

The Construction of Electronic Information Application Specialized Top Talent Cultivation System in the Background of "Intelligent Manufacturing + Artificial Intelligence"

Feng Wang^{a*}, Zhiming Xu^b, Jiajun Zou^c, Weifeng Chen^d

Guangzhou Xinhua University Guangzhou, China

Abstract: With the continuous emergence of emerging technologies, new application technologies gradually have changed the trend of life and society as well as work, in this context, emerging professions are also constantly being declared by colleges and universities, in recent years, especially hot smart manufacturing and artificial intelligence is under this trend of continuous development and growth, many colleges and universities are actively declared, more and more colleges and universities of the deployment of such professions, the traditional professions have a tendency to weaken in the In this context, how to deepen the engineering education reform of electronic information, relying on the changes brought about by the new profession to improve themselves, build the new development trend of the application of specialized top talents training system, to promote the traditional professions in the transformation of education reform to create a first-class, we must see the heritage of the traditional professions, to play to their own strengths in combination with the new technology and new systems, the integration of new professions of the excellent experience, the establishment of the application of the specialized top talents training system can continue to be the best. Specialized top talents training system can continue to serve the regional economic development and industrial upgrading of talent needs.

1. INTRODUCTION (HEADING 1)

From February 2017, when the Ministry of Education promoted the construction of new engineering disciplines [1], to April 2019, when the Ministry of Education issued a notice on the implementation of the "Double Ten Thousand Plan" for the construction of first-class undergraduate specialties [2], it can be seen that the reform of engineering education has entered into a fast car to, because the rapid development and rapid iteration of emerging technologies have increased the demand for engineering talents. Quality of the demand for engineering personnel is increasingly high, the requirements to enhance the quality of education, cultivate practical innovation ability, teamwork spirit and theory and practice of the academic style. Electronic information disciplines as a large class of engineering, the positioning of its disciplines for the traditional engineering, early years there are many colleges and universities because of the subsequent development of electronic information specialties strained, the overall withdrawal of the number of too much, you can see that the development of electronic information is not enough, in this case, the emergence of intelligent manufacturing and artificial intelligence and other new majors, the number of just a few years surge, the overall number of large, but we should see the actual situation, because new majors,

although new, but the teamwork spirit and the theory and practice. Because the new professional although new, but also lack of accumulation and heritage, not after the declaration of success can build a good professional, need a lot of human and material input, on the contrary, electronic information as the old traditional professional, there are disadvantages but also has a strong heritage and rich experience in the construction and development of the establishment of disciplinary systems do not necessarily have to pursue the new and big and complete, should be based on the actual starting point, combined with the conditions of the school's own and the demand for regional talents. It should be based on the actual starting point, combined with the school's own conditions and the needs of regional talents. Electronic information as a major category of specialization covers a number of directions, such as: Internet of things, embedded, electronic communications, computer networks and so on. In the direction of the establishment of the case, should focus on the development of emerging directions, such as: intelligent Internet of things, embedded systems engineering, etc., the same can be in the existing conditions for better construction and development of electronic information technology.

The training of outstanding engineers is to cultivate students' ability to solve complex engineering problems [3]. Electronic information as a traditional discipline curriculum system is centered around the project practice

^aiswf@xhsysu.edu.cn, ^bxujay@xhsysu.edu.cn, ^czoujiajun333@xhsysu.edu.cn, ^dcfwf345@xhsysu.edu.cn

* Corresponding author: iswf@xhsysu.edu.cn

teaching, the main idea is also to cultivate students' innovative engineering ability, in the face of increasingly complex engineering problems can find the optimal solution, the need to accumulate engineering experience, but also need to be good at the use of new technologies and new methods and new tools, to cultivate a comprehensive and innovative quality of talents, cultivate the real top-notch specialists, need to be carried out from various aspects of the Effective measures to implement the program, to effectively revise the talent training program, strengthen the cooperation of enterprises, play the advantages of industrial colleges, with the help of the excellent engineering experience of enterprises to cultivate specialized and applied talents to meet the market demand. In the process of formulating the talent training program, we should draw on the new advantages of the new professional experience, incorporate relevant practical project courses, and enhance the difficulty of engineering practice courses. We should make an article above the direction of electronic information, integrate intelligent manufacturing and artificial intelligence related technology, and reform the characteristics of the direction, such as: intelligent robotics engineering, intelligent Internet of Things application, artificial intelligence application, etc.. The basic curriculum is still to cultivate students' basic engineering practice ability, lay a good foundation, on top of which can increase the curriculum of emerging technologies, communicate with other emerging majors, reform the existing professional courses, more comprehensive design of the curriculum of the practical project, strengthen the difficulty of the practical engineering application, and promote the learning of the second classroom and other initiatives. It is necessary to build an engineering education system to cultivate applied professionals with the goal of serving regional economy and social production.

2. CURRENT BOTTLENECKS AND PROBLEMS ENCOUNTERED IN THE DEVELOPMENT OF THE ELECTRONIC INFORMATION PROFESSION

With the development of emerging technologies, more and more new engineering majors, the original traditional engineering majors to form a considerable challenge, new majors seek to jump out of the original box to new technologies and new visions for development, will boldly take some new ideas, as well as for the future of the technology to do the padding, but the need to invest a lot of manpower and material resources, inevitably to the pursuit of the new to chase the new, and often ignored the construction of the basic curriculum, and the electronic information as an old profession like losing vitality, not to deepen the reform of engineering education to boldly innovate, also facing the development of an awkward situation, no matter what the Electronic information as a veteran professional like the loss of vitality, did not go to deepen the reform of engineering education to boldly innovate with the times, the same is also facing the development of the embarrassing situation, whether as a veteran or emerging professions have the development of the problem, the need to look outside the box to the future.

2.1. Interdisciplinary cross-fertilization and reform of the curriculum is difficult to put into practice

The curriculum of electronic information majors is basically fixed, and it is generally difficult to have a big change, which reflects the result that the curriculum is too basic, and the empirical effect of curriculum innovation is not yet clear [4]. Curriculum content can not be a layer of the same, even if the knowledge points of the basic professional courses are basic knowledge, should also strengthen the design of the difficulty, especially through the interdisciplinary cross-fertilization of the way to strengthen the curriculum of the practical and as well as innovative, to strengthen the integrated design of the curriculum, but also with the help of virtual simulation to learn all kinds of knowledge points. Interdisciplinary cross should be done in practice, can not just increase the course, the knowledge system is not articulated, the increase in the course is not enough to its role in the training of applied talents, in the process of curriculum development, many times just to reflect the characteristics of the setting, did not consider the course whether the real interdisciplinary cross.

2.2. Insufficient investment in the development of electronic information profession

Electronic information profession as the old engineering, there is the foundation of the input follow-up input is relatively small, as a mature discipline are step by step operation, in fact, to develop a profession, need to create a first-class, to create the profession in accordance with the requirements of the first-class professions, such a process requires the input and tilt of the resources, but in general, the school will focus on and prioritize the input of the new profession, the new profession requires the preliminary Construction resources are very large, so it is difficult to obtain strong support for electronic information, the face of insufficient investment at this time to find ways to continue to promote the construction of first-class professions in a cooperative manner, high standards and high requirements, and focus on their own strengths to promote the development of the profession.

2.3. Insufficient investment in the development of electronic information profession

Electronic information technology is not a lack of fixed excellent teachers, not a lack of experienced teachers, after years of development, most teachers have a wealth of teaching experience, it can be said that the faculty is relatively strong, but should be seen, the development of the profession needs fresh blood, the need for interdisciplinary comprehensive quality of teachers, can not be based on the original disciplines of the requirements of the teachers, can not be divided into only the hardware and software teachers, but with other disciplines, background, comprehensive quality stronger teachers who can apply new technologies, absorbing new disciplines out of excellent students as a useful

supplement to the exchange of disciplines, but also the application of new technologies. The background of other disciplines, the comprehensive quality is stronger to apply the new technology teachers, absorb the emerging disciplines out of the excellent students as a useful complement to the teachers of electronic information technology, can promote the exchange of disciplines, but also more convenient for disciplines to carry out in-depth engineering education reform.

3. BUILDING A SYSTEM FOR TRAINING TOP-NOTCH TALENTS IN THE APPLICATION OF ELECTRONIC INFORMATION THROUGH A VARIETY OF INITIATIVES

Reconstruction of the electronic information profession of applied top talents training system, need to take a variety of pragmatic measures, to fundamentally solve the bottlenecks and contradictions in the development of bold reforms in line with the trend, must draw on the experience of excellent first-class professions, to draw on the reform experience of the new profession, with reference to the success of the case, thinking about how to deepen the reform of engineering education in the electronic information profession, we must make use of the existing resources as well as borrowing from the new professional resources, and cooperate with companies in the College of Industry, the purpose of cooperation is to strengthen industrial integration, industry is to verify the effectiveness of the reform, through enterprises and companies to docking social demand, tracking the results of the research feedback, feedback for reform and development.

3.1. Playing the advantages of industry-teaching integration to assist teaching and learning

The purpose of the integration of industry and education is to serve the cultivation of talents, and only through the active interaction and synergy between the two main parties of the school and the company can we give full play to their respective advantages and provide a good environment for the cultivation of innovative talents to grow in practice [5]. The establishment of industrial colleges is also a way to assist teaching for the sake of industry-teaching integration, to give full play to the advantages of enterprises and companies, especially in the scope of the industry covered, to bring the advanced technology experience of the industry to the classroom, in the construction of the curriculum, to be targeted to the design of a comprehensive project, to complete the project teaching to guide the students to cultivate technical skills, to be in the mode of dual-teachers, professional teachers plus engineers way to carry out the curriculum Teaching, to bring into the enterprise's problem projects with students' graduation design, through the establishment of internship bases, so that students can adapt to the company's work in advance. In order to train students in various ways, the process should radiate all the students from freshman to senior, can be in the form of industry

competition, let students enter the school to participate in the competition of the lower grades, as well as let the enterprise engineers to do into the school industry education, the establishment of a full set of industry-teaching integration teaching system, in the form of the form of daily work into the teaching, as a kind of useful supplement to the teaching.

3.2. Re-revision of the talent training program

Talent cultivation program is generally revised in accordance with the cycle, but each revision is a minor adjustment, the adjustment is almost no range, one aspect is because teachers are familiar with the existing curriculum system, on the other hand, many course content is difficult to update, the implementation of the implementation of the program can be taken in a certain complementary way, first relying on the new specialties, such as: intelligent manufacturing and artificial intelligence professional curriculum system, seek to adapt to the electronic information Related courses, first increase the corresponding emerging courses, such as: artificial intelligence applications, etc., on this basis, eliminating some of the bad results, the promotion of talent training is not very effective courses, but can not remove the key core professional courses, you can increase the corresponding direction to the direction of the way to increase the optional courses, in this way you can add more new technology courses, the increase in the curriculum can allow students to choose the interest of the Direction. The reform of the professional foundation courses needs to be careful and prudent, the general reform of the professional foundation courses is to increase the application of new technologies, even the professional core courses are not static, need to be combined with the application of new technologies and new software, many of the courses can be taken as a virtual simulation of the way of learning, so that the students can be based on the original curriculum for the simulation of the design of the integrated project, which can solve the problem of the lack of physical resources.

3.3. Pooling existing strengths to share resources in a cooperative manner

Cultivate applied top specialists can not focus on the existing electronic information disciplines, can not just use the existing resources to meet the teaching, so it is difficult to build the profession into a first-class professional, need to borrow the advantage of resources in the form of cooperation with other professions to share the laboratory as well as advanced teaching resources, the purpose of this approach is to integrate the knowledge system of other professions, to enhance the training mode of this profession, and the way of cooperation and win-win access to cross-disciplinary knowledge system. Win-win way to contact the interdisciplinary cross knowledge system, but also allows students to interdisciplinary project development and technology research, not limited to the direction of the electronic information itself, the courses can rely on the existing conditions of the school

laboratory, you can use such as intelligent manufacturing experiments are PLC, etc., can reduce the hours and difficulty of the course, as well as the nature of the course, so that students can be more broadly contacted. In addition to weak electricity other than strong electricity knowledge system, on the one hand, to train composite cross-disciplinary composite applied talents, on the one hand, can let students cover a wider range of employment channels, cultivate outstanding engineers can not be separated from this way, through the way of touching, integration of advantageous resources, reasonably improve the utilization rate, is not confined to their own disciplines of the conditions of all the resources to establish an integrated system, we must strive to create a first-class professional, to build a first-class curriculum. Build first-class courses.

3.4. Improvement of professional training objectives and enhancement of students' competitiveness in employment

Cultivate students' ability to solve complex engineering problems and literacy, and comprehensively improve students' engineering ability [6]. To improve the professional personnel training objectives, to cultivate applied specialized characteristics of top talents as the direction, to increase the strength and scope of its training, to take more measures for engineering education work, can not be limited to classroom teaching, to establish the experimental training platform system, to increase the experimental training at the same time to start from the freshman year with a purpose and goal-oriented learning activities, to the second classroom way to extend the original course teaching, to let the course teaching completed at the same time can excellent students for in-depth study. Let the course teaching is completed at the same time can be excellent students for in-depth study, such as: in the freshman course in the original basic innovation engineering training courses, based on the original, you can encourage students to further study after the end of the course project development and design, the laboratory experimental materials in a registered way to lend can be in the dormitory to continue to learn. Take the construction goal of first-class professional as the standard, improve the quality of the whole talent training, and cultivate more applied specialized top-notch talents, at the same time, we should combine with the employment situation of the students, tracking and investigating in the context of strengthening and upgrading the quality of cultivation, whether it is possible to improve the competitiveness of the students' employment, through the way of enterprise research, as well as consulting and investigating in the campus job fairs, and we have to form the valuable research report, but also for the sake of a better The revision of the training program, enhance the employment competitiveness of students can also be a side reflection of the cultivation of applied outstanding top-notch talents, especially students who contact key employment enterprises, through the organization of the graduation of top-notch students to obtain good development as a

propaganda model. By organizing the top students who graduated and gained good development as a typical publicity, it motivates and encourages students of all ages to actively cultivate the quality of excellent engineers.

3.5. Introducing interdisciplinary outstanding teachers to improve the professional teachers' business level

Teachers are the important core force to cultivate applied specialists, excellent teachers can bring better results and lead students to faster and better development, we should strive to improve the business level of professional teachers, not to meet the status quo, to improve the level of knowledge and accumulation of interdisciplinary teaching experience in order to change the knowledge system of the discipline, to focus on participating in the production and research and development of enterprises, and enterprise engineers together with the technical seminars and Develop and update the teaching content of the curriculum, set up innovative interdisciplinary practice projects of the curriculum, with the enterprise problem issues as a grip, the solution of difficult problems and other methods into the experimental training teaching, the teacher is the main body of the curriculum design, to make full use of the professional advantages, as well as to continue to learn to explore and make progress in the form of scientific research to enhance the professional business level. Should also introduce outstanding interdisciplinary talents, to recruit new teachers with emerging technologies as the background of the degree, through the introduction of fresh teacher blood, to drive the overall level of improvement, interdisciplinary outstanding teachers can give full play to their own strengths in the profession of the depth of changes to the professional curriculum, you can increase the emerging technologies of the practical project courses, the curriculum is integrated into the industrial frontier and hands-on practical ability requirements for redesign [7]. To form a team of teachers in the form of a course group, so that experienced veteran teachers lead young young teachers with the spirit of struggle, in the form of course seminars to reconstruct the course content, to further expand the dual-teacher teacher team. They should become proficient problem solvers, able to work in multidisciplinary teams, ready to adapt to new technologies, and able to acquire new knowledge and skills when needed[8].

3.6. Enhance the input of whitelisted events, increase academic competitions and academic program support

Electronic information to cultivate more excellent specialized talents, but also can not leave the support of academic competitions and academic projects, to increase efforts to invest in more white-listed industry influential competitions, based on the original basic competitions, to the challenge of more difficult and larger competitions, such as: the International Youth Robotics and Artificial Intelligence Competition, is not limited to electronic

competitions, you can participate in the interdisciplinary cooperation in a wider range of disciplines. Competition, according to the software, hardware, integrated design and development, and communication networks, etc. apply for about six competitions each year, required to cover all students from freshmen to graduating seniors, to classify and guide students to participate in various types of events, the classification of disciplinary competitions, as well as participation in the degree of importance of the academic competitions, regularization of the better academic competitions. On the basis of academic competitions to guide a wider range of students to declare college student innovation and entrepreneurship training program projects, projects to promote scientific research, projects to promote technological research and development, projects to promote the training of talents, through academic competitions and academic projects to increase the cultivation of specialized top-notch talents.

4. CONCLUSION

The education, more precisely the engineering higher education, should be able to load individual the depth knowledge and skill that makes people capable and competent[9]. Under the hot development of intelligent manufacturing and artificial intelligence new professional, this background brings opportunities and changes to the development of electronic information professional, relying on the development of its emerging technologies, sharing its construction resources, cooperation and exchange to promote the deepening of the engineering education reform of the profession, the new professional brings a new knowledge system, but also through the observation of the development of new professions to the electronic information professional reform to provide effective experiences and programs, with the accumulation of infrastructure, combined with the application of new technologies, to strive for first-class in the curriculum content and professional construction standards, as well as the development requirements of the post-New Engineering era, to boldly carry out the electronic information professional reform. Programs, with the accumulation of infrastructure, combined with the application of new technologies, striving for first-class in curriculum content and professional construction, benchmarking the construction standards of first-class majors, as well as the development demands of the post-New Engineering era, boldly carry out the top-level design, and grope for a new mode of cultivating the electronic information application-oriented specialized top-notch talents.

ACKNOWLEDGMENT

This research is supported by 2023 Project of Guangdong Higher Education Institute of Teaching Management, Private Colleges and Universities Teaching Quality Management Committee: Construction of Electronic Information Applied Characteristic Top Talent Cultivation System under the Background of "Intelligent Manufacturing + Artificial Intelligence". (Project No.:

GDZLGL2305); Guangdong Higher Education Society's Higher Education Research Project for the Year 2022 of the "14th Five-Year Plan": Research on Quality Improvement Path of Construction of Engineering Specialties in Guangdong Local Research on Quality Improvement Path of Engineering Specialty Construction in Undergraduate Colleges and Universities (Project No. 23GYB100); 2021 Guangdong Teaching Quality and Teaching Reform Project: Construction of Applied Talent Cultivation System for Electronic Information Specialties in the Context of "Intelligent Manufacturing + Artificial Intelligence" (Issued by: No. 29 of Guangdong Education Higher Letter <2021>); The Second Batch of School-Level Teaching Quality and Teaching Reform Projects of Guangzhou Xinhua College in 2021 (Curriculum Teaching and Research Department) (Project No.: 2021JYS003).

REFERENCES

1. New Engineering [EB/OL]. <http://eee.tju.edu.cn/index.htm>
2. Ministry of Education. Notice of the General Office of the Ministry of Education on the Implementation of the "Double Ten Thousand Plan" for the Construction of First-class Undergraduate Programs [EB/OL]. http://www.moe.gov.cn/srcsite/A08/s7056/201904/t20190409_377216.html
3. He Qiang, Wang Pan, Miao Xiangshui, et al. Exploring the practice of cultivating excellent engineers in integrated circuits based on engineering thinking[J]. *Research on Higher Engineering Education*,2023(06):78-81.
4. ZHOU Ding, LU Guanru, GUO Pengxiang et al. Design pedagogy for interdisciplinary course projects in the context of new engineering education[J]. *Research on Higher Engineering Education*,2023(06):16-26.
5. CHEN Lu, HU Yongxiang, ZHANG Zhinan et al. Industry-teaching integration, using "real problems" to cultivate students' creativity and executive ability[J]. *Research on Higher Engineering Education*,2023(05):65-69.
6. YI Bing, LIU Ting, WAN Qin et al. Exploration and Practice of Talent Cultivation Mode of Excellence Program in Local Universities Based on Professional Accreditation of Engineering Education[J]. *Research on Higher Engineering Education*,2023(06):54-58.
7. Ma Nan, Lu Guodong, Wu Ting et al. Teaching development of engineering teachers from the perspective of craftsmanship[J]. *Research on Higher Engineering Education*,2023(05):93-98.
8. Caeiro-Rodríguez M, Manso-Vázquez M, Mikic-Fonte F A, et al. Teaching soft skills in engineering education: An European perspective[J]. *IEEE Access*, 2021, 9: 29222-29242.

9. Pahari B R. Strategies to reform engineering education[J]. Journal of the Institute of Engineering, 2011, 8(1-2): 48-63.