Research and practice of the training mode of "Excellent front-line engineer"

Xiaoling Cheng[1,*], Renming Deng[2]

[1]School of Electronics and Information, Nanchang Institute of Technology, Nanchang, Jiangxi, China
[2]Guangzhou Yuejian Communication Technology Co., LTD, Nanchang Yuejian Technology Co., LTD, Nanchang, Jiangxi, China

*2012105@nut.edu.cn

Abstract. This study focuses on the modernization needs of the electronic information industry chain in Jiangxi Province, and clarifies the urgent needs of "excellent front-line engineer" in the electronic information engineering major. At present, there are deficiencies in school-enterprise cooperation, and the training mode of the engineer of "excellent engineers" has not been deeply studied. Through the ability structure of "three layers and seven categories", the "hierarchical classification" cultivation mode is proposed to make the cultivation more flexible and targeted. In practice, this model has optimized the curriculum system, strengthened the school-enterprise cooperation, improved the consistency of students' employment, promoted the results of discipline practice competition, promoted the deep cooperation between professional teachers and the industrial chain, and provided beneficial experience and enlightenment for the training of "outstanding front-line engineers" in electronic information engineering.

Keywords: School-enterprise cooperation; Excellent front-line engineer; Three layers and seven categories;

1 Introduction

The upgrading of the electronic information industry chain in Jiangxi province has been identified as the top priority in the "1269" action plan, among which the electronic information industry chain is listed as the first of the 12 key industrial chains in the province, and it is planned to reach the operating income of 1.2 trillion yuan by 2026. This makes the need for "excellent frontline engineers" in electronic information engineering become increasingly urgent. At present, although the school-enterprise cooperation has achieved remarkable results, the in-depth research on the training mode of "excellent front-line engineer" is still insufficient[1]. This study aims to make up for this deficiency, by deeply analyze the needs of the electronic information industry chain, reveal the problems of the existing research, and propose and implement the "hierarchical classification" cultivation mode. There are many problems in the current research on how to train "excellent front-line engineers", including the failure to directly carry out

I. A. Khan et al. (eds.), *Proceedings of the 2024 3rd International Conference on Humanities, Wisdom Education and Service Management (HWESM 2024)*, Advances in Social Science, Education and Humanities Research 849,
https://doi.org/10.2991/978-2-38476-253-8_55

research on the characteristic talents, the lack of deep integration of industry and education, the neglect of the development of industrial chain, and the failure to give play to the main role of enterprises in student evaluation. This study will address these problems, through top-level design and empirical research, so as to improve the modernization level of "excellent front-line engineers" in electronic information engineering and meet the urgent needs of the industrial chain for high-quality talents.

2 Top-level design of talent training- - "three layers and seven categories"

This Through the in-depth research on the needs of Jiangxi electronic information industry chain, the top-level design of talent training for "outstanding front-line engineers" will be improved to make it closer to the actual industrial needs. This study refined competence requirements into several levels, each containing several categories, to achieve more flexible and targeted cultivation patterns. Through this innovative top-level design, it tries to break the division of the traditional training system and make the training process more in line with the actual situation of the complex and changeable electronic information industry chain[2].

The traditional training system is often too rigid and fails to fully meet the needs of the rapid development of the industrial chain. By finely dividing the levels and categories of the ability requirements of "excellent first-line engineers", the actual needs of different levels and different fields can be more accurately captured, making the training process more flexible and personalized. This fine design helps to better meet the special requirements of the industrial chain for high-level engineers and improve the pertinancy and practicability of talent training.

2.1 Capacity structure of "three layers and seven categories"

In order to better meet the needs of the electronic information industry chain, this study proposes the "three layers and seven categories" capability structure of applied.

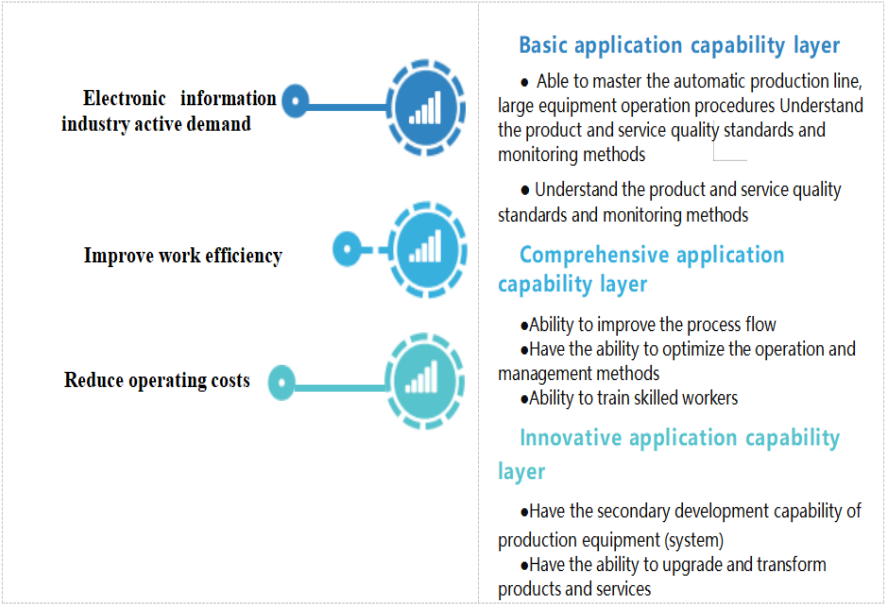

Fig. 1. Schematic Diagram of the "Three Levels and Seven Categories" Competency Structure for Applied Talents in Electronic Information Majors

talents, as shown in Figure 1. The first is the basic application ability layer, which requires students to master the automatic production line and large equipment operation procedures, and understand the product and service quality standards and monitoring methods. The second is the comprehensive application ability layer, which requires students to have the process improvement, operation and management method optimization, technical workers training and other abilities. Finally, the innovative application ability layer, which requires students to have the ability of secondary development of production equipment (system), upgrading and transformation of products and services. The purpose of this structure is to ensure that students can comprehensively develop at different levels and meet the needs of all links of the industrial chain.

2.2 Characteristics of the "three layers and seven categories" mode

The training mode has four characteristics, the first is "one orientation". It makes clear that the orientation of teaching activities is to cultivate application-oriented electronic information talents, paying special attention to the ability to reduce operating costs and improve operational efficiency. The second is the "two docking", closely docking with the urgent needs of the electronic information industry, to ensure that the course content is closely related to the "three layers and seven types of capabilities", to maintain practical and forward-looking. The third is "three satisfaction", through theoretical knowledge, practical teaching and quality training, to fully meet the "three layers and seven types of ability" training requirements, to ensure that students in all aspects of

the comprehensive training. Finally, "four attention". In the teaching process, it pays attention to the combination of theory and reality and ideological and political education, emphasizes the key technology and application ability, quality training emphasizes comprehensive ability and innovation consciousness, and the evaluation system pays attention to ability assessment and quality examination, so as to ensure the comprehensiveness and effectiveness of the training process.

2.3 Mode adaptability of "three layers and seven categories"

The design of this training mode is designed to closely meet the urgent needs of the electronic information industry, especially focusing on the gap of "reducing operating cost and improving operational efficiency" that may not be noticed in general applied universities and vocational colleges.[3]Through the close cooperation with the backbone enterprises in the industry, to ensure that the reform of the training mode is not only systematic, but also can achieve significant results in the practical application. This adaptive design makes the model more practical and better meets the urgent needs of the electronic information industry for talents with specific capabilities.[4]

3 The results of the top-level design of talent training

Under the guidance of the "three layers and seven categories" capability structure, the optimization and reform of the curriculum system aims to closely meet the needs of the electronic information industry. By deepening the school-enterprise cooperation, the ability cultivation of "reducing operation cost and improving operation efficiency" is clearly defined as the guidance, the refined docking of course content is implemented, and the theoretical knowledge and practical teaching fully meet the ability cultivation requirements of "three layers and seven categories".At the same time, school-enterprise cooperation and the implementation of "school-enterprise double teachers" flipped classroom further ensure the close connection between curriculum and industrial needs, and are committed to cultivating electronic information professionals with more practical application and innovation ability.[5]

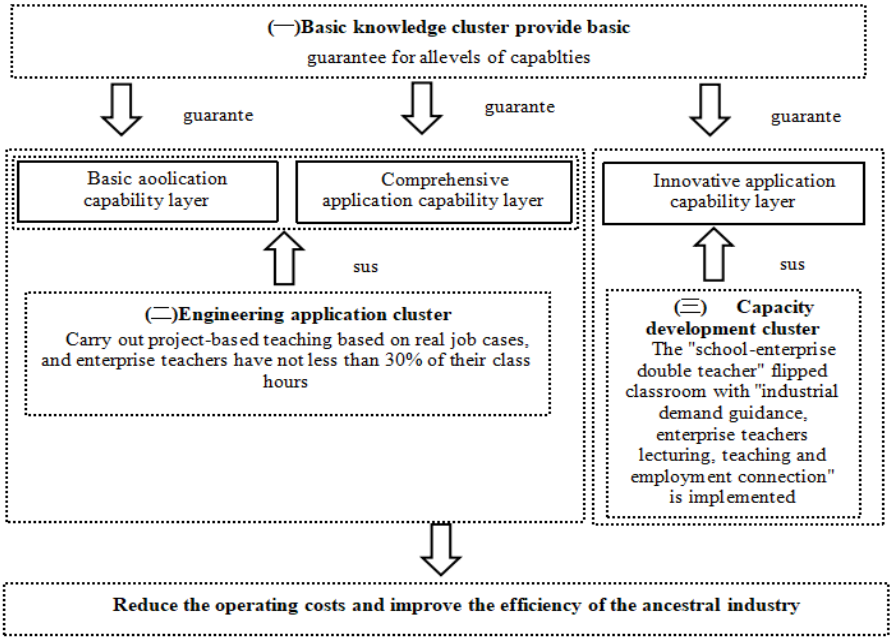

Fig. 2. Schematic diagram of the clustering reform of electronic information major courses

As shown in Figure 2, Three course clusters are proposed to combine theory and practice and reform by classification. The basic knowledge cluster provides a foundation for ability cultivation, enhancing teaching effectiveness through content fragmentation, network reconstruction, and the use of AI technology. [6] The engineering application cluster supports basic and comprehensive application abilities through project-based teaching, with a focus on real case scenarios and significant involvement of industry experts. The ability development cluster focuses on innovation application ability, employing a "flip classroom" approach guided by industry demand, featuring lectures by enterprise teachers, and emphasizing teaching and employment cohesion.

4 Conclusion

This study explores a training mode for "excellent frontline engineers" in electronic information engineering, proposing a "hierarchical classification" approach to meet Jiangxi Province's industry needs. This model improves students' employability, enhances discipline practice competition results, and fosters deeper cooperation between teachers and the industry.[7] The research contributes positively to talent training in electronic information engineering and is significant for meeting the modernization needs of Jiangxi Province's electronic information industry chain.

Acknowledgements

This work is supported by the Jiangxi Provincial Higher Education Teaching Reform Project (Project No: JXJG-23-25-4).

References

1. Beldon Haget, Herbert Yager, etc. Promote the integration of industry and education to cultivate excellent engineers [J]. Higher Education Research in China, 2023,(11):17-25.
2. Lu Huacai, Li Manhua. Research on the ladder training mode of engineering practice ability of excellent engineers [J]. Education and Teaching Forum, 2020, (26): 57-58.
3. Sun Wenfu, Wang Lingling, He Yanting. Research and practice of the model of university-enterprise cooperation to cultivate excellent engineers [J]. Light Industry Technology, 2017,33 (02): 158-159.
4. Yang P. Discussion on the Training Mode of Excellent Engineers in Conditions with Industry University Research Cooperation[J]. 2018.
5. Guo Jingyuan, Wang Xiaochun, Xiong Zhengye, etc. Practical exploration of cultivating outstanding talents in electronic science and technology by diversified mode [J]. Shanxi Youth, 2023, (12): 148-150.
6. Chen Lifang, Zhang Ya, Yao Jianfei, etc. Training of excellent engineers based on the integration of science and education and industry and education [J]. Chemical Industry Higher Education, 2023,40 (06): 51-56.
7. de Vlam M E, Schepers J, Alblas A, et al. Exploring the influence of knowledge-seeking behavior on frontline service engineer problem-solving performance[J].