Research and Exploration on the Practice Teaching Model of IOT Specialty—Taking the Practical Teaching Model of IOT Engineering Specialty of Shandong Agricultural University as an Example

Yu-Cun WANG*, Hao FAN and De-qin SHU
Shandong Agricultural University School of Information Science and Engineering, Tai’an City, Shandong Province, China
*Corresponding author

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Abstract. Shandong Agricultural University attaches great importance to the cultivation of innovative practical ability of Engineering students. Combining with the orientation of the University and its own characteristics, Shandong Agricultural University has found a more distinctive way to cultivate students in the engineering practice teaching of Internet of Things specialty, and has formed an effective practical teaching mode of Internet of Things specialty. This mode can enhance the engineering of Internet of Things specialty students’ Practical ability, as well as improving students’ ability to apply what they have learned, and has a good effect in promoting students’ ability to combine theory with practice.

The Internet of Things (IOT) refers to a huge network formed by real-time acquisition of various information about objects or processes through various information sensing devices and the combination with the Internet. The Internet of Things (IOT) has realized the connection between things and things, things and people and networks, so as to facilitate the identification, management and control of people or things. It is called the third wave of the development of the world information industry after computers and the Internet. Internet of Things (IOT) industry has become the top priority in fostering and developing strategic emerging industries in China, and has been officially listed as one of the key strategic emerging industries for national development. Personnel training of Internet of Things specialty is based on the cultivation of compound applied talents such as Internet of Things application market development and technology promotion. Its professional characteristics determine how to effectively cultivate students' theoretical and engineering practice ability, and how to cultivate professional compound application talents has become the core issue of professional training. As an important part of higher education in China, engineering education practice teaching is an effective way to enhance students' engineering practice ability, improve their comprehensive quality, and cultivate their innovative spirit and ability. It is also an indispensable important teaching link for students during their undergraduate study. Further strengthening the practical teaching of engineering education is an important measure to embody the characteristics of practical education in Colleges and universities in China. Shandong Agricultural University attaches great importance to the cultivation of innovative practical ability of Engineering students. Combining with the orientation of the University and its own characteristics, Shandong Agricultural University has found a more distinctive way to cultivate students in the field of engineering practical teaching of Internet of Things specialty, and has formed an effective practical teaching mode of Internet of Things specialty. Practice has proved that this model has a good effect on enhancing the engineering practice ability of students majoring in Internet of Things, improving students’ ability to apply what they have learned, and promoting students’ ability to combine theory with practice.

Enhancing the Level of Theoretical Understanding of the Cultivation of Students’ Innovative and Practical Abilities

The decision of the State Council of the Central Committee of the Communist Party of China on deepening education reform and promoting quality education in an all-round way points out that the
whole Party and the whole society must proceed from the overall situation of the prosperity and
development of our socialist cause and the great rejuvenation of the Chinese nation, take Deng
Xiaoping Theory as the guide, carry out the spirit of the 15th National Congress of the Communist
Party in an all-round way, deepen education reform, comprehensively promote quality education
and build a The socialist education system with Chinese characteristics has laid a solid foundation
of talents and knowledge for the implementation of the strategy of rejuvenating the country through
science and education. Implementing quality education means carrying out the Party's educational
policy in an all-round way, aiming at improving the quality of the people, focusing on cultivating
students' innovative spirit and practical ability, and bringing up socialist builders and successors
with all-round development of ideals, morality, culture, discipline, morality, intelligence, physical
fitness and beauty. [1]

Application-based Characteristic Famous Schools are the Educational Foundation Support
for Cultivating Students' Innovative and Practical Abilities

Shandong Agricultural University is a multi-disciplinary university with the advantages of
agricultural science and the characteristics of life science. It integrates agriculture, science,
ingineering, management, economics, literature, law and art. In the course of running a school for
more than a hundred years, the school has continuously inherited and carried forward its fine
cultural traditions and noble spiritual qualities. It has put forward the idea of "combining learning
with practice, learning is valuable, educating people and learning is paramount". It is the first pilot
University of the Ministry of Education, the Ministry of Agriculture and the State Forestry
Administration to reform the education and training plan for outstanding agricultural and forestry
talents. It is the first five famous schools with applied basic characteristics in Shandong Province.
One is the top 50 universities with typical experience of innovation and entrepreneurship in China
[2]. According to the characteristics of the school, the goal of the specialty of Internet of Things in
our school is to cultivate the applied engineering specialists who can meet the needs of social and
economic development. To cultivate high-level professionals with good scientific literacy and solid
knowledge structure of Internet of Things, who can engage in education, scientific research and
engineering application in scientific research, education, enterprises, undertakings and
administrative departments. On the one hand, the characteristics of famous universities with basic
characteristics and typical experience of innovation and entrepreneurship provide the basic campus
cultural atmosphere for the cultivation of students' innovative practical ability of Internet of Things
engineering specialty; on the other hand, the setting of engineering application objectives in talent
cultivation goals lays the objective foundation for the cultivation of students' innovative practical
ability of Internet of Things engineering specialty.

Talents Training Program of Internet of Things Specialty Pays Attention to the Cultivation of
Students' Innovative and Practical Ability

The talent training program of Internet of Things in our university includes general education,
discipline foundation, professional practice, professional core and professional development
courses[3]. Among them, the professional practice module includes basic practice, professional
practice and comprehensive practice. The specific forms include professional knowledge practice,
curriculum design, innovative entrepreneurship practice, graduation practice and graduation design.
Practical teaching credits are 31.5 points, which is 18.53% of the total credits of the talent training
program. In the talent training program, it fully embodies the important position of practical
teaching in curriculum learning.
Table 1. Statistics of Talents Training Program of IOT Engineering Specialty of Shandong Agricultural University in 2018.

| Professional Name       | Course Module          | Credit | Percentage of Total Credit |
|-------------------------|------------------------|--------|----------------------------|
| Internet of Things      | General Education Courses | 38     | 22.35%                     |
|                         | Basic Subjects         | 59     | 34.71%                     |
|                         | Professional Core Courses | 17     | 10.00%                     |
|                         | Professional Direction Courses | 19     | 11.18%                     |
|                         | Professional Development Courses | 3.5   | 2.06%                      |
|                         | Interdisciplinary courses | 2      | 1.18%                      |
|                         | Practical courses      | 31.5   | 18.53%                     |
|                         | Total                  | 170    |                            |

Training Students' Practical Ability through School-Enterprise Cooperation

Internet of Things is widely used in intelligent transportation, environmental protection, government work, public safety, safe home, intelligent fire protection, industrial monitoring, environmental monitoring, street lighting control, landscape lighting control, building lighting control, square lighting control, elderly care, personal health, flower cultivation, water system monitoring, food traceability, enemy investigation and intelligence collection, etc.[4]. Domain. There are many enterprises engaged in the research and application of Internet of Things engineering technology in society. Our school has cooperated extensively with Dane Training, Tsinghua Vision, Qianfeng Education, Hewlett-Packard (China), Tai’an Yungu and many other enterprises by employing external enterprise teachers and joint ventures. It has enriched the professional orientation of students majoring in Internet of Things in the light of the needs of enterprises and the current situation of the industry, and has achieved good results in training students' comprehensive practical ability. This is the case. Especially by choosing several important core courses with strong practical needs, at the end of the semester, the engineers and technicians of enterprises should conduct comprehensive training on the courses. Through the joint cultivation of school-enterprise cooperation, the students of Internet of Things engineering specialty have clearer objectives in the process of practical learning, more practical ways of thinking to analyze and solve problems, and effectively enhance the comprehensive quality of students. This is the case.

Internet of Things Related Competitions Provide Another Way to Evaluate Students' Learning Effects

It is one of the effective ways for our school to promote the practical skills training of students majoring in the Internet of Things by recognizing competition results as innovative credits, recognizing students' achievements in Internet of Things-related competitions, and combining the level of competition awards obtained in Internet of Things-related competitions with the evaluation mechanism of course learning effect of Internet of Things-related professional courses. In the process of training students majoring in Internet of Things engineering, our University encourages students to participate actively in the National University Internet of Things Design Competition, China University ICAN Internet of Things Innovation and Entrepreneurship Competition, National Software and Information Technology Professional Competition, Shandong Internet of Things Innovation and Application Competition, Qilu Software Competition and other competitions. In the process of team competition, students' collective concept has been strengthened, and their ability of organization and coordination has been improved. More importantly, in order to achieve good competition results, students' learning enthusiasm will generally be significantly improved. In addition to grasping classroom theoretical knowledge more firmly, students will consciously combine theory with practice, and can actively expand theoretical knowledge[5], thus realizing the transformation of students' learning level from learning to application. In recent years, the students...
majoring in Internet of Things in our university have achieved good results in many large competitions with industry influence nationwide. On the one hand, these achievements enrich the students' learning experience and have a positive impact on their further study and employment; on the other hand, they also have a demonstration effect on students of different grades of the same major.

**The Influence of SRT Project Training on the Practical Teaching Mode of Internet of Things Specialty**

SRT is the abbreviation of Student Research Training, which is the undergraduate research and training project. It is a scientific research and training project for undergraduates and a measure to implement practical teaching reform in undergraduate education stage. Every school year, SRT projects with obvious practical and applied significance are set up for students majoring in Internet of Things, and students are encouraged to participate widely. The whole process of students' participation in SRT project, including the writing and selection of the project declaration in the early stage, the subsequent project research and implementation, and the summary of the project conclusion, is a conscious and purposeful training process for students' comprehensive practical ability. Students trained by SRT projects generally have a good concept and consciousness of scientific research, which lays a good foundation for students to engage in scientific research work in the future.

In a word, in the process of cultivating the talents of Internet of Things engineering specialty, starting from the characteristics of its own famous universities with basic application characteristics, and fully recognizing how to cultivate the talents of Internet of Things engineering specialty, which is the core issue of cultivating the talents of Internet of Things engineering specialty, our school has come out of a more distinctive student in the engineering practice teaching of the students of Internet of Things specialty. The way of training has formed an effective practical teaching mode for Internet of Things specialty.

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