

# Research on Innovation and Entrepreneurship Education in Higher Vocational Colleges Based on "1+X" Certificate System

## -- Take the IOT major of Suzhou Vocational Institute of Industrial Technology as an example

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### Abstract

China's higher vocational education has gone through two stages, from the specialized research on innovation and entrepreneurship education to the current research on the integration of innovation and entrepreneurship education and professional education. In recent years, with the strong promotion of the Ministry of Education, various colleges and universities have made remarkable achievements in the innovation and entrepreneurship education of students. With the full implementation of the "1+X" certificate system of the Ministry of Education, it provides a good theoretical basis for the reform of students' innovation and entrepreneurship education. This paper explores how to integrate the advanced concept of the "1+X" certificate system into the innovation and entrepreneurship education of the Internet of Things(IOT), so as to bring new breakthroughs to the training of electronic information technology talents.

### 1. Introduction

In 2019, The State Council issued the National Implementation Plan for Vocational Education Reform (referred to as "20 Vocational Education"), It is proposed to launch the pilot work of "academic certificate + several vocational skill level certificate" system ("1 + X" certificate system) in vocational colleges and application-oriented vocational undergraduate colleges, "1" in "1 + X" means a diploma, "X" refers to the vocational skill level certificate; "1" is the student's academic background, "X" is the student's skill improvement; "X" is a variable, A combination of several similar or different levels of skill certificates, Certificates can be in the same field, It can also be in different fields. The "1 + X" certificate system provides students with diversified and multi-level choices, which is more conducive to the cultivation of compound talents and innovative talents. Suzhou Vocational Institute Of Industrial Technology, as a high-level higher vocational college with Chinese characteristics, it is imperative to strengthen the innovative education for students majoring in the Internet of Things. Under the situation of public innovation, peoples entrepreneurship, the proportion of things professional students to participate in the double gen gradually increased, the sensor network "1 + X" certificate into the Internet of things professional students double gen education, build 1 + X certificate system of double gen education teaching system, make students reserve related innovative entrepreneurship skills and knowledge, can high quality employment or entrepreneurship in the future.

## **2. Logic and Connotation of Mass Entrepreneurship and Innovation Education Under the "1 + X" Certificate System**

### **2.1. The Logic of Mass Entrepreneurship and Innovation Education Under The "1 + X" Certificate System**

The logic of mass entrepreneurship and innovation education of Internet of Things majors refers to the integrated development of "1 + X" professional certificate and innovation and entrepreneurship education. Under the background of mass innovation and entrepreneurship, carrying out innovation and entrepreneurship education has become an inevitable choice for higher vocational colleges to train innovative talents. After years of practice, facing the dilemma of innovation and entrepreneurship education and Internet of Things professional education development, how to realize the "1 + X" certificate education and students' mass entrepreneurship education has always been a hot topic of research and the focus of teaching practice. On the one hand, the ultimate goal of "1 + X" certificate system and innovation and entrepreneurship education is to cultivate talents who are moral, intellectual, physical, aesthetic and labor oriented and can meet the needs of The Times; on the other hand, innovation and entrepreneurship education is inseparable from professional education, and the two must be integrated.

### **2.2. Construction Connotation of The "1 + X" Certificate System**

The "1 + X" certificate system is a major innovation in the national vocational education system design, and a major direction choice of higher vocational education in the future. Students majoring in the Internet of Things can choose multiple similar or complementary vocational skills for in-depth study according to a certain professional position, and improve their innovation, entrepreneurship and employment ability by obtaining relevant vocational level certificates. The traditional single diploma certificate system reflects that students obtain the junior college level in academic education, but it does not reflect the level that students reach in the corresponding professional skills. In a sense, this talent training mode, with academic education as the evaluation standard, is difficult to achieve the goal of cultivating technical and skilled talents, which is contrary to the orientation of serving employment and entrepreneurship and cultivating craftsmen in big countries. How to truly reflect vocational education as a type of education, not just a kind of academic education below the undergraduate level, the "1 + X" certificate system pilot work is a major measure. The Implementation Plan of National Vocational Education Reform clearly states that evaluation organizations should be adopted in both the types and evaluation of third-party evaluation organizations, and industry enterprises should participate in the evaluation, which fully reflects the market-oriented principle of "X" certificate. The 1 + X certificate system, highlighting vocational education as a type of education, cultivates highly skilled comprehensive talents, promotes the reform of vocational education evaluation mode, evaluates students more accurately and comprehensively, and plays the role of diversified evaluation baton, reflecting the essence of vocational education as a type of education. Under the 1 + X certificate system, vocational college students can obtain relevant vocational skills level certificates according to their own employment interests and specialties, and better meet the market needs, so as to improve their comprehensive ability.

## **3. Research on the Integration Strategy of "1 + X" Certificate System and Innovation and Entrepreneurship Education**

The "1 + X" certificate system provides a theoretical basis for the reform of innovation and entrepreneurship education. The Internet of Things major is a typical engineering major. Most

of the entrepreneurial students of the Internet of Things major rely on their professional knowledge to carry out various types of innovation and entrepreneurship activities. Based on the "1" academic education curriculum system, master solid professional knowledge and skills, reasonable allocation of innovation and entrepreneurship capabilities through "X", to lay a solid foundation for improving individual core competitiveness.

### **3.1. Attach Importance to the Top-Level Teaching Design, And Form A Collaborative Education System That Promotes the Deep Integration of Teaching Methods**

Based on the "1 + X" certificate system to carry out the integration reform of the Internet of Things needs to break the traditional educational thinking. To improve the Internet of things professional students' innovation ability as a starting point, in order to improve the quality of students' employment and entrepreneurship goal, with students learn to get the evaluation criteria, focus on innovation entrepreneurial consciousness, organization and management ability, professional and technical ability, risk prevention and control ability, value creation ability, intellectual property ability, will quality to build a new innovation entrepreneurship education system. Under the top-level teaching design concept of "1 + X" certificate system, the traditional classroom-based teaching mode should be changed to realize the "teacher-centered" to "student-centered" student-centered teaching mode, and form a teaching mode that integrates innovation and entrepreneurship education and professional education. According to the requirements of innovation entrepreneurship education, change the teaching implementation plan, teaching management plan, the innovation entrepreneurship education into professional education, realize the collaborative education effect, encourage teachers and students to actively carry out innovative entrepreneurship teaching practice, and establish the matching evaluation system, so as to improve the teachers and students of innovative entrepreneurship education understanding and attention.

### **3.2. Organic Integration of Multi-classroom, To Realize the Whole-process Integration of Innovation and Entrepreneurship Education and Professional Education**

Combined with the actual situation of the Internet of Things major in higher vocational colleges, the innovation trend and entrepreneurial prospects of different positions are analyzed, according to the school training plan and program, the characteristics of students in different grades and the setting of professional courses, into which innovation and entrepreneurship education is gradually integrated to form a complete curriculum system. In the process of implementing innovation and entrepreneurship education, the hierarchical teaching reform is carried out, and the professional learning at different stages and levels is set up with the practice tasks of innovation and entrepreneurship to different degrees. In the process of practical courses, innovation and entrepreneurship education should be integrated, and corresponding innovation and entrepreneurship projects can be created for students at different levels, which can strengthen the training of students' innovation and entrepreneurship ability, guide students to apply their professional theoretical knowledge into practice, and improve their practical ability to solve problems. The establishment of the organic integration of multiple classrooms is conducive to the whole-process integration of innovation and entrepreneurship education and professional education.

### **3.3. Strengthen the Construction of Innovation and Entrepreneurship Teachers in Combination of Professional and Concurrently**

Referring to the basic idea of the "1 + X" certificate system, innovation and entrepreneurship teachers can form a combined teaching team by introducing enterprise teachers in the industry. Innovation entrepreneurship education and the "1 + X" certificate system of professional

education organic integration, for teaching ability has higher requirements and standards, need college teachers not only solid professional knowledge and skills, also must have outstanding innovation ability and rich practical experience, to develop for students to create fusion curriculum and appropriate teaching mode, put forward higher construction goals for teachers. The practical course teaching of innovation and entrepreneurship education can promote the specialization of innovation and entrepreneurship education, enhance students' innovative thinking and innovative consciousness, and cultivate students' innovative literacy and practical ability of problem solving. Invite successful entrepreneurs into innovative entrepreneurship education, attract, hire professional talents in the industry part-time job, teaching, the introduction of rich enterprise resources of double teachers, regularly invite professional frontier scholars into the school to conduct the share experience, to enrich and enrich teachers, form a professional education teachers, innovative entrepreneurship guidance teachers, industry experts, successful entrepreneurs composed of teachers.

### **3.4. Jointly Build A "1 + X" Integrated Science and Reality Teaching Center**

According to the current professional characteristics of the Internet of Things major of Suzhou Vocational Institute Of Industrial Technology, the conditions of students' platform courses, professional cognition, basic practical training and practical teaching are matched with the actual needs of the professional position, and the overall goal of cultivating the basic abilities that students need to master is finally determined. In the whole process of the integrated teaching center, the practical teaching goal system of the "1 + X" certificate system has a guiding role in a series of links such as the organization and implementation of the practical teaching content. To train and meet the job needs as the starting point, while considering the students are qualified for specific industry positions in the future, but also need to continuously develop and face a broader career environment. Therefore, while paying attention to the regular training objectives, we should strengthen the ability of cultivating students to adapt to the society, flexible ability, and innovative practical ability. Encourage students to learn how to learn, learn to cooperate and learn to care for each other in the learning process, and cultivate students' spirit of criticism, reflection and innovation. Relying on the rich industry alliance resources of Beijing New World Education Group, we will establish an enterprise industry-university-research cooperation base composed of schools, scientific research institutes and enterprises, form an industry-university-research consortium based on mutual integration and communication, and integrate the resources of the New World and the university. Form technology incubation "1 + X" certificate training base and science and technology service team, accurate docking micro, small and medium-sized enterprises specialization, refinement, specialization, novelty service, project cooperation, product development, technology transformation, such as services, form a "micro growth, small rise, growing" arrangement development pattern, at the same time gathered all kinds of resources into the school talent training, build high quality teaching resources. Expand students' production practice, on-site technology and innovative application channels, temper teachers' technical transformation and product research and development capabilities, so as to build an innovative and entrepreneurial talent training and technological innovation platform integrating talent training, team building, technical service, resource sharing, flexible mechanism and efficient output.

### **3.5. Form A Diagnosis and Improvement Mechanism for Professional Entrepreneurship and Innovation Education of The Internet of Things Under The "1 + X" Certificate System**

Under the "1 + X" certificate system, the university and the enterprise will establish a regular diagnosis and improvement mechanism of professional "goal-standard-operation-diagnosis-improvement" quality spiral, and dynamically adjust the personalized talent training plan

according to the effect of innovative and entrepreneurial talent training. Under the framework of the school teaching diagnosis and improvement system, According to the construction of the enterprise college, Optimize the quality assurance Committee of talent training; Establish a series of standards such as professional construction, curriculum development, teacher development and student growth, Set the target, standard, and warning values, Forming a professional group quality management standard system; Establish a normalized self-diagnosis and reform mechanism of "goal-standard- -operation-diagnosis-improvement" for professional groups, Make full use of the college's "Smart Campus Management Service Platform", Centering on the four dimensions of "major-curriculum-teacher-student", Carry out assessment reform at the professional level, process monitoring reform at the curriculum level, and assessment reform at the level of teachers and students, All-round real-time monitoring of quality operation, Form a quality evaluation mechanism of school self-diagnosis, industry and enterprise diagnosis, and third-party diagnosis.

#### 4. Conclusion

The comprehensive implementation of the "1 + X" certificate system provides a theoretical basis for promoting the professional construction of the Internet of Things major and the training of innovative and entrepreneurial talents. According to the "1 + X" certificate system of the core guiding ideology, realize the optimal allocation of resources, can effectively improve the quality of innovative entrepreneurship education, but in real situations, due to the influence of traditional education concept, higher vocational colleges attaches great importance to professional education and development, ignore the situation of innovative entrepreneurship education is widespread, the school of innovative entrepreneurship education and professional education correlation is not high.

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#### References

- [1] Xu Haixiang, Wang Zhengyun, Shi Shuai, et al. Exploration of the reform mode of "three teaching" of food professionals in higher vocational colleges under the background of 1 + X certificate [J]. Anhui Agricultural Science, 2021,49 (10): 273-275 + 278.
- [2] Yu Jingbo, Qu Qiaopeng, Zhang Huilin. The Current Situation and Countermeasures of innovation and Entrepreneurship education in Higher Vocational Colleges [J]. Journal of Changjiang Engineering Vocational and Technical College, 2021,38 (02): 31-34.
- [3] Wang Yu, Chen Lanjian. Based on Employment orientation [J]. Journal of Tongling Vocational and Technical College, 2018,17 (04): 4-6 + 10.
- [4] Ma Hongxin, Wang Honghe, Shi Haolin, et al. Practice and Research of Professional Association for Promoting Innovation and Entrepreneurship Education for College Students- -Take College Students' Innovation and Entrepreneurship Association of College of Animal Science and Technology of Jilin Agricultural University as an example [J]. Heilongjiang Animal Husbandry and Veterinary Medicine, 2021 (05): 146-149.

- [5] Li Lin, Li Wei, Pei Zhonggui. Research on Innovation and Entrepreneurship Education based on the "1 + X" Certificate System- -Taking the Software major in Higher Vocational Colleges as an example [J]. Computer and Telecom, 2021 (08): 14-16.
- [6] Zeng Xiuzhen, Li Yaxin on the course selection and implementation path of "professional, innovation and integration" in higher vocational colleges [J]. Vocational Education Forum, 2020 (7): 64-71.
- [7] Chen Jidong, Nie Zhe, Mu Yan. Exploration and practice of the talent training mode of "three progressive, three integration and three escort" [J]. Journal of Shenzhen Vocational and Technical College, 2020 (3): 48-52.
- [8] Liu Yu, Zhu Qiang, Lu Xiaochun. The real dilemma and development strategy of professional innovation and integration in higher vocational colleges from the perspective of professional group [J]. Vocational Education Research, 2020 (6): 57-62.
- [9] Zhang Jun, Ling Xu. Research on the Professional Talent Training of Higher Vocational College Industrial Robot under the "1 + X" certificate system [J]. Journal of Hunan Vocational and Technical College of Posts and Telecommunications, 2020,19 (3): 78-80.