110 units, constructed a comprehensive and diversified cooperative education mechanism, so that the professional teaching and personnel training can serve local economic construction and social development, and improve students' professional qualities, innovation and entrepreneurship abilities as well as personal development potentials. These measures can also strengthen the foundation of school running, optimize professional teaching environment and teaching conditions, improve teachers' professional levels and develop their abilities.

5. Further Reflections on Promoting the Integration of Professional Education with Innovation and Entrepreneurship Education

5.1 Course development

In the Opinions on Implementation, it is clearly put forward that we should tap and enrich the resources of innovative entrepreneurship education in various professional courses. This shows that there are a lot of innovative and entrepreneurial resources in professional courses, which can be exploited and utilized. The innovative resources in professional courses are the entrance and carrier of integration. These resources are not only teaching materials in class, but also the contents and cases for lectures and discussion. They can also stimulate students' motivation on professional learning.

Specifically, we can study pioneers and innovators in the specialty, analyze the cases and find out their spirit embodied in deeds and actions, such as the innovative process and innovation of famous scientists and inventors; we can study cases of professional innovation, summarize the rules and characteristics of innovation, especially focus on the study of major and subversive innovation and innovative ideas in the industry. The innovative thinking and innovative methods in the specialty can also be studied.

These resources should be processed according to the clues of innovative thinking and methods. After processing, they can be expressed as textbooks, videos or sharing websites on the case analysis of professional innovation and entrepreneurship, and the analysis of innovative achievements and the methods of professional innovators. Professional innovation resources can be integrated as a case, as a chapter, as a method, as a research topic, or as a challenging question.

5.2 Integrating innovation and entrepreneurship teaching methods into professional education

Traditional professional education in China emphasizes knowledge imparting and neglects ability training. Teachers impart knowledge from textbooks in class. Even in experimental teaching,

most of them are confirmatory experiments, rather than pioneering ones. Therefore, the integration of teaching methods is more important. The integration of teaching methods means changing the traditional professional teaching mode which emphasizes knowledge imparting and neglects ability cultivation. It initiates the classroom revolution which emphasizes application and entrepreneurship, and creates a new teaching mode with the main objectives of training professional innovative thinking and cultivating students' entrepreneurship ability.

Generally speaking, the innovation and entrepreneurship education has following methods: problem-based learning (PBL) or project-based learning (PBL), task-based learning, inquiry-based teaching, guidance-based teaching, discovery-based teaching, group-based learning, workshops, “learning by doing”, DIY (Do It Yourself) and five-step teaching method. These innovative and practical teaching methods should be widely used in the teaching of specialized courses.

5.3 Ecological construction for the integration of innovation, entrepreneurship and professional education

All colleges and universities should form the standards of integrating innovation, entrepreneurship and professional education, as well as the systems and mechanisms of incentive, organization and management, and then generalize the experience to all disciplines and majors of the school to achieve the goal of integration.

The ecological construction means to form an atmosphere of comprehensive integration. Every teacher should have the sense of “being responsible for the terminal products”. They need to cooperate tacitly in all aspects of education and achieve “integration”, rather than simply “addition” independently. It requires to give full play to the role of professional teachers, university counselors, professional laboratories and school management agencies. The school needs to establish an ecological system that integrates innovation and entrepreneurship education with professional education at the university level. On this basis, it is needed to form a team of innovative and entrepreneurship tutors at the two levels of colleges and departments, increase the proportion of innovation and entrepreneurship research in the assessment of professional teachers, and encourage professional teachers to cooperate in entrepreneurship.

6. Conclusion

The report of the Nineteenth National Congress of the Communist Party of China points out that innovation is the first driving force leading development. The cultivation of innovative ability has always been an important task of higher education. The integration of innovation and entrepreneurship education into professional education is the national requirement and the development trend of higher education in the world. However, universities and professional teachers are facing problems in integration methods. Many teachers are professional but lack of innovation and entrepreneurship abilities. The integration construction is a breakthrough of teaching reform and a powerful way in “golden courses” construction. It also needs a process of gradual exploration, improvement and popularization.

There are many kinds of specialties with different characteristics in colleges and universities. Different majors have their own features; there are no unified modes for integration education. Some majors lay particular emphasis on the foundation and others on the industry. Therefore, it is necessary to explore diversified methods for the integration of innovation, entrepreneurship and professional education for different majors.

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