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A Practical Study of Information Technology-Driven Teaching Reform of Innovation and Entrepreneurship in Higher Education -Take Guangxi Normal University as an Example

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Abstract: The teaching reform of innovation and entrepreneurship education in higher education takes information technology as the driving force, promotes the integration of innovation and entrepreneurship education with professional education, makes it run through the whole process of education and talent training, cultivates students' innovative spirit, entrepreneurial consciousness and innovative and entrepreneurial capability, and improves the quality of talent training in universities. This paper carries out an empirical research in Guangxi Normal University from seven aspects, namely, policy formulation, curriculum system, teaching staff, events and activities, practice platforms, cultural environment and students' evaluation, and makes an analysis of the approaches and strategies of integrating information technology with the whole process of innovation and entrepreneurship education in universities. It is revealed that the teaching reform of information technology-driven innovation and entrepreneurship in universities is a systematic project, involving a number of departments and colleges. Collaborative innovation is required to build a good ecology and promote its development as a whole. The implementation of universities' entrepreneurship policies, teaching practice, curriculum teachers and competition activities have a significant impact on university students' entrepreneurial intention. Based on the findings, this paper puts forward the following suggestions for information technology-driven innovation and entrepreneurship education in universities: creating a cultural environment of digital innovation and entrepreneurship, constructing a digital training system for improving university students' entrepreneurial ability, optimizing the support of entrepreneurship policies, enhancing the publicity and implementation of entrepreneurship capital support, etc.

Keywords: Information technology-driven, innovation and entrepreneurship education in higher education, education and teaching

1. Introduction

In 2015, Premier Li Keqiang pointed out in the government work report that "mass entrepreneurship and innovation initiative" should be built as a "double engine" to promote China's economy and be elevated as a national strategy. In May 2015, the General Office of the State Council issued the Implementation Opinions on Deepening the Reform of Innovation and Entrepreneurship Education in Higher Education, which clearly proposed the requirement of comprehensively deepening the reform of innovation and entrepreneurship education in universities and "regard the deepening of reform of innovation and entrepreneurship education in universities as a breakthrough in promoting the comprehensive reform of higher education". Guangxi Normal University actively responded to the call of the state to deepen the reform of innovation and entrepreneurship education, carried out the teaching practice of innovation and entrepreneurship education by categories, established the "1 + X" innovation

and entrepreneurship curriculum system for all undergraduate students, designed and developed online courses and school-based teaching materials, successively opened 18 innovation and entrepreneurship elective courses, optimized teaching resources, conducted teacher training and established a tutor library. It was recognized as the second batch of "model schools for deepening innovation and entrepreneurship education reform" by the Ministry of education. Taking Guangxi Normal University as an example, this research conducted research from seven aspects: policy formulation, curriculum system, teaching staff, event activities, practice platforms, cultural environment and students' evaluation of innovation and entrepreneurship education, so as to understand the teaching approaches and existing problems of the current information technology-driven innovation and entrepreneurship education, and put forward corresponding strategies to further promote the implementation of innovation and entrepreneurship education reform in universities.

2. Research Design

2.1 Questionnaires and Samples

The questionnaire employed in this paper is divided into three parts. The first part elicits the basic background information of university students, including their gender, major, grade, native place, and whether they have participated in any events of innovation and entrepreneurship. The second part is the university students' evaluation of information technology-driven innovation and entrepreneurship courses, including the teaching modes and assessment methods of innovation and entrepreneurship courses. The third part is university students' evaluation of the innovation and entrepreneurship education system, including the diversification of innovation and entrepreneurship courses, the combination of innovation and entrepreneurship courses and professional courses, the teaching of information technology-driven innovation and entrepreneurship courses, teachers with entrepreneurship experience, teachers with teaching experience in entrepreneurship education, the diversification of innovation and entrepreneurship competitions, and integrated entrepreneurship practice services, university students' entrepreneurship center and off-campus practice bases. This study takes the undergraduates of Guangxi Normal University as the research object, adopts the method of stratified sampling and randomly selects 1062 students from 20 colleges, covering all grades and majors of the university, which is relatively representative. There are 238 freshmen (22.48%), 370 sophomores (34.94%), 283 junior students (26.72%) and 168 senior students (15.86%). 447 of them have participated in innovation and entrepreneurship events, accounting for 42.21% of the samples.

2.2 Evaluation of Information Technology-Driven Innovation and Entrepreneurship Curriculum Reform

According to the survey (see Table 1), 78.53% of university students believe that simulation practice integrated with information technology is the most effective teaching mode, followed by case teaching, accounting for 62.90%, while specialized lectures and self-study of online courses only take up 14.88% and 6.12% respectively. It is evident that university students hope that innovation and entrepreneurship classes integrated with information technology need to be closer to real practice. More specifically, students hope to have an authentic understanding of innovation and entrepreneurship through simulation practice and case teaching driven by information technology. With regard to the best assessment methods of innovation and entrepreneurship courses driven by information technology, 80.04% of university students vote for entrepreneurship simulation practice, 75.33% of students favor entrepreneurship project display, 58.85% of students think it is the writing of entrepreneurship plan. And the proportions of entrepreneurship competition awards, theoretical examination, starting a company and others are 32.11%, 19.11%, 12.52% and 3.95% respectively (see Table 1). It manifests that university students believe that entrepreneurship simulation practice is closer to the real entrepreneurial process and entrepreneurial experience and can be more effective in assessment.

Table 1. *Evaluation of Information Technology-Driven Innovation and Entrepreneurship Curriculum Reform*

Projects	Categories	Samples(person)	Proportion (%)

Teaching modes of innovation and entrepreneurship courses	Classroom teaching	432	40.68
	Case teaching	668	62.90
	Panel discussion	342	32.20
	Simulation practice	834	78.53
	Network courses	65	6.12
	Specialized lectures	158	14.88
	Interactive experience	560	52.73
	Others	158	14.88
Assessment methods of innovation and entrepreneurship courses	Theoretical examination	203	19.11
	Entrepreneurship plan writing	625	58.85
	Entrepreneurship Project display	800	75.33
	Entrepreneurship simulation practice	850	80.04
	Entrepreneurship competition awards	341	32.11
	Starting a company	133	12.52
	Others	47	4.43

2.3 Evaluation of Information Technology-Driven Innovation and Entrepreneurship Education System

Guangxi Normal University attaches importance to innovation and entrepreneurship education. In September 2016, it established the college of innovation and entrepreneurship, focusing on the reform of key areas and procedures, such as "curriculum system, teaching staff, practice platforms, event activities and cultural communication". In accordance with the principle of "hierarchical training, systematic promotion, integrated construction and all-round education", it runs innovation and entrepreneurship education through the whole process of talent training, focuses on the innovation and entrepreneurship curriculum system, teaching staff, event activities, practice platforms and cultural atmosphere and strives to cultivate students' innovative spirit, entrepreneurship awareness and capability of innovation and entrepreneurship. Through the questionnaires and interviews with teachers and students (see Table 2), it is revealed that more than half of the students believe that the types of entrepreneurship education courses offered by the school are diverse, and the content of innovation and entrepreneurship courses is closely combined with their professional knowledge and the cutting-edge trend of the times. 93.37% of the students regard the diversification of teaching is above average, 91.01% of the students hold their teachers' entrepreneurial experience is above average, and 93.63% of the students think their teachers' teaching experience in entrepreneurship education is above average. This reveals that our teachers have a strong awareness of innovation and entrepreneurship, abundant experience in entrepreneurship education, and the innovation and entrepreneurship courses are deeply favored by the students. In terms of other aspects, namely, providing diversified entrepreneurship competitions, integrated entrepreneurship practice services, establishing entrepreneurship center and off-campus practice bases, the proportions are 93.37%, 92.36%, 95.51% and 91.78% respectively. On the whole, the overall design of innovation and entrepreneurship education curriculum system is relatively reasonable, which meets the requirements of innovation and entrepreneurship teaching in universities. The university has done well in the design of innovation and entrepreneurship courses, the construction of teaching staff for innovation and entrepreneurship courses, holding innovation and entrepreneurship competitions, and the allocation of infrastructure of innovation and entrepreneurship education, which is highly praised by most students.

Table 2. *University Students' Evaluation of Innovation and Entrepreneurship Education System*

Projects	Categories	Samples (person)	Proportion (%)
	Excellent	256	24.43

Diversity of types of innovation and entrepreneurship courses	Good	410	39.12
	Average	313	29.87
	Fair	46	4.39
	Poor	23	2.19
The combination of innovation and entrepreneurship courses with professional courses	Excellent	259	25.54
	Good	372	36.69
	Average	316	31.16
	Fair	67	6.61
	Poor	31	3.06
Teaching of innovation and entrepreneurship driven by information technology	Excellent	347	33.37
	Good	423	40.67
	Average	201	19.33
	Fair	63	6.06
	Poor	6	0.58
Teachers with entrepreneurial experience	Excellent	298	28.52
	Good	393	37.61
	Average	260	24.88
	Fair	64	6.12
	Poor	30	2.87
Teachers with teaching experience in entrepreneurship education	Excellent	362	34.94
	Good	403	38.90
	Average	205	19.79
	Fair	55	5.31
	Poor	11	1.06
Diversity of types of innovation and entrepreneurship competitions	Excellent	346	33.27
	Good	397	38.17
	Average	228	21.92
	Fair	57	5.48
	Poor	12	1.15
Integrated entrepreneurship practice services	Excellent	297	28.37
	Good	420	40.11
	Average	250	23.88
	Fair	55	5.25
	Poor	25	2.39
University students' entrepreneurship center	Excellent	486	46.46
	Good	390	37.28
	Average	123	11.76
	Fair	38	3.63
	Poor	9	0.86
Off-campus practice bases	Excellent	276	26.39
	Good	413	39.48
	Average	271	25.91
	Fair	58	5.54
	Poor	28	2.68

3. Research Results

3.1 Summary of Current Situation Using information technology to drive innovation and entrepreneurship education in universities is a systematic project, involving multiple departments and

colleges. Collaborative innovation is needed to build a good ecology and make it advance as a whole. Entrepreneurship policies of universities, teaching practice, teaching staff and competition activities have a significant effect on university students' entrepreneurial intention. Through questionnaires and interviews with teachers and students, the current situation of innovation and entrepreneurship education in universities can be manifested in the following aspects:

(1) Students generally have a positive evaluation of the current innovation and entrepreneurship education system which is reflected in the types of innovation and entrepreneurship courses, the teaching approaches of innovation and entrepreneurship courses when integrated with information technology, teachers' experience in innovation and entrepreneurship education, guidance services for innovation and entrepreneurship competitions, and the construction of innovation and entrepreneurship bases. The vast majority of students believe that the system is of great help to them by stimulating their own entrepreneurial will, cultivating their entrepreneurial and innovative spirit, enriching their entrepreneurial knowledge and improving their entrepreneurial skills.

(2) What students hope most is that teachers will teach by means of practical simulation, case teaching and creating interactive experience, and conduct course assessment by means of entrepreneurship simulation practice, entrepreneurship project display and entrepreneurship plan writing. Hence, it is advisable that university teachers should abandon the traditional modes of teaching and assessment but use the above methods to constantly improve the teaching quality of innovation and entrepreneurship and stimulate students' learning enthusiasm.

(3) Students generally believe that teachers who have entrepreneurship experience, entrepreneurship teaching experience, and can carry out entrepreneurship teaching by means of information technology are of great help to entrepreneurship education.

3.2 Existing Problems

Based on the questionnaires and interviews with teachers and students, there are some problems existing in current education of innovation and entrepreneurship, presented as follows.

(1) The integration of innovation and entrepreneurship education and professional education is inadequate, and the construction of innovation and entrepreneurship curriculum system needs to be further improved. This mainly lies in the fact that innovation and entrepreneurship education reform and talent training are not effectively integrated. Although colleges have incorporated innovation and entrepreneurship education into the undergraduate talent training program, it has not been implemented thoroughly. First, a majority of universities have not offered courses related to innovation and entrepreneurship. Second, secondary colleges and teachers do not have a comprehensive understanding of innovation and entrepreneurship education, and fail to effectively integrate information technology into innovative thinking, methods and teaching design in professional teaching. Some are still teaching in traditional modes.

(2) There is a lack of teaching staff for innovation and entrepreneurship education, and the teaching practice driven by information technology is also insufficient. Teachers play a significant role in guaranteeing curriculum teaching and guiding student to participate innovation and entrepreneurship practice. However, most universities have limited teachers for innovation and entrepreneurship teaching What's more, the practice of using information technology to assist teaching is insufficient, which forms an obstacle to the integration of innovation and entrepreneurship teaching into university education and the whole process of talent training.

(3) Information resources for innovation and entrepreneurship education are underdeveloped and the evaluation and incentive mechanism is not complete. More specifically, the use of information technology to improve the quality of innovation and entrepreneurship education and the development of online teaching resources is still insufficient, and the evaluation mechanism of innovation and entrepreneurship education is not perfect and need to be further strengthened.

3.3 Suggested Strategies

The development of a new generation of information technology, represented by cloud computing, big data, Internet of things, mobile Internet and artificial intelligence, has posed new challenges to talent training and teaching in universities. How information technology can better drive the reform of innovation and entrepreneurship education is an urgent problem to be addressed for universities.

(1) Attach importance to the development and design of information resources and promote the construction of innovation and entrepreneurship courses. Based on the orientation of talent training and objectives of innovation and entrepreneurship education, universities should adjust the curriculum of innovation and entrepreneurship education, pay attention to the development and design of information resources, develop online courses of innovation and entrepreneurship education and educational information data platforms, exploit and enrich the innovation and entrepreneurship education resources of various professional courses, strengthen innovation and entrepreneurship education in the process of imparting professional knowledge, organically integrate innovation and entrepreneurship courses with professional courses, and effectively connect innovation and entrepreneurship practice with professional practice teaching.

(2) Build information technology platforms, involve more professional teachers in the teaching of innovation and entrepreneurship courses, and expand the teaching staff of innovation and entrepreneurship. Universities should take advantage of information technology to establish network resources and teaching platforms, encourage and support professional teachers to participate in the teaching of basic compulsory courses for innovation and entrepreneurship, explore the integration of information technology with the teaching process, and make use of Tencent Conference, Ding Talk, Mosoink Cloud Class, Rain Classroom, Zhumu and other information-based tools to assist in lesson preparation, classroom exercises, learning records, after-school assessment, etc., so as to enhance the teaching efficiency and effect. Interactive, experiential and small class teaching is also encouraged. In addition, it is advisable to strengthen the training on teachers in terms of innovative thinking, methods and innovative teaching design, cultivate their entrepreneurial theoretical knowledge and entrepreneurial skills, and enable them to carry out online and offline mixed teaching, practical simulation, case teaching, and interactive teaching in the classroom with the assistance of information technology.

(3) Strengthen the development of information resources for innovation and entrepreneurship, and create a positive campus atmosphere for innovation and entrepreneurship. Universities can carry out curriculum teaching with the help of online resources such as Mooc and online available courses, develop information resources to serve education and teaching based on the distinctive features of different disciplines, and establish a perfect incentive mechanism for innovation and entrepreneurship education. In the meantime, universities should promote the establishment and transformation of cultural areas for innovation and entrepreneurship on campus, increase the places for teachers and students to interact with each other, and create a good environment for the cultivation of innovative and entrepreneurial talents. Also, it is advisable for universities to actively carry out various academic exchanges and extracurricular academic activities of science and technology activities, and encourage students to attend various academic lectures and reports, expand their knowledge and horizon, initiate their enthusiasm for innovation, and form a strong innovative academic atmosphere.

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