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Exploration and practice of the run-through cultivation mode for high-end technical and skilled talents---Taking Beijing university of information technology as an example

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Abstract: Run-through Cultivation is an innovative training mode supported by Beijing Municipal Education Commission. It is jointly trained by high-level vocational colleges with Beijing characteristics and application-oriented undergraduates, to connect with advantageous majors in industrial development, and develop talents with high-end technical skills. On the basis of applied higher education, our university increases the training of technical skills at the undergraduate level. Relying on the professional advantages of undergraduate colleges to open up the growth channel of technical skills talents, and cooperate with a number of higher vocational colleges to explore through training mode. Clarify the orientation, training objectives and the training mode of through-education, drive the optimal allocation of educational resources, make full use of the school's high-quality characteristic resources, avoid the homogenization with ordinary undergraduate training methods, and highlight the through-training characteristics of high-end technical and skilled talents. Integration of production and education, cooperation between schools and enterprises to educate people, adhere to the combination of moral and technical training, education and training, to cultivate high-quality technical and skilled personnel. Practice has proved that the effect is good.

Keywords. Run-through cultivation, talent cultivation mode, high-end technical and skilled talents, vocational education.

1. Introduction

In 2015, the Beijing Municipal Commission of Education issued documents such as the "Notice on Conducting the Run-through Cultivation Experiment for High-end Technical and Skilled Talents (BJZC [2015] No.5)", the "Supplementary Notice on Conducting the Run-through Cultivation Experiment for High-end Technical and Skilled Talents (BJZC [2015] No.8)", and the "Notice on Establishing the Contact System for Run-through Cultivation Experiment Institutions" (BJZC [2015] No.15), a pilot program has been decided to carry out to cultivate talents with high-end technical skills from 2015 in Beijing .In order to adapt to the normalization and scale of " run-through education" in teaching mode, organizational management, student work, and other aspects, promote standardized management of " Run-through education ", and cultivate high-end technical and skilled talents with the school's professional characteristics, Beijing University of Information Technology has established the College of Applied Technology on June 30, 2020, adding undergraduate level technical and skilled personnel training to the school's applied higher education. Relying on our advantageous majors, we actively and steadily promote the implementation of comprehensive training, and gradually explore a path for cultivating high-quality technical and skilled talents.[1]

2. Improve the transfer mechanism from Junior college to undergraduate, implement the concept of Run-through education

Implement the spirit of the "Notice on Doing a Good Job in the Upgrading and Transfer Work of the Beijing High-end Technical and Skilled Talents Run-through Cultivation Pilot Project" (JJH [2019] No. 537), strengthen communication and cooperation with higher vocational colleges based on the characteristics of the school, coordinate and collaborate, and adhere to the concept of integration and the principle of fairness and justice. Strictly review the qualifications of transition students based on student status information, and uniformly organize qualified students to take exams according to the requirements of the Beijing Education and Examination Institute [2].

(1) Adhere to the comprehensive evaluation, and improve the upgrading mechanism

The comprehensive evaluation score is calculated based on a hundred-point system and consists of three parts: professional course exams, regular subject exams, and ability outstanding projects. the calculation method of comprehensive evaluation results is as follows:

comprehensive evaluation score=professional course 1 score of 20%+professional course 2 score of 20%+average daily score of 60%, and outstanding ability projects plus 10 points

The usual performance refers to the scores of students in compulsory vocational courses at the higher vocational stage (60 points for passing the make-up exam), which focuses on the accumulation of students' academic achievements at ordinary times.

(2) Set up subjects scientifically, implement the concept of penetration, and reflect the characteristics of the discipline

The professional course exam is determined by the University of Information Technology on the basis of full and careful communication with the docking vocational college. The exam subjects and exam questions should not only highlight the characteristics of the discipline, but also ensure the continuity of education. To establish a joint training mechanism and strengthen the integrated design of talent training programs.

(3) Implement the system strictly, improve the process continuously, and ensure the quality of students

In accordance with the arrangements and requirements of the Beijing Education and Examination Institute, great importance has been attached to and meticulous preparations have been made to implement the examination organization strictly, proposition management, invigilation and inspection tour, and we have successfully completed the work of 2022 upgrading to higher education. And summarized the feedback scores of candidates after the exam timely, and track and improve them continuously. Implement the enrollment filing system, review the students' junior college graduation qualifications again before enrollment is filed, and sign and seal the review form [3].

3. Clarify the school running orientation and training objectives of run-through education, and highlight professional characteristics

(1) The particularity of Run-through education

Run-through education is different from traditional undergraduate education, that there are significant differences in the orientation and training objectives. If the orientation is not clear, it is easy to weaken and homogenized with ordinary undergraduate education in the training stage of undergraduate colleges, unable to achieve the true integration of the advantages of undergraduate and vocational colleges. At present, although talent training programs are formulated by vocational colleges, when it comes to the undergraduate stage, due to the differences in the subject knowledge systems between undergraduate and vocational colleges, the management body has changed, and their training objectives and curriculum settings are often limited by various aspects, leaving few opportunities for independent design of curriculum systems. On the other hand, there are also many problems with the integration and convergence of academic stages. Currently, the College of Applied Technology does not have its own full-time teachers, and the teachers are mainly from various colleges. It is difficult to form a talent cultivation feature that focuses on the practical cultivation of technical skills, which to some extent deviates from the original intention of cultivating high-quality technical and skilled talents. Some characteristic majors with higher levels undertake multiple teaching tasks at different levels at the same time, with different student bases and training objectives, which also poses a huge challenge to teachers' teaching methods, resulting in low enthusiasm for teaching; some students of run-through class are prone to psychological problems such as lack of learning confidence due to their different foundation from undergraduate students. In order to solve this series of problems, the College of Applied Technology has conducted repeated communication and negotiation with vocational colleges and other colleges that undertake courses. Taking full account of the actual situation of students, we have jointly formulated the training plan and the teaching outline for through education [4].

(2) Make full use of the high-quality and characteristic resources of the school, avoid homogenization with ordinary undergraduate education, and focus on cultivating students' comprehensive quality and professional abilities

In order to build an integrated training system, the College of Applied Technology has led and organized many discussions between colleges undertaking run-through education projects and higher vocational colleges such as Beijing Electronic Technology Vocational College and Beijing Information Technology Vocational College. According to the regularity of integrated talent cultivation to grasp the training positioning and educational goals of each academic stage, and arrange the teaching course content and syllabus of each specialty comprehensively, and explore the design of a seven-year integrated curriculum system; We have confirmed the number of students that plan to enroll in our school in the next three years, and made preparations in advance. Take the software engineering specialty (run-through project) as an example: With students as the core, the training objectives are set around the quality requirements that students achieve upon graduation and the professional abilities they should possess for a period of time after graduation. As can be seen from the teaching schedule，the curriculum is mainly composed of professional practice courses, which account for over 50%. Even in professional theoretical courses, the experimental and practical parts are equally emphasized.

In 2022, In order to ensure the efficient and high-quality management of all aspects of the graduation design (thesis) of the run-through cultivation, the graduation design (thesis) leading group of the School of Applied Technology has been established, we have four professional graduation platforms, and have been incorporated into the school's mature graduation design management system, all students' graduation projects can be monitored at any time to ensure the quality of education [5].

4. Build practice base, creates a second classroom for students, promote discipline competitions, and improve the level of disciplines. Strengthen cooperation between schools and enterprises for talents cultivation

The college has launched a "talent training workshop" program, making detailed planning in the management and construction of training bases, exploring new paths for quality education, and providing more and better development opportunities for students to grow.

(1) Build practical training base for new technologies, and enrich talent cultivation models

In 2022, four practical training bases have been established and improved: robot training base, electronic production training base, microcontroller development training base, and embedded system development training base. Expand and enrich the forms of competitions based on the development of discipline competitions. Let more and more students take part in the competitions, improve the selection system, standardize base management, optimize the resource allocation, standardize the competition process, and manage academic competition based on level and category. Teach students according to their aptitude, form echelon development model, build the student team, conduct hierarchical teaching, combine online basic theoretical course with offline traditional practical teaching, provide targeted and planned practical training for students, improve the incentive mechanism, form a higher quality discipline competition management system, and enhance sustainable development, Cultivate students in practice and improve the overall quality of students[6-7].

(2) Promote academic competition, improves the discipline level, and cultivate students' quality

The academic competition should be integrated with the cultivation of talents, which should be incorporated into the practice teaching and the cultivation of talents, so as to stimulate the interest and potential of students, The high or low of college students school achievement have an important relationship with their quality of will. The discipline competition can exercise the quality of students, and cultivate their teamwork consciousness and the spirit of innovation.

The construction of the first phase of the Practical Training Base of the College of Applied Technology has been completed. Robots, smart cars, and ROS platforms have been purchased. Experienced teachers and enterprise experts have been hired as instructors. And several students have participated in relevant training and practical training. The competition platform is opened to students in software engineering, communication engineering, computer science and technology, and other related majors in our college. A professional elective teaching program has been established, which is based on the theoretical knowledge of students during their school years. In a short time, the effect is remarkable. It highlights the information characteristics and professional advantages of our school in the field of robotics and artificial intelligence.

Encourage students to participate in competitions, focus on cutting-edge technology and industrial needs, promote learning and application through competition, cultivate students' willpower and teamwork spirit, and establish a high-quality talent cultivation system. Students' willpower will be fully exercised in the process of solving problems. During competition training, it was scorching heat, and the students were sweating like rain in the stuffy training ground. They fail again and again, try again, but insist on not giving up. The team spirit embodied in the competition is even more crucial. Each student is conscientious and responsible, exerting the power of the team, in order to cultivate students' qualities such as respect, responsibility, empathy, and cooperation.[8]

(3) Strengthen cooperation between schools and enterprises, and promote collaborative education through industry-university cooperation

Focusing on new industries, new formats, and new technologies, the College of Applied Technology has established a training platform for students. In response to the call of the Department of Higher Education of the Ministry of Education, the College has carried out the industry-university cooperative education project "Teaching Reform and Practice of Humanoid Robot Practical Training Course". The practice base around the research of artificial intelligence, robotics, computer science and technology and software engineering have been built, combining Product outcome of enterprise artificial intelligence and robotics, we have produced training courses related to humanoid intelligent robots. Humanoid robots integrate multiple disciplines such as machinery, electricity, materials, computers, sensors, and control technology, reflecting a country's high-tech strength and development level, with a huge market development potential. With the continuous development of the market, there is more demand for relevant talents and higher requirements for professional skills. To this end, the college takes the lead in establishing an integrated training base to carry out talent training centering on related industries and industrial changes. Cultivate students' practical abilities and enrich talent cultivation models. Through higher vocational education training, students generally have good practical ability, and learned relevant courses such as computer science and technology, software engineering and other related courses, and have gained a certain foundation. Combining the company's technological advantages in the field of humanoid robots, through continuous exploration and teaching reform attempts, the traditional curriculum system is gradually changed into a teaching arrangement that is more in line with the needs of market talents. The latest robot technology of enterprises can be introduced into the classroom, supplemented by multimedia means and physical robots, making difficult theories intuitive and operable. Strengthen practical teaching links and guide students to participate in

competitions related to practical training content and exhibitions of scientific and technological innovation achievements through courses. Enhance students' interest in learning, improves teaching efficiency, and improve students' creativity and practical ability as a whole to enhance the ability to serve enterprises [9].

5. Outlook

The goal of the college to train the talents with high technical skills puts forward higher requirements for the new curriculum teaching. Keep up with the pace of the times, focus on long-term goals, and grasp the historical opportunity of characteristic vocational education firmly.

(1) Encourage students to participate in career planning lectures to establish career goals as early as possible

Interest and ambition are the best teachers. These students have only two years in our school. Making career plans as early as possibility can help students establish goals, making career planning as early as possibility is conducive to students' setting goals, and they can have a direction and a clear goal in their future study, especially in the process of professional study. Objective evaluation of self, recognizes their strengths and weaknesses, and conduct self-assessment and evaluation; through attending school lectures, students can conduct career awareness, understand employment needs, understand the current situation and prospects of the target industry, compare and analyze their strengths and weaknesses, opportunities and challenges, and make specific action plans as soon as possible [10].

(2) Strengthen curriculum construction and promote curriculum construction based on work practice

To further improve the professional course connection system between different students, promote the integration, modularizaion, and project-based courses, and accelerate the construction of digital professional courses. Establish a comprehensive teaching quality monitoring system and strengthen the management of academic affairs and the graduation design, adding full-time teachers that need to have both strong educational background and teaching skills, but also have a certain practical ability. In the course setting, it is necessary to keep pace with the times and update it in a timely manner according to the actual enterprise technical requirements. Pay attention to new industries, new forms of business, and new technologies, expand the number of important fields such as advanced manufacturing, artificial intelligence, and modern agriculture, and expand the setting of specialties in short supply and the scale of talent cultivation.

(3) Integrate the "academic certificate + several vocational skill level certificates" system into the talent cultivation program, and optimize the curriculum setting and teaching content

The education mode of "academic certificate + vocational skill certificate" (also known as "1+x") can accurately match the development needs of enterprises and industries. Our School of Continuing Education has awarded the "Winning School" and "Excellent Organizational Unit" with the 1+X Certificate in 2021. In the construction of curriculum resources, four certificate courses, two specialized courses in computer science, and two specialized courses in information security have been produced using special funds. In 2022, we will continue to carry out in-depth pilot work on vocational skill level certificates with relevant colleges in the professional fields of big data application development (JAVA), product entrepreneurship design, Internet software testing, and other professional fields. The College of Applied Technology and the College of Continuing Education belongs to the same organization and management, which is closely integrated in this aspect. The students of the College of Applied Technology come from higher vocational colleges and have obvious advantages. The "1+x certificate" system was integrated into the talent training program, so as to enhance the core competitiveness of students and cultivate high-quality technical and skilled talents to meet the needs of the industry.

(4) Further develop the construction of off-campus practical teaching bases, and promote the talent cultivation model of "innovative practice and school-enterprise joint education" vigorously

Both schools and enterprises play an equally important role in the talent cultivation process, actively cooperating with relevant enterprises to jointly cultivate highly skilled talents suitable for these enterprises' job positions, so as to form a relatively stable employment channel. Actively join relevant organizations such as the Beijing Electronic Information Vocational Education Group, strive for more opportunities for school-enterprise cooperation, build off-campus practical teaching bases, promote the joint cultivation model of schools and enterprises, carry out various types of industry-education integration and school-enterprise cooperation projects, to build "overpass" for talent cultivation [11].

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References

[1] Notice of the Ministry of Education on printing and distributing Standards for the Establishment of Vocational Schools at Undergraduate Level (Trial) [EB/OL].(2021-01-29) [2022-04-26]. http://www.hnpi.edu.cn/zlgl/info/1021/ 1104.htm.

[2] Tai Kangfeng, Ren Jiangwei, Men Yaling. The logical review and practical strategy of formulating the talent training program of "Run-through Cultivation from Higher Vocational Education to undergraduate Education " [J]. China Vocational and Technical Education, 2022(1) :92-96.

[3] LI Zheng. Integration of Industry and Education in Vocational Education: Obstacles and Resolution [J]. China Higher Education Research, 2018 (9):87-92. 10.16298/j.cnki.1004-3667.2018.09.16

[4] Hao Tiancong. Why Vocational Education becomes Type Education? -- Based on the observation of national skill formation system construction [J]. Journal of Soochow University (Education Science Edition), 2020 (4): 63-72.10.19563/j.cnki.sdjk.2020.04.008

[5] Jiang Dayuan. Transboundary, integration and reconstruction: The three characteristics of vocational education as a type of education -- the experience of learning the Implementation Plan of National Vocational Education Reform [J]. China Vocational and Technical Education, 2019(7): 9-12.

[6] Shi Weiping, Hao Tiancong. From School-enterprise Cooperation to Industry-education Integration: The Redirection of Vocational Education Running Mode Reform in China [J]. Educational Development Research, 2019 (1):1-9. 10.14121/j.cnki.1008-3855.2019.01.003

[7] Yao Yan.Research on the Talent Cultivation Cohesion Among"Secondary Vocational,Higher Vocational and Undergraduate Education" Based on Outcome Orientation Education [J].Journal of Harbin Polytechnic. 2021(05):68-70. 10.16145/j.cnki.cn23-1531/z.2021.05.021

[8] Wu Haiyong. Ideas of the Construction of High-level Professional Teaching Groups under the"Double-high Plan"in Higher Vocational Colleges[J]. Shanghai Educational Evaluation Research,2021,10(4):46-51.10.13794/j.cnki.shjee.2021.0054

[9] Wei Dayu. The bottleneck and breakthrough path of the construction of high-level professional group in higher vocational colleges[J]. Education and vocation, 2021(17):45-49. 10.13615/j.cnki. 1004-3985. 2021.17.007

[10] Sun Wenjuan,Tian Li. On the Construction of High-Level Professional Groups in Vocational Colleges ---A Case of Trade and Logistics Professional Groups in Urumqi Vocational University[J]. Xinjiang Vocational Education Research,2021,12(3):35-38.10.16455/j. cnki.65-1281 /g4.2021.03.009

[11] Yang Yong, Lin Xu. Four dimensions in One: Rational Logic of action-oriented teaching method[J]. Education and vocation,2021(2): 80-87.10.13615/j.cnki.1004-3985.2021.02.017

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