Exploring how to develop innovation and entrepreneurship syllabuses in universities in Guangdong in the age of "Internet +"

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Abstract: **In the age of "Internet +", the innovation and entrepreneurship syllabus provides a vital framework for innovation and entrepreneurship training at universities. To integrate course resources, optimize the innovation and entrepreneurship syllabuses and create an informatized training platform are the major directions for reforms of innovation and entrepreneurship education in universities. This paper concludes the experience of American universities in developing innovation and entrepreneurship syllabuses, analyzed the problems that universities in Guangdong have met in developing these syllabuses, such as absence of an overall plan, detachment between innovation and entrepreneurship education and specialty training, lack of experience among the teachers, to name a few. To develop innovation and entrepreneurship syllabuses, universities in Guangdong can make efforts in the following aspects: to conduct overall planning in a top-down manner and provide favorable policies; to develop online course platforms to improve the quality of informatized education; to develop a layered and comprehensive syllabus for innovation and entrepreneurship education; to develop a faculty of "triple-competent teachers" to improve the quality of teaching; to connect to major national development strategies, integrate resources in and out of the universities and improve the quality of courses. Establishing innovation and entrepreneurship syllabuses in universities in Guangdong will provide talents needed to boost the advancement of the Guangdong- Hong Kong- Macau Greater Bay Area and the Belt and Road Initiative.**

Keywords: Internet+; University; Innovation and entrepreneurship syllabus; Development ways; Informatized platform

I. Introduction

Innovation and entrepreneurship syllabuses are important developing blocks of innovation and entrepreneurship education. Ideally located in the education demonstration zone of the Guangdong-Hong Kong-Macau Greater Bay Area, universities in Guangdong are fully engaged to develop innovation and entrepreneurship education. Specifically, they are planning to integrate course resources, optimizing syllabuses and developing informatized platforms to explore how to establish innovation and entrepreneurship syllabuses, advancing innovation-driven education reforms and provide talents for the development of the Greater Bay Area and the Belt and Road Initiative.

II. Experience from American universities in establishing innovation and entrepreneurship syllabuses

American universities have incorporated innovation and entrepreneurship education to all-round education and life-long education. To be specific, they made a point of all-round development of students, established thorough, systemized and modularized cross-disciplinary education models, and incorporated innovation and entrepreneurship training into college education of students in different grades and different majors. They embrace the idea of "practice-oriented and theory-guided" training and advocate a "behavior-oriented and experience-guided" teaching model. Exploratory teaching and research-oriented learning have achieved good performance in entrepreneurship classes in America.

Martin Trust Center for MIT Entrepreneurship in America, by cutting across boundaries between subjects and majors, have established close partnership with schools, labs, engineering institutes and enterprises, launched diverse startup plans, and developed a unique entrepreneurship training syllabus that consists of four major modules: Fundamentals of Innovation and Entrepreneurship, Innovative and Entrepreneurial Skills, Guidelines to Industries, and Electives. Among the diverse innovation and entrepreneurship events and contests it has organized are The Bernard M. Gordon-MIT Engineering Leadership Program (Gordon ELP), Hacking Medicine, Global Founders' Skills Accelerator, Innovation and Entrepreneurship Bootcamp, MAKEMIT, etc. [1].

Entrepreneurship education in Stanford University, however, puts more emphasis on theories and incorporates the features of different subjects. It emphasizes teaching of theories on finance, management, market, capital and risks that are involved in entrepreneurial initiatives, and establishes a syllabus that covers different modules including economics, law, management, sociology and psychology [2]. The entrepreneurship education framework Stanford develops consists of entrepreneurship courses, extracurricular activities, and entrepreneurship education organization and resources, with courses divided into four categories, i.e. product-oriented courses, case-oriented courses, focus courses and lectures [3].

Babson College, a global leader in entrepreneurship training, provides modules that cover the whole process of

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entrepreneurship from inception, development to management and achievement. The modules include a basic module of "general entrepreneurship skills", a specialty module of "entrepreneurship in your specialty" and a supportive module of "in-depth exploration". Cornell University provides nine modules for the three stages of entrepreneurship – preparation, startup and enterprise management, and develops an "incremental" model for entrepreneurship education [2].

III. Current situation and problems in innovation and entrepreneurship syllabuses in universities

Boosted by national policies to advance innovation and entrepreneurship education in China, universities across the nation are making efforts to reform innovation and entrepreneurship training, making breakthroughs in different aspects and developing more in the depth. The popular modes of innovation and entrepreneurship education in China include the theoretical course-dominated mode, practice course-dominated mode and the comprehensive mode. In accordance with the government's endeavor to "Develop Demonstration Universities for Innovation and Entrepreneurship Education in Guangdong", the "Standards for Developing Demonstration Universities for Innovation and Entrepreneurship Education in Guangdong (Pilot)", and the "Climbing" Plan, universities in Guangdong have been advancing reforms for innovation and entrepreneurship training, and have established an efficient and practice-oriented syllabus [4]. Despite these achievements, problems remain: uniform and overall planning is absent, innovation and entrepreneurship education and specialty training are separated, and teachers are short of experience, etc.

A. Lack of uniform and overall planning and insufficient informatization

There is no specific organization set up to take charge of innovation and entrepreneurship education in universities. Innovation and entrepreneurship training in universities in China largely relies on student societies and the career service centers. Specific organizations like Martin Trust Center at MIT set up specifically to organize innovation and entrepreneurship events and courses are still not available in China now. As a result, uniform and overall planning of innovation and entrepreneurship education in Chinese universities is absent. Though most universities in Guangdong have set up schools of innovation and entrepreneurship, what realm this subject belongs to is not identified, the courses are not scientifically designed, and the training objectives are not clear. Besides, as universities give more weight to practical issues like whether an entrepreneurial idea is actualized, whether it achieves success and how startup initiatives can boost the students' employment, the courses provided can only meet the students' "practical" needs. Moreover, innovation and entrepreneurship courses are provided as general electives in universities and most are delivered online. These courses are not incorporated into the curriculum [5] and the scores that students obtain in these courses are not counted into the university's grade point calculation system. As universities still divide students into different subjects, innovation and entrepreneurship training cannot follow a uniform curriculum or cover the whole process of innovation or entrepreneurship initiatives. Consequently, innovation and entrepreneurship education falls short of popularity and professionalism. Universities in China are still facing a spate of problems in establishing innovation and entrepreneurship syllabuses, such as insufficient informatization functions, inefficient informatization management, and lack of informatized assessment methods [6]. On top of these, without a real-time tracking system for these courses, it is difficult for universities to assess the effect and make adjustments to serve regional economic needs.

B. Separation between innovation and entrepreneurship education and specialty training as well as lack of assessment and feedback

The innovation and entrepreneurship courses offered by universities in Guangdong currently are few, in want of popularity and professionalism. The innovation and entrepreneurship education in China is detached from specialty training, and there is no syllabus as offered by MIT that integrates different specialties and covers all steps from inception of ideas to marketization in startup initiatives. Design of innovation and entrepreneurship courses in Chinese universities is subject to independent decisions of universities. Some universities in Guangdong set the Innovation and Entrepreneurship Courses as a required course for all students, while other entrepreneurship courses are provided as general electives. Some universities provide innovation and entrepreneurship courses on MOOC, online course platforms or their own course teaching websites. Though most universities are active in introducing innovation and entrepreneurship courses from famous universities abroad, they fail to incorporate these courses into discipline development plans. In want of more diversified teaching methods, these courses often equip students with fundamentals of innovation and entrepreneurship, without training their skills in business management. As a result, the success rate of students' entrepreneurial initiatives turns out low.

Another problem is the lack of feedback on the effect of innovation and entrepreneurship courses. Due to universities' obsession with the number of entrepreneurship programs and the volume of investment these programs draw, innovation and entrepreneurship courses fail to enhance the students' sense of innovation and entrepreneurship. Universities should conduct satisfaction surveys on innovation and entrepreneurship courses, modify the syllabuses accordingly, and develop courses that serve the purpose of regional economic growth and accord with the university's characteristics so as to increase students' entrepreneurial programs and their success rate [4]. In addition, the innovation and entrepreneurship courses that universities in Guangdong provide do not match the needs of industries in the Greater Bay Area. Though those courses are for all students, the supply and the demand do not match, which is likely to dampen the students' ambition for innovation or startups.

C. Lack of teaching experience and monotonous teaching methods

Despite the fact that most universities in Guangdong have set up a school of innovation and entrepreneurship, the lack of lifelong-tenure vacancies for teachers at universities leads to a shortage of a stable and professional faculty. Teachers for innovation and entrepreneurship education in universities principally consist of professional teachers, student counsellors

and innovation and entrepreneurship advisors. Every year, these teachers are grouped in teams to prepare courseware, but the team-developing effort falls short of the ideal. In general cases, the school of innovation and entrepreneurship takes the lead or other schools take their own measures to carry out innovation and entrepreneurship training, but the innovation and entrepreneurship courses, divided by topics and modules, do not ensure continuity and fail to incorporate knowledge of different majors. Though the students can improve their skills in innovation and entrepreneurship in class, teachers cannot provide practical guidance due to lack of first-hand experience. As a result, these courses fail to stimulate the students' desire for innovation and entrepreneurship, the entrepreneurial ideas and programs are not scientific and show no market potential, thus unable to stand market challenges and leading to a low success rate of entrepreneurship [7]. The teaching skills of teachers for innovation and entrepreneurship courses are monotonous and cannot suit the needs for the whole process of startups. As a result, most courses are theoretical and far removed from industrial practice. On the other hand, initiatives to develop a faculty of teachers for innovation and entrepreneurship education usually fail to achieve the expected effect as universities do not conduct surveys on the demand for these teachers, identify the list of training content and take measures to improve the teachers' expertise.

IV. Ways to develop innovation and entrepreneurship syllabuses in universities

In order to build an innovation and entrepreneurship ecosystem, universities should make full use of both internal and external resources when establishing their innovation and entrepreneurship syllabuses. By introducing a system of courses consisting of general education courses, specialty courses and practice courses, universities can solidify the students' foundation for innovation and entrepreneurship knowledge and skills; meanwhile, by introducing extension classes consisting of startup programs and entrepreneurship training, universities can engage social forces including the government, enterprises, research institutes and other organizations in their initiatives to develop an innovation and entrepreneurship syllabus, working together to provide more talents for the Greater Bay Area [8].

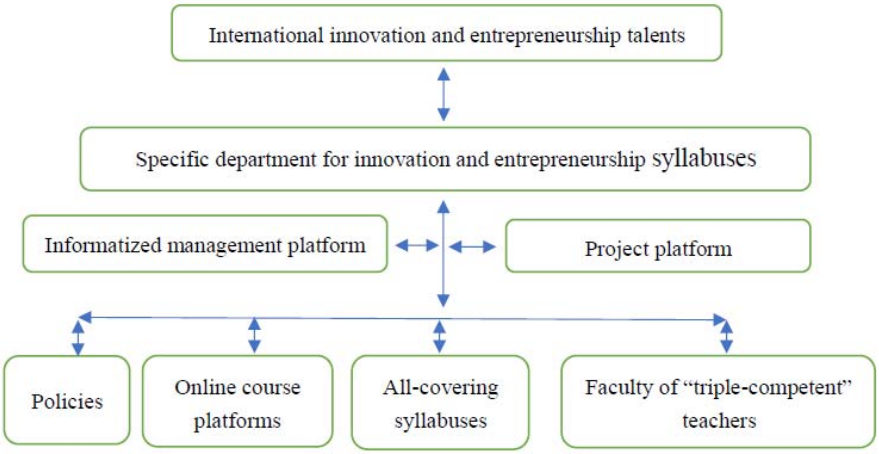

Figure 1. Ways to develop innovation and entrepreneurship syllabuses in universities in Guangdong

A. Overall planning in a top-down manner to provide supportive policies

Universities should conduct overall planning for innovation and entrepreneurship education, founding a specific department to realize systematic and strategic management [9]. The department should take charge of all issues regarding the innovation and entrepreneurship courses, design a unique syllabus and train talents with a global vision. The department should aim to materialize ideas, convert inventions to products, encourage breaking boundaries between subjects, and cooperate closely with other departments; it should also identify talent training plans and course reform objectives, design annual training plans, develop a syllabus that meets the needs of all students and covers the whole process of entrepreneurship. It should establish a grading system to incorporate the scores for innovation and entrepreneurship courses into the performance appraisal system. A flexible grading system should be introduced to allow students to leave school temporarily for their startup initiatives and establish specifications to switch achievements in startup initiatives into academic scores so as to encourage the students' enthusiasm for entrepreneurship. A layered incentive system should also be introduced. Specifically, incentive policies in favor of entrepreneurial initiatives should be introduced to direct teachers and students to innovation and entrepreneurship education, thus creating a favorable atmosphere of "entrepreneurial culture" on campus [2]. Multiple channels of investment from the government and alumni should be ensured to support research on innovation and entrepreneurship syllabuses and improve the education quality based on research results.

B. Developing online course platforms and improving quality of informatized education

With the development of "Internet +", big data and cloud computing technologies, universities should increase investment into informatization and create high-quality online teaching platforms for innovation and entrepreneurship courses. An informatized management group should be organized under the innovation and entrepreneurship education management

department to advance the development of an informatized syllabus, and develop an online course platform to realize real-time sharing of quality courses. It should also train the teachers' skills for online teaching, inspire the teachers' creativity and improve their recognition of online education. Online platforms built on the basis of cloud computing should be fully utilized to provide micro-classes, MOOC courses and crash creativity courses, develop exploratory and collaborative teaching models to improve educational quality. Internet technologies should be used to develop sharing classes, simulate real-world entrepreneurial environment, and share entrepreneurial experience online so that students can take online courses in light of their specific needs. An elaborate grading and appraisal system for innovation and entrepreneurship courses should be established to make up for the current vacuum in this regard and develop a syllabus to train innovation and entrepreneurship talents with a global vision. Universities should learn from quality courses abroad to develop an innovation and entrepreneurship syllabus in cooperation with each other. For instance, MIT and Harvard has jointly launched edX, an online course platform, to provide quality courses for entrepreneurs across the globe [1].

Informatized management of innovation and entrepreneurship courses should be optimized, a long-term course appraisal system should be established and teaching appraisal metrics should be identified. On the online course platform, universities can enhance teacher-student and inter-student communication, conduct online assessment of assignments, realize real-time and follow-up management of innovation and entrepreneurship courses to make timely adjustment and orient the courses to real-world needs [6].

C. Developing a layered and all-covering innovation and entrepreneurship syllabus

Universities in Guangdong should follow a triple-layered model consisting of "general courses", "specialty courses" and "practice courses" to develop a multi-pronged, layered and domain-specific system of innovation and entrepreneurship courses. Meanwhile, by developing online teaching platforms, universities should develop an informatized and highly practical system of courses that covers the whole cycle of entrepreneurial initiatives from inception of ideas, creation of prototypes to fundraising and founding of startups. With these measures taken, resources can be shared and universities in Guangdong can develop a global innovation and entrepreneurship syllabus.

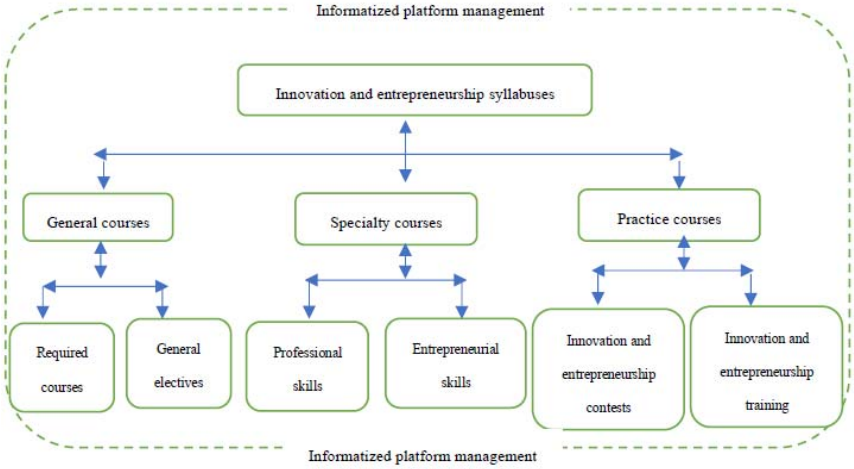

Figure 2. Innovation and entrepreneurship syllabuses in universities in Guangdong

As Figure 2 shows, the syllabuses consist of three modules: general courses, specialty courses and practice courses. The general courses, divided into required courses and electives, are provided throughout the whole process of talent training. These courses introduce the training models of STEM subjects (science, technology, engineering and mathematics) from abroad to train creative talents, inspire them to explore and innovate, and improve their problem-solving skills. Specialty courses provide domain-specific training in combination with innovation and entrepreneurship training for students to improve the students' professional expertise and innovation and entrepreneurial skills. These courses aim to incorporate innovation and entrepreneurship training into professional training to facilitate the students' entrepreneurial initiatives throughout the whole cycle. Practice courses are courses that combine "innovation and entrepreneurship contests" with "entrepreneurial training" to cultivate talents in a "learn-by-doing" model. Universities should take initiatives to organize innovation and entrepreneurship contests in the Greater Bay Area and improve the students' creativity and entrepreneurial skills. Innovation and entrepreneurship training programs that manifest characteristics of universities, such as lectures from entrepreneurs, salons, forums, workshops and innovator and entrepreneur incubators should be organized to allow teachers and students to learn more about the operations and management situations of benchmark enterprises in diverse industries. Universities can develop incubators for innovation and entrepreneurship programs and provide one-stop services for teachers and students to improve their entrepreneurial skills and increase the success rate of entrepreneurship programs [9]. Universities should, in partnership with the government, enterprises and alumni, organize elite training camps, train entrepreneurship teams, and increase the success rate of innovation and entrepreneurship endeavors. In the meantime,

by introducing quality course resources from abroad, universities can develop advanced courses and provide world-class training for students via elite training camps and practice-oriented training programs.

D. Developing a faculty of "triple-competent" teachers and improving their teaching skills

Universities in Guangdong should introduce or develop teams of "triple-competent" teachers (theory-competent, practice-competent, and all-competent). Quality teachers for innovation and entrepreneurship training should not only have good teaching skills, but have experience or qualifications for innovation and entrepreneurship education; otherwise, they are not able to provide effective guidance for the students. In this regard, universities can learn from MIT's "twin-track system" to invite experienced and influential experts or entrepreneurs to give lectures, work together with the university's teaching staff to develop new courses and lectures so as to provide students with both theoretical and practical guidance [1]. Universities in Guangdong can also enter partnership with world-class universities to develop English or bi-lingual innovation and entrepreneurship classes, thus readying students for startup plans abroad [10].

The demand for training of teachers in innovation and entrepreneurship education should also be surveyed to identify the training content. Metrics for qualification of teachers in this regard should be identified. Universities can also organize annual teacher training camps or sponsor innovation and entrepreneurship academic conferences to introduce first-class educational resources. Also, universities can introduce policies like "off-job training" and "flexible service" to allow teachers to take part in industrial practice, learn more about enterprise operations, their structure of positions and managerial systems so as to improve the teachers' teaching expertise.

E. Connecting with national development strategies and integrating resources from different channels to improve courses

Initiatives to develop innovation and entrepreneurship syllabuses in universities should be connected to national development strategies. Universities should utilize resources from the government, enterprises, research institutes and other social organizations, work together with these social forces to reform the innovation and entrepreneurship syllabuses, explore new models that combine innovation and entrepreneurship courses with social development, sharpen the students' creativity and entrepreneurial skills. In this way, universities in Guangdong can provide more talents for the Greater Bay Area and the Belt and Road Initiative.

Author introduction

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