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Research on Nobel Prize Winning in Japan and the Construction of Practical and Innovative Student Teams in Private Colleges

Zhu Changping[1, 2], Peng Yinbing[1, *], Sun Mengqiu[1], Tong Xingxing[1], Cheng Xinyi[3], Li Wanwan[1], Wang Wenjing[1]

[1]Key Laboratory of Unmanned Aerial Vehicle Development & Data Application of Anhui Higher Education Institutes, Wanjiang University of Technology, Ma'anshan, China

[2]College of Internet of Things Engineering, Hohai University, Changzhou, China

[3]Department of Computer Science and Technology, Xiamen University Malaysia, Selangor, Malaysia

Email address:

cpzhu5126081@163.com (Zhu Changping), yinbingpeng@126.com (Peng Yinbing), 1944729582@qq.com (Sun Mengqiu), 1114944821@qq.com (Tong Xingxing), cst1809199@xmu.edu.my (Cheng Xinyi), 3027866036@qq.com (Li Wanwan), 2571906104@qq.com (Wang Wenjing)

[*]Corresponding author

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Abstract: Training students' innovative abilities has become a basic mode of colleges' talent cultivation, and college students who join the practical and innovative team can receive some basic training and lay a foundation for their growth. The author analyzes causes of the Japan's winning of the Nobel Prize from the five elements of "target, personnel, positioning, power, and plan" constructed by the team. The purpose is to enable the team of practical innovation students in private colleges to forge ahead and cultivate internationally competitive talents needed to build an innovative country. The results show that: "shortage of resources and emphasis on education; focus on inheritance and teamwork; attaching importance to science and technology as solid foundation of the country; free scientific research and avoidance of interference; consolidation of the foundation and rise with accumulated strength" are factors that keep Japan winning the Nobel Prize one after another. Drawing on Japan's successful experience in scientific and technological innovation, the author explored five aspects in the construction of practical innovation student team in Wanjiang University of Technology in five aspects "recognition of oneself and full play of strengths; flexible teaching with various methods and inheritance; focus on application and reliable work; clear responsibility and hierarchical management; continuous communication and improvement." The preliminary exploration proves that these team building measures are in line with the reality of private universities, and are well received by the board of directors, tutors and students.

Keywords: Private Colleges and Universities, Student Teams, Practice and Innovation, Analysis of Nobel Prize, Japanese Inspection

1. Introduction

On October 1, 2018, the Nobel Prize in Physiology or Medicine 2018 was awarded jointly to American immunologist James P. Allison and Japanese immunologist TasukuHonjo. It is amazing that, in the 18 years since 2000 onward, 18 Japanese scientists have won the Nobel Prize in Natural Sciences, with an average of one prize a year. People cannot help wondering the roots for Japan's mushrooming achievements. According to what Mr. Zhu Changping saw and heard during his visit to Japan in 2009 [1], and his team's continuous attention for many years, all of Japanese Nobel Prize winners have ever received higher education and many have won PhD degrees. Their winning of the Nobel Prize is

closely related to their rigorous training in practical and innovative activities in universities, which can be said to play a fundamental role in their winning. Therefore, the author believes that in the practical and innovative team building, it is necessary to study carefully causes of Japan's winning of the Nobel Prize and apply them to the practice and innovation, because it is beneficial to improve cohesion and activity quality of the team, strengthen students' innovative and academic standardization consciousness, enhance the ability of sustainable development, speed up the construction of China as an innovative country and narrow the gap with Japan and other countries in the winning of Nobel Prize. The author studied the causes of Japan's winning of Nobel Prize from the five elements of team building, and carried out the exploration of the construction of practical and innovative teams for private colleges. The research outline is shown in Table 1.

Table 1. *Reasons for the "power of Nobel Prize" for Japan.*

Team structure / Elements	Reasons for Japan's winning of Nobel Prize	Construction of Students' Team in Private Universities
Target	emphasis on education	recognition of oneself and full play of strengths
Personnel	focus on inheritance and teamwork	flexible teaching with various methods and inheritance
Positioning	attaching importance to science and technology as solid foundation of the country	focus on application and reliable work
Power	free scientific research and avoidance of interference	clear responsibility and hierarchical management
Planning	consolidation of the foundation and rise with accumulated strength	continuous communication and improvement

So far, five Japanese have won the Nobel Prize in Physiology or Medicine. In the 18 years since the beginning of the 21st century, the Japanese have won 18 Nobel Prizes, which means Japan has realized more than half of its plan proposed in 2001---30 Nobel Prizes in 50 years. The number of his Nobel Winners in natural sciences surpasses that of the United Kingdom, Germany and Russia, which makes Japan to claim the second Nobel Prize country only after the United States of America. There is a common feature in Japanese Nobel Prize winners: they have participated in the practical and innovative activities when they were college students, and have gained excellent enlightenment in the process of innovation activities [1]. It can be seen that the practical and innovative teams and activities hereafter have a profound impact on the Nobel Prize winners. This paper will analyze the reasons why Japan has become "power of Nobel Prize" from five aspects, which are closely related to the construction of practical and innovative student teams in private colleges in China.

1.1. Target Selection: Shortage of Resources and Emphasis on Education

Japan is called a "small island nation" in the world, with a total area of 378, 000 square kilometers, a quarter of the area of Xinjiang Hui Autonomous Region, China, whose area is 1.66 million square kilometers, and close to China's eighth-largest Yunnan Province with an area of 383,300 square kilometers. The total population of Japan is about 126 million, slightly more than that of Guangdong Province, China, which is 109 million. As a defeated country in World War II, Japan paid huge compensation to other countries. The two atomic bombs have also caused heavy casualties in Japan. After Japan declared unconditional surrendered on August 15, 1945, the economy of the whole country was on the verge of depression.

In the face of resource shortage, Japan focused its development goals on education and science and technology through actively developing education and fostering talents. In 1950, the degree of nine-year compulsory education in Japan reached 99%, and in 1970, 23.6% of high school students were admitted to universities. The development of education has provided high-quality economic modernization with qualified talents. Japan formulated an export-oriented economic development strategy, introduced the most advanced science and technology and adjusted the domestic industrial structure by promoting exports [2]. For example, in the late 1960s, Japan became one of the largest TV set producers in the world and exported a large number of TV sets. Japan especially attached great importance to the production of electronic products which were not highly dependent on natural resources. With its advanced technology, Japan has seen a steady and fast economic development. Emphasis on education has laid a solid foundation for the growth of Nobel Prize winners.

1.2. Personnel Structure: Focus on Inheritance and Teamwork

It is difficult, with only strict and solid working style, to win Nobel Prize in the field of natural sciences, especially of basic physics. Excellent tutors and teamwork are the key factors for winning the Nobel Prize. The intensive teacher-student relationship for Japanese scientists is very prominent around the world. That tutor and students jointly conduct research and jointly win awards is typical of such relationship. Close cooperation and incorporation of everyone's wisdom to overcome difficulties are the embodiment of innovative spirit and sense of teamwork.

Take the physics award as an example. Just as the saying goes, "A strong general has no weak soldiers; the pupil outdoes the master [3]". It is not surprising that such phenomenon is quite common among the Japanese Nobel Prize winners. In 1981, when Akasaka returned to the Department of Electronics Engineering at the Faculty of Engineering, Nagoya University, where he once served as an

associate professor, he conducted research on blue light-emitting diodes (LEDs). After ten years of hard work with his student Amano, he finally succeeded in obtaining ultra-bright blue LEDs in 1992. In 2014, both the teacher and the student won the Nobel Prize in Physics. In fact, as early as 1982, many attempts at gallium nitride (GaN) failed, and many scientists turned their attention to the other two materials that seemed to be more promising. But there were still people who have not lost their confidence, one of whom was Akasaka, teacher of Amano. At his fourth grade in University, Amano joined the Akasaka's laboratory to carry out practical and innovative activities. After being a member of the lab, Amano has been working on blue LEDs with his teacher Akasaka, and has completed the undergraduate paper with the grade "Excellence". In the following two years for his master's degree, he has been researching on GaN, and LEDs thereafter have made great contributions to energy conservation. It is the close cooperation between the tutor and his student and the spirit and determination to overcome all handicaps with combined knowledge that is the key to their success in research.

1.3. Positioning and Focusing: Attaching Importance to Science and Technology as Solid Foundation of the Country

As a country built on the ruins of the Second World War, Japan attaches great importance to the development of science and technology. In the 1980s, the Japanese government put forward the strategy of "building a nation of science and technology", which emphasizes scientific and technological innovation as the foundation of the nation. In response to the strategy and to meet demands for talents in science and technology, the Japanese government took a series of measures: 1) strengthen the government's macro-control, so that different scientific institutes and organizations can respond in time to the general trend of scientific and technological development; 2) create collaborative research system, incorporating "administration, production and learning" so that the government, enterprises and universities have their own focus in the field of research [4]; 3) increase investment in scientific research and improve the quality of the research personnel, so that the personnel not only become "technological breakthrough" talents, but also can look ahead on the future with a prospective view.

Accordingly, the Japanese government carried out a series of educational reforms on colleges and universities, for instance, improving the scientific research structure of colleges and universities, increasing the number of colleges and universities as well as departments and disciplines suitable for the development of science and technology, paying attention to enhancing the quality of education and the cultivation of creative talents, founding new universities or graduate schools with unique characteristics and "special researcher system", and so on. Let's take Kyoto University as an example. It is alma mater for Yukawa Hideki, Japan's first Nobel Prize winner. Kyoto University boasts a unique educational philosophy and an organizational system developing with times, and has become a model for national universities of Japan. It is committed to training students not only with extensive knowledge and advanced technology, but also with innovative engineering talents in new areas of engineering. Under the guidance of such advanced educational idea, Kyoto University created a significant learning atmosphere and enforced strict management upon practical innovation, which deeply educated every student and laid a solid foundation for them to continue their further studies or future work in society.

1.4. Protection of Rights: Free Scientific Research and Avoidance of Interference

The strategy of "developing a nation via science and technology" provides first-class hardware for the development of science and technology while the relaxed and free academic atmosphere is the indispensable software. The independence and freedom of Japanese scientific research environment without interference is the key to guarantee continuous success as it ensures the free and independent research of scientists. On the one hand, Japanese researchers do not have to pay special attention to public relations or worry about funding channels. Consequently they can conduct scientific research from beginning to end without interference. The channels and forms for the university professors and staff in research institutes to apply projects are actually the registration system. The projects do not go through approval at different levels, and a certain amount of funds can be quickly allocated to guarantee their research for several years. On the other hand, the liberal, free and equal academic atmosphere in Japanese universities is exemplary. Among them, Nagoya University is particularly remarkable. The liberty, freedom and democracy of Nagoya University are also reflected in the eclectic selection of talents.

RyojiNoyori, Nobel Laureate of 2001, was invited as an associate professor and head of organic chemistry lecture. In 1960 Shimomura, who discovered green fluorescent protein, was awarded a doctorate in science by Nagoya University. Yong, one of the inventors of blue-light diodes, was over 51 years old when he transferred to Nagoya University from the Panasonic Institute of Technology. 2008 Nobel Prize winners ToshihideMaskawa, Kobayashi and Osamu Shimomura emphasized that "Nagoya University is the hometown of learning" and "the home of the spirit". Such an eclectic selection of talents, encouragement of bold thinking and focusing on their own research is just what academic research needs. As the vice president of Nagoya University--Watanabe -- said in an interview in 2009: "Nagoya University's motto is "A courageous intellectual, 'which means not only cultivating talents who have access to existing knowledge, but also those who have the courage to study with suspicion. And, the instructor's enlightenment can be said to be an important factor". This is the real reason why Nagoya University, as the youngest national university, can compete with other national universities with much longer histories.

1.5. Planning: Consolidation of the Foundation and Rise with Accumulated Strength

The Nobel Prizes won by Japan bears one thing in common: they are hardly awarded for the latest scientific discoveries, instead, they are for the research achievements made twenty or thirty years ago. This just confirms that rather than an award for the latest scientific discoveries, the Nobel Prize is for the scientific discoveries that can go through a rather long period of time. This is the embodiment of consolidating the foundation and rising with accumulated strength. After Japan's lose in World War Two, science was put in the most prominent position. At that time, Japan assembled the best scientists, including university professors, to compile a set of teaching materials to cultivate children's curiosity about nature and science. In today's concept, Japan began quality education in the 1940s. Students worked harder in colleges and universities than in primary and secondary schools. In the late 1950s, some Nobel Prize winners entered the university one after another. At that time, the first-class universities in Japan generally divided learning into two stages. In the first and second grades, general education was implemented, and only in the third and fourth grades did students apply for their majors according to their scores. The advantage is that students don't have to choose majors blindly in the college entrance examination and there are two years for them to explore their real interests. Students proceed with their learning mostly in small classes and can directly enter the teacher's laboratory to carry out practical and innovative activities. Practical capability is especially important for students of science and engineering. What they learn during on-site teaching in large quantities cannot be covered by books.

Therefore, the Japanese Nobel Prize winners are all university graduates, many of whom have received doctorates. These universities invariably attach great importance to the cultivation of students' innovative and practical capabilities. Tamura, who won the Physiological Medicine Award, was a teacher at the night department of Mouta Industrial High School as well as a special honorary professor at Beili University in Japan. He graduated from Yamanashi Prefecture University. After graduation, Damura furthered his study at Night University for a master's degree. At the same time, he sought for research funds sponsored by enterprises and carried on scientific and technological innovation. This accumulative experience laid the solid foundation of "flash of inspiration", which incurred the Nobel Prize. Let's turn to another example. When diligent Hideki Yukawa entered the threshold of university, he decided to devote himself to studying physics, specifically the emerging quantum physics. At that time, Japan's science was still very backward and quantum physics was a blank space. Hideki Yukawa's decision was bold and risky, but he did not fear it and began to explore the microcosm with confidence. In this way, Hideki Yukawa laid a solid foundation of knowledge in the university. It is safe to say that only through the accumulation of basic research can there be "thick accumulation and rich fruits" behind.

2. Construction and Operation of Practical and Innovative Student Teams in Private Colleges

In 2005, when Chinese Premier Wen Jiabao visited Qian Xuesen, Mr. Qian said, "None of the students who have been trained for so many years have made academic achievements comparable with those of the masters trained in the Republic of China." Then Mr. Qian asked further "Why can't our schools cultivate outstanding students?" Qian Xuesen's question is a difficult proposition about education development in China, which needs to be tackled by the whole education circle and even the community. From above analyses of Nobel Prize winning in Japan, certain enlightenment can be elicited. In free and equal academic atmosphere and under the guidance of tutors, students get trained beyond textbooks and, full of curiosity, trace back to the origin of knowledge to realize their fantastic ideas. This is also the author's original intention to construct a team.

2.1. Team Target Selection: Recognition of Oneself and Full Play of Strengths

Team building is designed to maximize team performance and output. Team goals are the prerequisite for its building and so it is crucial to develop goals that everyone agrees on. There is a certain gap in the college entrance examination results and the cultural knowledge between students of the key public universities and those in private colleges, but the positive enthusiasm and courage to explore the world are the same for the students in private colleges and those in famous universities such as Peking University and Tsinghua University. The vast majority of the former also hug dreams, passions, and determination to study hard for the nation's construction. Accordingly, team building use various projects as the carrier of practice and adhere to "inspiration of innovation enthusiasm, independent accomplishment of the project, serious reflection and summary, and active promotion and improvement" as indispensable parts of practice. The final purpose is to cultivate students to their best through innovative practice.

In fact, a lot of students in private colleges are fond of manual practice and always come upon with sudden fantastic ideas. For example, a student in the mechanical department does not achieve high scores in required courses, but he is keen on reflection very much. After the Spring Festival in 2017, when the student met with Mr. Zhu Changping for the first time, he put forward the idea to publish his articles in the world's top journal Nature. Mr. Zhu warmly encouraged him to take this as a goal by reading articles in Nature, seeking advice from the author of literatures so that his personal ideas have three innovative features of "differences, feasibility, value" and conducting a careful experimental exploration to own enough data to validate his ideas. After nearly two years of hard work, the student and his team have obtained some

meaningful data and have been encouraged by foreign scholars after uploading the data to the relevant international journal's pre-exploration pages. Now the student has been admitted by Xi'an Jiaotong-Liverpool University to work for master's degree.

2.2. Team Structure: Flexible Teaching with Various Methods and Inheritance

The structure of team personnel is the basis of coordination, cooperation and collaboration. A team consisting of a mentor with his postgraduates, graduates and undergraduates is widely acknowledged all over the world. The mode of cultivating students in small classes is an effective way to teach students according to their aptitude [5-9]. At present, the scores of the college entrance examination are taken as the only standard for admission to Chinese universities. Although many students love innovative practice from an early age and have good scientific research potential, they are unable to enter famous universities such as Peking University and Tsinghua University because of the poor results of the college entrance examination. Creating conditions for these students to develop their interests and expertise is the main purpose of the author's team building. Most of the private colleges, however, offer only undergraduate education, and the teachers are mostly retired or young teachers. How to cultivate undergraduates with postgraduate training mode is a difficult problem of team personnel structure.

In order to effectively solve this problem, the author draw on the experience from Isamu Akasaki, who allow his student Hiroshi Amano to enter his laboratory to conduct graduation design. In 2016, Mr. Zhu Changping brought six of his students (4 for the bachelor's degree and 2 for the master's degree) from the Internet of Things Engineering College of Hohai University into Wentian College of Hohai University (now Wanjiang University of Technology) for thesis writing. The six students assisted the teachers to recruit more than 200 students majoring in communication or automation in grade 2015. Those with desire for innovation and practice could join the team. The tutors and six students led newly-recruited students to learn basic IT technology and formulated practical and innovative topics.

These recruited students have been learning so actively that after one year of training, they have completed their respective projects and declared more than 10 national patents. Fourteen students have applied for master's degree. Eighteen students are going on their graduation design with their teachers and, in turn, help the teacher to train 15 excellent students enrolled in 2016. Then these 15 students brought out the next 32 students. Now, the brilliant team with 65 students is developing sustainably and healthily.

2.3. Team Positioning Focus: Focus on the Application and Work Reliably

Proper team orientation is very important as it not only affects the direction of team development, but also the speed and quality of team development. From the angle of the existing training mode, the key state-run universities attach great importance to cultivating students' scientific research spirit and ability to explore problems, while private colleges focus on cultivating students' innovative and practical ability as that they can serve as down-to-earth practical talents [10-11]. Private colleges operate under self-management, so they pay more attention to the needs of the society in personnel training, and the specialties established are closely linked with students' actual work in the future. Take Wanjiang University of Technology, where the author is now working, as an example. It boasts the College of Innovation and Entrepreneurship and the Anhui Key Laboratory of Open UAV and Data Application. It pays attention to cultivating students' ability to practice and explore, and provides a platform for innovative and applied talents with serious attitude.

In order to cultivate students' practical, innovative and explorative ability, students on the team compete for innovation and entrepreneurship projects for college students under the guidance of teachers. In the process of competition and completion, they hone their ability to write applications, answer questions, phase reports, summarize questions and complete projects [12-13]. The implementation process of the innovative and entrepreneur project reveals that many students in private colleges have interests and specialties which can be brought into full play quickly in appropriate conditions. Masatoshi Koshiba, the Nobel Prize winner, was a "poor student" in college, but, through high marks of experiments, was allowed to enter the graduate school and won the Togawa scholarship. He finally won the Nobel Prize in physics. Similarly, when students are guided to conduct practical and innovative projects in which they are interested in the cultural atmosphere of perseverance and steadfastness, they will feel happy to learn and make progress every day.

2.4. Team Rights Protection: Clear Responsibility and Hierarchical Management

In team building, reasonable setting of the person in charge and his authority definition is very important to the development of the team. A small number of student cadres in colleges and universities have misplaced their positions and showed so-called official privilege, which leads to students' disgust and difficulties in carrying out their work. In team building, the author appointed students with both virtue and ability as the leaders. The team's finance, personnel and information are managed openly and transparently through the mature systems [13]. In order to ensure the efficient operation of the teams, the principle of team management is: everyone does his business and every business is done by certain people. Consequently, everyone can give full play to his strengths and perform their duties well.

Each grade has a student in charge and the students in senior grades are responsible for leading the lower grades. Tasks are distributed to different grades and the person in charge of each grade subdivides tasks to members of the

grade according to their expertise. In innovative activities, it is very important for everyone to be responsible for and dedicated to doing what they are interested in. Many Japanese scientists can immerse themselves in the field of scientific research by working in laboratories for decades, unknown to the public. This is an important factor for them to win the Nobel Prize. Most private colleges in China have only four grades of undergraduate students. Seniors supervise and help juniors; juniors supervise and help sophomores; sophomores supervise and help the freshmen. When there emerge problems that cannot be solved among the members, seniors communicate with the instructor and work out solutions together [14].

2.5. Team Planning: Continuous Communication and Improvement

An excellent team should provide its members with a platform for personal development so that individuals and teams can make progress together. Students in private colleges failed to achieve ideal results in the college entrance examination partly due to serious subject-bias and partly due to serious lack of self-discipline. The establishment of a perfect team system is the guarantee for the smooth progress of practical and innovative activities [15], of which the essence is self-management and self-monitoring. Under the guidance of tutors, rules and regulations are formulated to supervise the process of practical and innovative activities in time.

The author's team has group and individual plans for each semester and each year, and carries out a progress report every half month, advocating cognitive discussion and realizing positive interaction and improvement together. It provides students with a stage to show their abilities, to constantly learn from experience and to realize self-fulfillment. Furthermore, instructors can understand the progress of practical and innovative activities, and strengthen the interactions with students so as to broaden their design ideas, form a good competitive mechanism, and stimulate students' novel ideas [16].

3. Conclusions

Exploring effective ways to improve the quality of practical and innovative activities has always been one of the key and difficult issues of higher education [17-18]. In the era of rapid development of science and technology, facing the Japanese "blowout" Nobel Prize awards, private colleges in China, the base for training applied talents, put forward higher requirements for building of practical and innovative student teams. Students in private college may have some shortcomings before entering the university, such as subject bias and lack of self-discipline, but many of them have extensive interests, outstanding expertise and deep love for innovative activities. After training of large-scale innovative projects based on teams, most of them have displayed significant improvements in innovative thinking, team cooperation [19], summary writing, sense of responsibility, learning enthusiasm and other abilities and qualities. The growth of these students shows that everyone with dreams is amazing! The development of China depends on young people, so it is a matter of national development to study effective ways to inspire every college student to learn, to practice and to grow healthily. As long as we persevere in research, we will be able to explore the law of talent training. It is still very hard to accomplish the task of building practical and innovative student teams in private colleges, but as long as we persist, we will surely achieve gratifying results, and the gap between the quality of personnel training in Chinese private colleges and that in developed countries will continue to narrow.

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References

[1] Zhu Changping, Wang Zhi, Zhu Chensong, Jiang Bing. Inspecting and thinking of cultivating practical and innovative talents in Japan [J]. Experimental Technology and Management, 2009, 26 (12): 168-170.

[2] Zhou Wenlian, Zhou Qunying. Analysis of the status quo and characteristics of Japan's national innovation system [J]. Japan Studies, 2007, (03): 42-46.

[3] Jiang Hualiang. Blue is better than blue [J]. Science, 2016, (01): 33-36+4.

[4] Qin Yumei. Investigation of the blowout phenomenon of the Nobel Prize in Japan in the early 21st century [J]. Journal of Anhui University (Philosophy and Social Sciences Edition), 2016, (04): 29-37.

[5] Zhou Zhonghai, Zhu Changping, Liu Danping. Construction and implementation of training mode for academic-oriented innovative talents [J]. Experimental Technology and Management, 2017, 34 (11): 31-34.

[6] Li Zhiwei, ZhongQinghua, Li Wei, Zhou Weixing. Exploration and practice of electronic information science based on autonomous learning [J]. Experimental Technology and Management, 2015, (04): 19-22+32.

[7] Fu Kun, Ling Zhenbao, Wang Jinguo. Exploration of independent practice and innovation education for college students of engineering science [J]. Laboratory Research and Exploration, 2015, (04): 196-198.

[8] Zhou Zhonghai, Zhu Changping, Chen Bingyan, Liu Danping, Zhu Hui. Exploration and practice of collaborative training of innovative and entrepreneurial talents under background of "Double innovation" [J]. Experimental Technology and Management, 2018, 35 (7): 23-26.

[9] Shi Yueding, Zhang Xuechang, Wu Hongbing, XuMeijuan, Zhang Lei. Construction and practice of mechanical design and manufacturing and automation in local colleges and universities [J]. China University Teaching, 2015, (02): 34-36.

[10] Li Xiuzhen, Li Qin, Wang Zheng, Ou Xianguo, Sun Zhijie. Exploring the training mechanism of students' comprehensive practice innovation ability [J]. Experimental Technology and Management, 2014, (08): 35-37+41.

[11] Xu Chengying, Wang Yaping, Wang Minghao. Curriculum Reformation of University of Applied Sciences in the Big Data Era in China [J]. Science Research, 2019, 9 (10): 168-174.

[12] Zhu Guanghui, Hu Xuena. Research on undergraduate innovative talents training model under the new situation —— taking the school of basic education of beijing institute of technology as an example [J]. Experimental Technology and Management, 2014, (07): 25-28.

[13] Nurdyansyah, Masitoh Siti, S. Bachri Bachtiar. Problem Solving Model with Integration Pattern: Student's Problem Solving Capability [J]. 2017. 258-261.

[14] Zhu Changping, He Haixia, Zhou Xiaochen, Wang Fei, Gao Yuan, Zhu Jinxiu, Chang Xueqin, Chen Bingyan. Exploration of stepwise cultivation method to improve the quality of graduation design [J]. Laboratory Research and Exploration, 2018, 37 (3): 183 -187.

[15] Zhu Chensong, Zhu Changping, Zhang Xiaohua, Zou Liang. Strengthening the application of management teaching practice and achieving teaching and learning [J]. Experimental Technology and Management, 2012, (10): 146-149.

[16] Shi Rui, Yu Xiaoyong, Liu Ying, Li Lijie. Exploration of the open management mode of university laboratories [J]. Experimental Technology and Management, 2010, (04): 164-166.

[17] Zhu Changping, Gu Qinghua, Chen Zengxi, He Haixia, Wang Fei, Zhu Jinxiu, Chang Xueqin. Practice of improving the quality of all aspects of the "Excellence Plan" [J]. Experimental Technology and Management, 2017, 34, 12: 11 -22.

[18] Zhu Chensong, Zhang Xiaohua, Zhu Changping, Jiang Chenxi. Analysis of innovation efficiency of industry-university-research alliance under the vision of joint innovation [J]. Enterprise Management, Statistics and Decision, 2017, 16: 186-188.

[19] Zhu Changping, Xie Xiukun, Zhao Chaohui, Wang Hanyu, Zhang Xiaohua, Zhu Chensong. Exploration of the cultivation of college students' entrepreneurial ability under the team mode [J]. Higher Engineering Education Research, 2015, No. 3: 33-37 to 82.

Biography

Zhu Changping (1956-), male, from Jingmen, Hubei. He is Ph.D and professor of Hohai University and Wanjiang University of Technology. His research interests include communication circuit and power ultrasonic technology. He received his MS degree from Huazhong University of Science & Technology in 2002 and Ph.D. in Communication and Information System from China University of Mining & Technology in 2010 respectively.

Tong Xingxing (1994-), female, from Chuzhou, Anhui. She is B.D of Wanjiang University of Technology and M.D of Jiangnan University. Her research direction is optical fiber sensing technology and demodulation during postgraduate period.

Cheng Xinyi (2000-), female, from Xiantao, Hubei. She is currently studying at Xiamen University Malaysia, Selangor, Malaysia. The main research direction is Computer Science and Technology.

Peng Yinbing (1977-), corresponding author, male, from Jingzhou, Hubei. He is associate professor of Wanjiang University of Technology. His research interests include second language acquisition and foreign literature. He received his MS degree from Nanjing University of Science & Technology in 2007.

Sun Mengqiu (1996-), female, from Huaibei, Anhui. She received the B.S. degree in Telecommunications Engineering from Wanjiang University of Technology, Anhui, China, in 2019. She is currently studying for the MS degree in the School of Physics and Electronic Information from Huaibei Normal University, Huaibei, China. Her main research interests are fiber lasers and ultrashort pulses.

Li Wanwan (2000-), female, from Bozhou, Anhui. She is currently studying at Wanjiang Institute of Technology. The main research direction is automation.

Wang Wenjing (2002-), female, from Chizhou, Anhui. She is currently studying at Wanjiang Institute of Technology The main research direction is automation.