

# Develop a New Talent Cultivation Model of Full-Process Industry-Education Integration

—The Path of Transformation and Development of Liuzhou Institute of Technology

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**Abstract**—Against the background of the transformation from local regular undergraduate colleges to applied undergraduate colleges, Liuzhou Institute of Technology has effectively linked with the development of regional economy and society. Through a series of measures including deepening college-enterprise cooperation, promoting industry-education integration, and building practical teaching platforms for collaborative education, the institute has developed a new talent cultivation model of full-process industry-education integration and achieved fruitful achievements in college-running and education, which makes it embark on a unique path of transformation and development.

**Keywords**—college-enterprise cooperation; industry-education integration; collaborative education; talent cultivation model

## I. INTRODUCTION

Industry and education integration is an effective way to develop undergraduate higher education, but it is also one of the bottlenecks in its development. The obvious function of industry and education integration lies in 2 aspects: on the one hand, it helps to improve the quality of applied talents cultivation and promote the development of applied colleges and universities; on the other hand, it can promote scientific and technological innovation, the transformation of scientific and technological achievements and improve the economic benefits of products.

At present, relevant researches on the innovative mechanism of industry-education integration of applied undergraduate higher education at home and abroad mainly focus on the following aspects. In terms of the researches on industry-education integration, Niu Shihua (2016) carried out a research on the industry-education integration of applied colleges and universities; Peng Mengjiao (2016) pointed out the plight and countermeasures of industry-education integration of Chongqing applied colleges and universities. The

researches on industry-education integration mechanism of applied undergraduate higher education mainly focus on the exploration of the deeply integrated mechanism, the long-term mechanism and the operation mechanism of industry-education integration. For example, Li Xinyi (2019) analyzed the main problems of industry-education integration mechanism in the process of transformation and development of local undergraduate colleges and universities, and put forward relevant improvement measures with an example of the education and guarantee mechanism of industry-education integration carried out by Guangxi University of Science and Technology; Guan Dan (2016) took Changzhou Vocational and Technical College of Engineering as an example to explore the long-term mechanism of industry-education integration from the aspects of resource integration, mechanism innovation, and system guarantee. In addition, some scholars have conducted innovative researches on industry-education integration mechanism of applied undergraduate higher education from the perspective of talent cultivation. For example, Sun Xiaohui (2017) took Huanghuai University and Heilongjiang Institute of Technology as examples to comprehensively analyze the status and influencing factors of cultivating applied talents in local engineering colleges and universities, expound the talent cultivation models of schools-enterprise cooperation abroad and put forward its enlightenment for domestic talent cultivation models.

However, there is few such saying of industry-education integration abroad. Related researches mainly focus on the school-enterprise cooperation models which are the ways to achieve industry-education integration, such as the enterprise-led model represented by the dual system in Germany, the school-enterprise model represented by the contract system in the United States and the apprenticeship system in the United Kingdom, and the school-led model represented by French apprentice training center.

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In summary, at present, there are many researches at home and abroad on work-study integration, school-enterprise cooperation, industry-education integration and so on, while few studies on the innovative mechanism of industry-education integration, especially the researches on the industry-education integration of Guangxi applied undergraduate higher education. Therefore, there is still a big room to launch researches and studies on it. As a regular undergraduate applied college, Liuzhou Institute of Technology is committed to constructing and perfecting a new talent cultivation model of full-process industry-education integration, which aims to provide other applied colleges and universities with some developing experiences on industry-education integration.

## II. A BRIEF INTRODUCTION TO LIUZHOU INSTITUTE OF TECHNOLOGY

Liuzhou Institute of Technology whose predecessor is Lushan College of Guangxi University of Science and Technology, founded in 2002, is an institute of higher learning approved by the National Ministry of Education to implement regular undergraduate degree education. It is located in Liuzhou, a famous industrial city with abundant history and culture of Guangxi Zhuang Autonomous Region, China. The campus covers an area of more than 86.68 hectares, with a total investment of more than 1.3 billion RMB and a total floor area of 330,000 square meters. The institute has advanced facilities and experimental training buildings with over 100 laboratories. The library has a collection of nearly 979,000 physical books. The institute has abundant faculty resources. There are more than 800 full-time teachers, among which 35% of them are with high professional title like professor and associate professor, and more than 70% of them have doctoral or master's degree.

The institute consists of 8 departments including Mechanical Engineering Department, Automobile Engineering Department, Civil Engineering Department, Electrical and Computer Engineering Department, Economic Management Department, Art and Design Department, Foreign Language and Literature Department, and Food and Chemical Engineering Department, as well as 5 public education departments including Ideological and Political Theory Department, Public Mathematics and Physics Department, Public Computer Department, Public English Department, and Public Art Department. The institute offers 38 undergraduate programs and has a comprehensive range of disciplines covering 5 categories: engineering, management, humanities, art and economy. It has more than 12,000 students from 26 provinces, including municipalities and autonomous regions, of China.

In 2014, the institute became one of the first 4 pilot undergraduate colleges which were undertaking transformation in Guangxi. And then college-enterprise cooperation and industry-education integration were promoted as a systematic project throughout the entire process of undergraduate talent cultivation, including the construction of faculty team, disciplines and specialties development plan, the formulation of talent cultivation specification, orientation and plan, curriculum content and model reform, professional curriculum setting, the construction of practical training and scientific

research platform, vocational education, innovation and entrepreneurship education and so forth. Industries and enterprises participated in every above links. Through the joint efforts of both the institute and enterprises, students can successfully handle the skills and abilities to be a backbone in the industry.

## III. COLLEGE-ENTERPRISE COOPERATION PROMOTES THE TRANSFORMATION OF THE INSTITUTE INTO AN APPLIED COLLEGE

### A. Introduce and Cultivate "Shuangshi" Faculty Team

"Shuangshi" means the teachers who have both teaching and engineering qualification certificates. Relying on the College-Enterprise Cooperation Council and Disciplines and Specialties Steering Committee co-organized by the institute and enterprises, Liuzhou Institute of Technology invites technical backbones with more than 5-year working experiences in the enterprises to give lectures and technical training for students. At the same time, the institute and the invited technical backbones sign an external teacher agreement, which stipulates that the teaching requirements for the technical backbones are not lower than the institute's basic teaching requirements.

In addition, the institute implements a policy of introducing flexible talents to employ retirees with high professional titles from enterprises, governments, and universities to enrich the "Shuangshi" faculty team.

What's more, the institute formulates some regulations for teachers to participate in social practice exercises related to their majors without salary, which generally last for 3 to 6 months, for example, participating in the technological transformation or innovation projects in enterprises by experiencing the front-line work, technical (design) internships, cooperative research and development, investigation and research, etc.

### B. Embed College-enterprise Cooperation in Talent Cultivation to Build Professional Clusters

The institute follows 3 linking principles of linking the construction of disciplines and specialties with industrial chain and innovative chain, linking curriculum content with vocational standards and job requirements, and linking teaching process with production reality. Based on college-enterprise cooperation and industry-education integration, the institute vigorously develops collaborative education.

#### 1) Link the construction of disciplines and specialties with industrial chain and innovative chain

Linking the construction of disciplines and specialties with regional enterprises and industries has two obvious advantages. The first one is the geographical advantages. Liuzhou is located in a multiple regional economic cooperation overlapping area, such as the Western Development Zone and the Pan-Pearl River Delta Economic Zone, and it serves as a bridge between the east and the west of China. The same as the institute, it is located in the National High-tech Development Zone and Liuzhou Moto Town, adjacent to Liuzhou Science and

Technology Information Industrial Park and Liuzhou Vocational Education Park. It enjoys unique geographical advantages. The second is the advantages of linking local industries. Liuzhou's economic development model is typically led by industry. There are more than 3,000 industrial enterprises in the city, and an industrial system has been established, which is dominated by automobile, machinery and other pillar industries. The automobile industry chain is the longest industrial chain in Liuzhou's economic development. The institute's engineering disciplines and specialties account for 59%, and have a strong link with the development of Liuzhou's economic industrial chain. That is an obvious characteristic of the institute.

In recent years, the institute has continuously adjusted and optimized the layout of disciplines and specialties in accordance with the construction and development of the industrial chain and innovative chain, such as Guangxi "14+10" industries with a value of hundreds of billions, the pillar industries, dominant industries and emerging industries of Liuzhou, and Liuzhou Moto Town, etc. The institute integrates the disciplines and specialties with the same engineering objects, similar technical fields or similar basic knowledge, and scientifically constructs 6 discipline and specialty cluster systems, including the automobile manufacturing industrial chain, machinery manufacturing industrial chain, electrical and information engineering, constructional engineering, public service and cultural industry, and food and chemical engineering. Combining regional advantages with the institute's development, Liuzhou Institute of Technology makes great efforts on constructing the clusters of the automobile manufacturing industrial chain and the machinery manufacturing industrial chain to serve advanced manufacturing industries and new energy industries. At present, the institute has 6 provincial key majors, including vehicle engineering, transportation, mechanical design manufacturing and automation, architecture, automation, food science and engineering.

## 2) *Link curriculum content with vocational standards and job requirements*

### a) *Target and positioning of talent cultivation*

The institute puts forward the college-running concepts of gaining a foothold in Liuzhou, serving Guangxi, taking transformation and development, and creating characteristics. The mission of it is to develop into a domestic high-level college of applied science with distinctive characteristics, and its talent cultivation goal is to cultivate the high-level applied talents who can adapt to the development of regional economy and society and with excellent moral characters, reasonable knowledge structure, outstanding practical abilities, and innovative spirit.

In order to meet the needs of local industrial development and the needs of enterprises, the institute revises talent cultivation programs every year. All teaching departments are required to carry out comprehensive investigations of disciplines and specialties, link the subjects with job requirements of industries and enterprise, and refine talent cultivation specifications and targets. Inviting experts from

enterprises to participate in the formulation and demonstration of talent training programs is also a core requirement.

### b) *Construction of applied curriculum system*

After continuous revision and optimization, the institute has initially built a progressive curriculum structure of "basic education-professional education-vocational education" which emphasizes on vocational quality and professional ability.

The institute restructures and optimizes the curriculum content, appropriately reduces the theoretical teaching hours, and increases the practical training hours. The proportion of practice training hours in the subjects of engineering and art is not less than 40%, and that in the subjects of economics, management and literature is not less than 30%. The institute builds 4 practical training modules of basic applied ability practice, professional ability practice, comprehensive ability practice, and innovation and entrepreneurship ability practice.

The reform of practical teaching content is deepened in accordance with the standards of real project, real equipment, and real requirements. In order to strengthen the links between skill training and job requirements, the institute implements some practical training modes which combine industries with teaching, such as order-based cultivation, internship, on-site teaching, social practice, graduation design or thesis project-driven practice and so on. In addition, experts from industries are employed as instructors of students for graduation design or thesis, which promotes the implement of the dual tutor system that every student has one tutor from the institute and the other from enterprises.

What's more, the institute strengthens the construction and reform of the second classroom to cultivate students' professional ability, applied ability and innovation and entrepreneurship ability. Students are encouraged to participate in subject competitions, scientific and technological activities, entrepreneurial practice, etc. through the ways of setting credit requirements, selecting advance individuals and other methods.

### 3) *Link teaching process with production reality*

High-level technical talents from industries are invited to participate in professional curriculum construction and teaching, jointly develop professional core curriculum systems and curriculum standards, and collaboratively develop career-oriented courses, career comprehensive case courses, and career comprehensive experimental courses. For the purpose of improving the coverage of professional courses used case teaching method, project-based pedagogy and task-based approach, the institute must have a deeply understanding of industrial development status and the industrial demands for talent's capacity, quality and knowledge structure. By using group learning, simulation training and other methods, students' application awareness and the abilities to solve problems will be improved, and the links of skill training and job requirements will be enhanced.

#### IV. INDUSTRY-EDUCATION LEADS THE REFORM OF THE TALENT CULTIVATION MODEL

##### A. Jointly Develop Special Courses

1) Automobile Engineering Department cooperated with Guangxi Fengchi Old Motor Vehicle Trading Market Co., Ltd. and Guangxi Tiancheng Motor Vehicle Evaluation Co., Ltd.. They jointly developed and taught 3 courses, including Vehicle Evaluation, Automobile Marketing and Practice of Used Car Trading, which achieves the integration of theory and practice, inside and outside the classroom, and teaching simulation and actual operation.

2) Civil Engineering Department and Guangxi Huadu Construction Technology Co., Ltd. reached an agreement to jointly develop 2 courses of Civil Engineering Materials and Structure Inspection. They also formulate practical teaching syllabus, arrangement of teaching semester and period, teaching plan, and so on together. At least 2 high-level technical backbones from these 2 enterprises are invited to participate in the department's teaching activities in each semester.

##### B. Jointly Set Up Special Order-based Classes

###### 1) Hong Teli-oriented Class

In order to verify the applicability of the "dual system" model in undergraduate talents cultivation, Mechanical Engineering Department proposed a professional model of cultivating applied technical undergraduate talents for independent colleges. They pointed out that except for unified basic subject knowledge, students with the same major should be allowed to choose courses in different professional directions based on their interests and career intentions to obtain different professional abilities. In 2015, based on the "dual system" model, Mechanical Engineering Department and Hong Teli Plastic Products (Dongguan) Co., Ltd., a member unit of the College-Enterprise Cooperation Council, jointly established Hong Teli-oriented Class and formulated a "dual system" talent cultivation system. There are many graduates who have become the backbones in the enterprise.

###### 2) Precision Testing Technology Direction Class

In 2018, Mechanical Engineering Department signed an agreement with Xiamen Lihexing Optoelectronics Technology Co., Ltd. to jointly cultivate applied talent in the direction of precision testing technology. They jointly formulated talent cultivation programs, developed related courses, and organized a teaching team to teach or carry out skills training for students in the class.

###### 3) Steel Structure Class

In 2018, Civil Engineering Department and Guangxi Construction Engineering Group the Fifth Construction Engineering Co., Ltd. reached an agreement to jointly build a steel structure class. According to the needs of the enterprise's development, Civil Engineering Department formulated a special talent cultivation program for the steel structure class, aiming to provide qualified talents for the enterprise.

###### 4) Modern Automation Production Control Technology Class

In 2017, the institute cooperated with Omron Automation (China) Co., Ltd. to jointly establish a Modern Automation Production Control Technology Class and Omron Intelligent Manufacturing Engineering Training Center. The institute provided an area of 300 square meters, and the enterprise assisted it to refine the related talent cultivation system, develop curriculum, compile textbooks, and design the courseware and practical training.

#### V. COLLABORATIVE EDUCATION DEEPENS COLLEGE-ENTERPRISE COOPERATION AND INDUSTRY-EDUCATION INTEGRATION

##### A. Jointly Apply for the Collaborative Education Project of Industry-College Cooperation Launched by the Ministry of Education

From 2017 to 2018, the institute cooperated with 5 enterprises of Xindao Science and Technology Co., Ltd., Guangdong Chengfei Intelligent Science and Technology Co., Ltd., Shenzhen Xinyingda Science and Technology Co., Ltd., Xiamen Big Thumb Animation Co., Ltd., and Beijing Disheng Digital Entertainment Science and Technology Co., Ltd., and respectively reached cooperation in teaching content and curriculum system reform, teacher training, construction of practical training center and off-campus practice bases, innovation and entrepreneurship education, etc.. 7 projects among them were approved by the Ministry of Education as the collaborative education projects of industry-college cooperation.

##### B. Jointly Build Service Platforms of Industry-Education Integration

1) Civil Engineering Department cooperated with Liuzhou OVM Machinery Co., Ltd. and Guangxi Metallurgical Construction Group Operating Company to co-establish Prestressed Product Research and Development Studio, Engineering Project Management Studio and BIM Engineering Application Center. Based on the construction of MIDAS Teaching and Training center, the cooperation with Beijing Midas Technology Co., Ltd. is being conducted now.

2) Art and Design Department cooperated with local enterprises to jointly apply for the project of Liuzhou Intangible Cultural Heritage Protection Platform, and it was approved. Therefore, the institute established Liuzhou Intangible Cultural Heritage Innovation Research and Development Center.

3) Art and Design Department applied for the project of establishing a public service platform for small and micro enterprises in Liuzhou, and was approved to establish Liuzhou Creative Design Service Center which provides consultation and services of image design, product design, clothing design, promotion and communication, and environmental space design for industries and enterprises related to creative design.

4) With the support of Electrical and Computer Engineering Department, Liuzhou Institute of Technology and Liuzhou Electrical Appliance Research Institute Co., Ltd. jointly established Liuzhou Electric Industry Product Research Development and Testing Center to provide electrical product

testing services for society and offer Liuzhou Institute of Technology practical training resources and teacher research platform of electrical testing skills.

5) With the support of Electrical and Computer Engineering Department, the institute and Guangxi Wangji Nuoli Information Engineering Co., Ltd. jointly established Beidou Information Industry Application Center and cooperated in 3 fields of basic technology research, high-tech application and talent cultivation.

6) Civil Engineering Department and Guangxi Huadu Construction Science and Technology Co., Ltd. jointly built an internship and practical training center. The institute provided the ground. A comprehensive cooperation in the field of architectural engineering is carried out on the aspects of curriculum and teaching, internship and practical training, enrollment and employment, talent cultivation, teacher training, project proposal and research, and so forth.

### *C. Jointly Carry out Scientific Research of Technological Breakthrough, Design and Development*

In recent years, the institute continuously deepens the cooperation connotation with enterprises and institutions by jointly carrying out various research projects and technology development activities, and makes a great success.

1) Food and Chemical Engineering Department cooperated with enterprises and jointly applied for 8 patents, among which 5 patents were jointly applied for with Guangxi Seven-color Pearlescent Materials Co., Ltd., and 3 patents were jointly applied for with Guangxi Laiji Biological Engineering Co., Ltd. In addition, 2 utility model patents were granted for them. Since 2015, 4 horizontal projects had been carried out by both sides.

2) A scientific research project named A Practical Research of the High Quality Product Information posted on Alibaba International Station---Taking Guangxi Seven-Color Pearlescent Materials Co., Ltd as an Example had been completed by Foreign Languages and Literature Department and Guangxi Seven-Color Pearlescent Materials Co., Ltd.

3) Automobile Engineering Department carried out scientific research projects on noise, vibration and Harshness with Kettering University and SAIC-GM-Wuling Automobile Co., Ltd. The institute sent teachers to participate in the project training and internship and arranged students to attend technical training.

4) Mechanical Engineering Department cooperated with Liuzhou Jiete Building Material Co., Ltd., Liuzhou Ruizhi Technology Co., Ltd. and Ma'anshan Tangtuo Rock Drilling Machinery Co., Ltd. and jointly carried out many technical research and development projects, such as the research and development of cast-in-place assembled composite wall.

5) Mechanical Engineering Department participated in 2 projects of Online Inspection of Industrial Robot Body and Automobile Emission Reduction Assembly Welding Quality Control, undertook by Liuzhou Huxin Automobile Technology Co., Ltd., an off-campus enterprise of Shanghai Jiaotong University.

### *D. Promote the Pilot Work of "1 + X Certificate" System to Improve Students' Professional Ability*

In recent years, the institute had actively explored the "dual certificate" education model which combined education certificate with vocational qualification certificate. The teaching departments with qualified disciplines are encouraged to introduce national vocational standards into teaching, reform the relevant curriculum knowledge system, and successfully link academic certificate with the certificates of professional qualifications, practicing qualifications, technical qualifications, and professional appraisal issued by the Ministry of Personnel, the Ministry of Labor and other related industries. In the assessment and evaluation mechanism for students, the institute explores the path of replacing the curriculum, examinations and credits with professional qualification certificates. The institute actively works with professional qualification certificate organizations, and introduces professional appraisal standards. Teachers are encouraged to participate in professional qualification certificate training and related academic activities to improve their academic professional skills.

#### *1) Set up IEERA International Oral English Certification Test Training Center*

In 2017, the institute formally established the IEERA International Oral English Certification Test Training Center in cooperation with the International English Education Research Association, and it was the only IEERA test and training center in Guangxi at that time. In the same year, a total of 196 students were organized to take the certification test, with a pass rate of 71% for the third level and 27% for the second level. In 2018, a total of 78 students attended the test and all of them passed the third level.

#### *2) Become the designated vocational skills training institute for training automobile maintenance intermediate workers*

In 2016, the institute became a new designated vocational skill training institute for automobile repairmen in Liuzhou. At present, vocational skills training and certification examination for automobile maintenance workers (intermediate level) had been carried out, covering 3 majors of automobile engineering, transportation and automobile service engineering. In recent years, the pass rate of the examination has reached 99%.

#### *3) Establish ACAA and Autodesk-ACC certification test sites*

In 2013, the institute successfully established the ACAA and Autodesk-ACC certification test sites, and organized students to take the corresponding project certification exams when they finished the courses. It aimed to help students test their learning effect, improve the level of software application, master professional application skills, obtain industry qualification certificates, and increase their employment competitiveness.

#### *4) Start the pilot work of reforming the "1 + X certificate" system*

In January 2019, National Vocational Education Reform Implementation Plan was issued by the State Council, and the first pilot work of "1 + X certificate" system was launched in

April. The institute kept pace with the times, promoted the “1 + X certificate” reform, and linked the certificate standards with the corresponding training evaluation organizations.

#### *E. Implement Innovation and Entrepreneurship Education Strategy Based on “One Park” with Three Bases*

The institute has a 5,400-square-meter Science and Technology Entrepreneurship Park, which is composed of 3 practical training bases, including a maker space named Little Ants, a business incubation center for college students and a incubation center for small and micro business. The project of the park was approved as one of Liuzhou Scientific Research and Technology Development Programs in 2015 with a total investment of 4,596,600 RMB. During the construction period, the enterprises entering the park have been granted 26 patents. There are over 600 students entering the park to carry out internships or practice activities per day, with an average of about 200 students per day in one year. The institute hosted a series of training activities and competitions on innovation and entrepreneurship for students, such as Liuzhou Maker Culture Festival, Liuzhou Entrepreneurship Guidance Activity in 2018, etc. Green Orange Lecture Hall, Teachers Workshop and Entrepreneurship Training Camp have been set up in the park for enterprises and students. Up to now, the park has been granted various honors of Guangxi Undergraduate Student Entrepreneurship Demonstration Base, Autonomous-level Maker Space, Guangxi Undergraduate Student Creation Innovation and Entrepreneurship Center, First batch of Liuzhou Entrepreneurship Incubator base, Liuzhou Entrepreneurship Incubator Demonstration Base and Liuzhou City-level Maker Space, Liuzhou City-level Scientific Incubator and other honors since its establishment.

1) *The Little Ants Maker Space.* The space is mainly open to college graduates who intend to start a business in Liuzhou, and provides an open platform for college students to communicate and realize their ideas. The space consists of innovation and entrepreneurship display area, entrepreneurship guidance rooms, professor studio, roadshow training area, one-stop service station, open laboratory, meeting rooms and an open office area with 80 seats. The one-stop service station is the office location for public service system co-built by the institute and Liuzhou High-tech Entrepreneurship Service Center. Government departments and service agencies are regularly invited to provide consulting service of entrepreneurship policy, business, tax, law and financing to the settled teams. Combined with the construction of the mechanical professional cluster, an open laboratory equipped with robot suits, laser cutting machines, 3D printers, multi-function table mills and so on was built in the Space. Up to now, there are 34 maker groups in the space, and their business cover the fields of cloud computing services, 3D maker, cultural creation, cross-border e-commerce and so on. So far, 11 groups successfully passed the evaluation and moved out the park, and the businesses of 5 student groups and 1 teacher studio are still in incubation.

In order to give a full play to the leading role of highly qualified and highly educated talents, 2 professor studios of the

mechanical disciplines and specialties were built in the park in 2018 to explore the innovation of disciplines and specialties and entrepreneurship practice and attract innovation teams. The settled innovation teams have completed 10 innovation projects and published 10 papers. What’s more, they obtain 1 national award and 12 provincial awards.

Under the guidance of Xi Jinping’s socialism with Chinese characteristics in the new era, the Party Committee of the institute built a New Era Lecture Hall and a New Era Civilization Practice Center in the park in 2019, which aims to lead and call on party members and cadres to participate in innovation and entrepreneurship activities and practical innovation project of Party construction.

2) *Business incubation center for college students.* The main function of it is to provide incubation services for the projects which can be operated as business with the incubation in the Little Ants Maker Space, and the enterprises established by college students by other ways. The center optimizes and integrates various social resources including talents, education, technology, and business to provide a better entrepreneurial environment for college students, which enables them to start business incubation and effectively serve local enterprises. The institute provides various conveniences for the settled enterprises. There is an exchange activity area equipped with projections, sound systems, and other facilities, which allows more than 40 students to conduct entrepreneurial projects, reviews, and financing and investment exchanges. Every settled enterprise can occupy about 30 square meters space, with free electricity and network services and 2-year free rent. The enterprises can exchange certain preferential policies for patents, competition awards, intellectual property rights and other achievements during the incubation period. At present, there are 21 enterprises founded by college students.

3) *Incubation center for small and micro business.* The main function of it is to provide incubation services for small and micro enterprises off campus, and the enterprises founded by college students that enter the accelerating incubation period through the introduction in the business incubation center for college students. According to the industrial structure of Liuzhou City and Liudong High-tech Zone, the center will focus on introducing and incubating innovative enterprises represented by automobile, information engineering, bioengineering, new energy, machinery manufacturing and other industries, and promoting the transformation of high-tech achievements in the fields of new energy automobiles, electronic information, intelligent manufacturing and new materials.

#### VI. ACHIEVEMENTS IN COLLABORATIVE EDUCATION

In 2018, the institute ranked the 41st in the national independent college ranking, and the 1st among independent colleges in the autonomous regional scientific research ranking. The institute’s quantity of intellectual property was ranked the 10th among all the colleges and universities in Guangxi, and the 1st among independent colleges. In the Guangxi annual inspection of private universities and colleges 2017, the

institute is evaluated as Excellent College and it is the only independent college receiving this honor in 2018. For the annual employment rate of graduates exceeds 95%, and the undergraduate self-employment rate ranked the 31st in China and the 1st in Guangxi, the institute was granted the honor of Guangxi Outstanding Unit of Employment and Entrepreneurship for Undergraduates in 2018. In the college year from 2017 to 2018, students won 51 national awards and 260 provincial awards. Among them, the LS Racing Team won the championship of Formula Student Electric China 2018, and the second place in Baja SAE China 2018, and respectively participated in Formula Baja SAE America 2018 and Formula Student Electric Germany 2018; the Mathematical Modeling Team won a total of 1 first prize, 1 second prize and 2 third prizes in American (International) College Student Mathematical Modeling Competition 2018; and the Lurenjia Team won the second prize in National College Student Robot Competition 2019.

According to the statistical report of Max Data Co., Ltd., an agency offered education data consulting and evaluation, the overall satisfaction rate with the institute of the graduates from 2016 to 2018 respectively is 83%, 86%, and 89%, and the current employment satisfaction rate respectively is 60%, 67%, and 70%. It shows a rising trend, and indicates that the market value of the institute's graduates has further improved. In addition, the proportion of graduates engaged in professional-related work from 2016 to 2018 is 68%, 66%, and 68%, respectively. Nearly 70% of the graduates are engaged in major-related work, which shows that the talent cultivation of the institute achieves a great success.

## VII. CONCLUSION

Although the institute has conducted some fruitful explorations on the integration of industry and education, there are still many problems that need to be researched and solved. For example, the system and mechanism of college-enterprise cooperation need to be improved; most of teachers in the institute are young teachers with weak social connections and insufficient ability to serve enterprises; the motivation of enterprises for college-enterprise cooperation is insufficient.

In the future, the institute will further develop the talent cultivation model of full-process industry-education integration to build a stronger link between applied talents cultivation and the development of industry and enterprise.

The institute will continuously formulate talent cultivation standards, targets and plans with enterprises to achieve the integration of the talents cultivation and the employment standards of industry and enterprise. The institute will further adjust the mode and method of talent cultivation by conducting follow-up surveys on graduates' employment and work conditions, and establishing a long-term feedback mechanism on the evaluation of employment quality.

At first, the institute will continuously carry out specialties and curriculum construction with enterprises to strengthen the links between professional curriculum and vocational standards. In addition, the teaching quality supervision and control system will be optimized, and the teaching methods will be improved according to the dynamic situation of students' practical training.

Second, based on college-enterprise cooperation and industry-education integration, collaborative education platforms will be co-established by the institute and enterprises. In order to achieve the integration between teaching and real situation and the integration between practical training and real projects, the real cases of the enterprises will be introduced into the teaching activities.

Third, multilevel college-enterprise cooperation organizations will be jointly built, and both the college-level and department-level College-Enterprise Cooperation Council and Teaching Steering Committee will be continuously optimized to deepen the integration of industry and education.

Finally, the introduction and cultivation of "Shuangshi" teachers should be strengthened, and teacher management system, evaluation system, and incentive mechanism will be further improved.

## REFERENCES

- [1] Guan Dan and Huang Yibo, "Construction of Permanent Industry-Education Integration Mechanism in Higher Vocational Schools----The Case of Changzhou Vocational and Technical College of Engineering," Changchun: Vocational and Technical Education, vol. 27, 2016, pp. 61-63. (*In Chinese*).
- [2] Li Xinyi, "Research on the Integration Mechanism of Production and Education in the Transformation and Development of Local Undergraduate Universities," [D], Guilin: Guangxi Normal University, 2019. (*In Chinese*).
- [3] Niu Shihua, Yang Pin and Shen Wenqi, "Reference and Enlightenment of Domestic and International Practice of Deep Industry-Education Integration," Xi'an: Modern Enterprise, vol.4, 2016, pp.66-67.
- [4] Peng Mengjiao, "Research on the Integration of Production and Education in Applied Undergraduate Colleges," [D], Chongqing: Chongqing Normal University, 2016. (*In Chinese*).
- [5] Peng Yinnian and Meng Qiaohong, "Thinking and Practice towards School-Enterprise Cooperation of Vocational Colleges under the Background of Industry-Education Integration," Nanchang: Journal of Vocational Education, vol. 14, 2016, pp. 46-49. (*In Chinese*).
- [6] Sun Xiaohui, "A Study of the Paths about Cultivating the Applied Talents with the Integration of Industry and Education of Local Engineering Colleges and Universities," [D], Harbin: Harbin University of Science and Technology, 2017. (*In Chinese*).
- [7] Wang Danzhong, "Basis, Form and Essence: An Analysis of the Connotation of Industry-Education Integration," Nanchang: Journal of Vocational Education, vol. 35, 2014, pp.79-82. (*In Chinese*).
- [8] Wang Danzhong and Zhao Peihua, "Exploration of the Cooperative Education Mechanism in Vocational Colleges from the Perspective of Industry-Education Integration," Beijing: China Higher Education, vol. 21, 2014, pp.47-49. (*In Chinese*).