

Exploration of University-Enterprise Collaboration Mode on Improving Teachers' Practical Teaching Ability

Caixia Yan¹, Qiaoli Han¹, Zhi Weng², Na Ta^{1*}, Kai Sun¹, Xu Wang¹, Qi Zhen¹, Yunfeng Sun¹, Ming Li¹

¹College of Energy and Transportation Engineering, Inner Mongolia Agricultural University, Hohhot, China

²College of Electronic Information Engineering, Inner Mongolia University, Hohhot, China

Email: *ndycx@imau.edu.cn

How to cite this paper: Yan, C. X., Han, Q. L., Weng, Z., Ta, N., Sun, K., Wang, X., Zhen, Q., Sun, Y. F., & Li, M. (2022). Exploration of University-Enterprise Collaboration Mode on Improving Teachers' Practical Teaching Ability. *Advances in Applied Sociology*, 12, 369-376.

<https://doi.org/10.4236/aasoci.2022.128029>

Received: July 26, 2022

Accepted: August 13, 2022

Published: August 16, 2022

Copyright © 2022 by author(s) and Scientific Research Publishing Inc.

This work is licensed under the Creative Commons Attribution-NonCommercial International License (CC BY-NC 4.0).

<http://creativecommons.org/licenses/by-nc/4.0/>



Open Access

Abstract

Universities play an important role in personnel training, in the context of “transformation”, the practical teaching ability of university teachers in the new era needs to be improved to cultivate qualified compound applied talents, university-enterprise collaboration is an effective way. This paper summarizes the measures and achievements on this topic, and analyzes the problems encountered in the process. Through in-depth field investigation and communication with enterprises, an innovative mode of deep university-enterprise collaboration is proposed to effectively improve teachers' practical teaching ability. It is intended to provide reference for other universities with similar situation.

Keywords

University-Enterprise Collaboration, University Teachers, Practical Ability

1. Introduction

In 2021, the Ministry of Education and other six departments issued “Guidance on strengthening the construction and reform of university teacher team in the new era”, the guidance “encourages universities and large or middle sized enterprises and institutions to co-build training bases for teachers, supports the exchange and integration of professional teacher of universities and the talent team of industrial enterprises, and improve teachers' practical and innovation ability”. In January 2018, the CPC Central Committee and The State Council issued

“Opinions on comprehensively deepening the reform of teacher team construction in the new era”, and it pointed out that “it’s necessary to explore the establishment of application-oriented undergraduate evaluation standards and highlight the cultivation of corresponding professional competence and practical application ability”. In 2017, “Some Opinions of the General Office of the State Council on Deepening the integration of Industry and Education” pointed out that deepening the integration of industry and education as well as promoting the organic convergence of education chain, talent chain, industrial chain and innovation chain are the urgent requirements for promoting the supply-side structural reform of human resources. Under new circumstances, it is of great significance to comprehensively improve the quality of education, expand employment and entrepreneurship, promote economic transformation and upgrading, and cultivate new drivers of economic development. With the deepening of comprehensive reform in the field of education in China, local colleges and universities have begun to transform. Universities serve as the main entities for talents cultivation, under the background of transforming to the applied undergraduate education, the improvement of teachers’ teaching ability has become an important part of the reform and development of colleges and universities, which needs careful analysis and research (Ding, 2019). In order to become competent to train applied talents with practical ability in the new era, university teachers should have both solid theoretical foundation and industry work experience or professional technical ability (Wang, 2016).

At present, most teachers in universities have not received systematic training on teaching skills, and their teaching experience is relatively weak. In fact, most young teachers started teaching career right after graduation from colleges or universities without in-depth industry working experience (Zhou & Huang, 2021). For example, in new energy science and engineering major, the proportion of teachers with enterprise work experience is only about 22 %. This leads to the phenomenon of poor hands-on ability of teachers in practical teaching, and often appears inadequate in solving practical engineering problems; some teachers lack the ability to transform professional theoretical knowledge and practical experience into teaching content, and it is difficult for them to guide students to solve practical problems occurs in enterprises. At the end, it cannot meet engineering education’s high requirements on professional teachers’ practical teaching ability. There are many measures to improve teachers’ practical teaching ability, the most effective way is to deeply promote university-enterprise collaboration (Zheng, 2017). Besides university teachers’ own experiences, the issue of lacking practical teaching ability also lies in other factors: such as the imperfect teachers’ training mechanism, the lack of industry-university-research combination mechanism for teachers, the low enthusiasm of enterprises, and teachers’ insufficient attention to improve their practical ability (Qiu, 2019).

The realization of university-enterprise collaboration requires government, universities and enterprises to increase support and coordination at the same time to ensure the implementation of improving teachers’ practical ability under

school-enterprise collaboration mechanism. Government plays a vital role in this collaboration, it can increase subsidies to colleges and universities and formulate preferential policies to better ensure and promote implementation of school-enterprise collaboration (Gao, Zhao, & Cui, 2018).

2. Research Contents and Methods

In view of the above problems, this paper explores the mode of deep collaboration between universities and enterprises to improve teachers' teaching and practical ability, with the aim of contributing to the improvement of teaching quality and cultivating qualified talents for the country. Specific research processes are shown in **Figure 1**. After analyzing the current situation of policy orientation and the new requirements for teachers' practical ability and the problems encountered during improvement of teachers' practical teaching ability, this paper summarizes the existing practices and achievements, and analyzes the problems encountered in the implementation process. In the form of investigating and visiting relevant enterprises and scientific research institutes, the combination point of school-enterprise collaboration is explored from the perspective of colleges and enterprises, so as to propose the innovative mode of school-enterprise collaboration.

3. Measures and Achievements of Our College during the Process of Improving Practical Teaching Ability through School-Enterprise Collaboration

3.1. Actively Establish "Mutually Beneficial and Win-Win" Collaboration Relationships with Enterprises

Taking the new energy science and engineering major as an example, horizontal projects were initiated with enterprises to establish connection and strengthen communication and collaboration. In 2018, our college collaborated with an

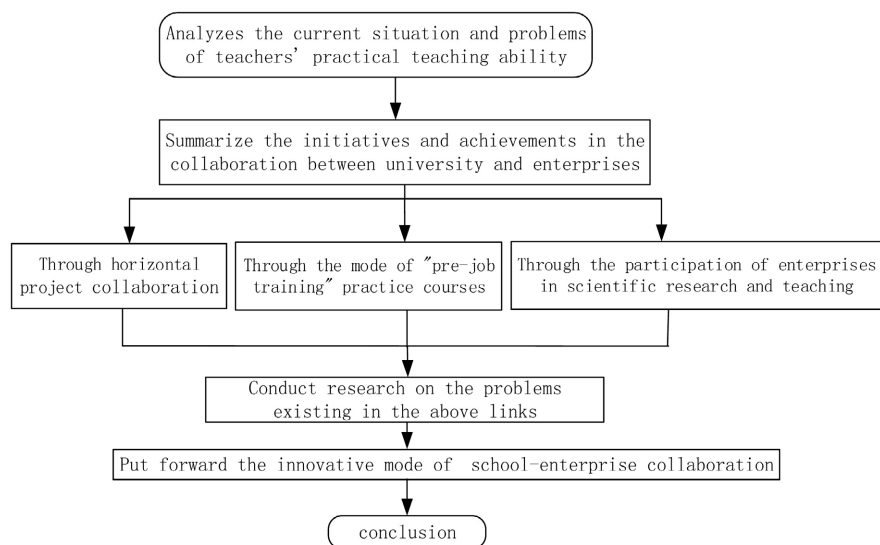


Figure 1. The research process.

electric power enterprise on horizontal project, in which teachers' team of new energy science and engineering mainly compiled training textbooks for company's new and transition employees (from thermal power to wind power). Teachers' team have integrated and combed a large number of wind power generation system related information through several field investigations, data collection at the work site, and communication with front-line staff. Seven textbooks about operation and maintenance of new energy stations have been compiled, covering basic theories as well as operation and maintenance knowledge required by wind farms and photovoltaic power stations.

The experience above is a very valuable opportunity for each member of our project team to accumulate practical experience. Teachers personally experienced the daily work of the wind farm, observed the operation and maintenance of the unit on the spot, and have an overall understanding of all aspects of the wind turbine's operation. After completing the project, teachers' theoretical knowledge of wind turbines becomes more solid, and the combination with practical work is further improved. Furthermore, teachers learned new things in the new energy industry and updated existing knowledge. In view of the problem that enterprises are not enthusiastic about school-enterprise collaboration or teachers' presence in plants. It is very important to actively explore the mutually beneficial and win-win collaboration mode. Enterprises live on production and profit, a collaboration mode would more likely become long-term if enterprises could improve and promote themselves while serving the society.

3.2. Exploration of School-Enterprise Collaboration Mode Based on Pre-Job Training

Restricted by internship sites and production nature of enterprises, student graduation internship of new energy majors enrolled from 2011 to 2013 was mainly based on observation, supplemented by safety training of enterprises and partial operation and maintenance knowledge explanation of wind turbines. The formation of such a model, mainly due to considerations of security issues and the special nature of the enterprise, as well as the time arrangement of the internship, it's inconvenient to arrange students for "post" internship. This internship model was deviated from the real meaning of production practice, which leads to unsatisfactory results. To solve the problem, we put forward the "pre-service training" mode of production practice starting with students enrolled in 2014. Under this model, students can participate in the actual work of wind farms and experience the actual situation of operation and maintenance. They can also learn the practical application knowledge of the ticketing process of power operation and the equipment area that needs special attention during daily inspection and regular maintenance. As seen from scene photos of practice training in **Figure 2**, the internship places and equipment were provided by collaboration enterprises with certain charges. Qualified students in the internship will be issued with training certificates. So far, a total of four sessions of 200 students have benefited from this practice mode, which leads to unanimous external



Figure 2. Practice training site.

praises. The counterpart employment rate of graduates increases year by year and it has continuously reached more than 85% for 3 years. Although this training model is designed for undergraduate practice courses, it can also help teachers achieve the goal of improving practical ability by taking turn to lead students' practice courses. This model can not only lay a good foundation for students in future work, but also provide favorable conditions for teachers to better combine theory teaching with practice (Sun, Yan, & Zhen et al., 2020).

In addition, the college has also signed school-enterprise collaboration agreements with a number of electric power enterprises. These enterprises can provide off-campus cognitive practice bases for students with new energy majors. For example, Longyuan Electric Power Co., Ltd. and Beijing Jingneng Electric Power Co., Ltd. all have wind farms in Huitengxile, Inner Mongolia, teachers and students from our college can visit and study the plants at any time.

3.3. Inviting Enterprise Engineers to Participate in Teaching and Scientific Research

Our college introduced policies, including financial support, to encourage enterprise engineers to teach part of professional courses, which is a new teaching mode. Course details will be discussed and determined by the teaching and research section, and senior engineers with enriched practical experience from relevant enterprises in the industry will be invited to complete 2 - 4 class hours of teaching. While conducting lectures to students, enterprise engineers will also drive university teachers who have participated in the training courses of enterprise technology to combine enterprise-level engineering practice projects with course practice. This helps university teachers integrate the implementation of practical engineering projects into daily teaching activities, research projects and technical discussions, eventually improves practical guidance capabilities of university teachers.

In recent years, students from our school have repeatedly achieved great results in the “National Undergraduate Renewable Energy Science and Technology Competition”, “Internet+”, “Challenge Cup”, “National Construction Colleges and Universities Construction Technology Application Skills Competition” and “Swell Cup Building Information Model Application Skills Competition”, which also indicates students' professional practice ability has been greatly improved through cultivating teachers' practical teaching ability.

Our college is still exploring other avenues: 1) Establishing strategic partnership with enterprises to strengthen deep collaboration in scientific research, information exchange, talent exchange and training, technology transformation and other aspects to further build a suitable industry-university-research collaboration system; 2) Strengthening collaboration with other universities to jointly build an industry-university-research collaboration platform. It has been learned that enterprises can also secure government support when applying for major special projects collaboratively with universities. On the other hand, through joint application with enterprises, teachers from our college have presided over major projects and key technology projects from the provincial Department of Science and Technology, which provides a favorable platform for improving university teachers' scientific research and practical ability.

4. Preliminary Study on the Innovative In-Depth University-Enterprise Collaboration Mode

The above content summarizes and sorts out the experience and achievements of school-enterprise collaboration of new energy major in our college, which is of great helpful to improve the practical teaching ability of young teachers.

At present, the main existing issues are: 1) Communication has been reduced after completion of horizontal projects with enterprises, some programs did not maintain long-term collaboration, and the collaboration mainly focuses on students cultivation but lacks special training for teachers; 2) In terms of funding for "pre-job training" based internship model, universities have been very hard to bear the cost although enterprises feel the most discounted prices were offered. Therefore, it is necessary to explore new ways of in-depth collaboration to improve teachers' practical ability while completing practical teaching.

After early phase investigation and communication, it was found that the dual goals can be achieved by optimizing the existing collaboration mode of practical training. At present, in addition to traditional production operations, many enterprises are also expanding their social influence and cultivating industry talents through university-enterprise collaboration. During conducting external research or leading internship activities, we learned that many enterprises have the intention for vocational training. In order to solve the problem of improving teachers' practical ability while taking into account the training cost, it is preliminarily proposed that the school practice course, such as production practice, can be linked to vocational skills identification after communication with a certain company. Through the development of detailed curriculum plans and comprehensive training of students' practical ability, combined with professional qualification certificate (electrician certificate, climbing certificate, etc.), the employment competitiveness of students could be enhanced. The implementation strategy can be that the school provides the site and future management work, and the enterprise assists in establishing the training base by providing training equipment and technical support as well as maintenance and training services. The school's capital investment is mainly for purchasing equipment, and the

training cost is borne by the enterprise. Teachers can also participate in corporate training and obtain corresponding training certificates. After the improvement of teachers' practical ability, students can be trained in the later stage, and the problem of high cost of external practice course has also been solved. In this way, although the initial investment is large, it can provide a long-term and stable platform for young teachers to improve their practical ability, communicate and work with enterprise personnel from time to time, obtain the most cutting-edge technology, and complete the training of students. This also reduces the hurdles for teachers to go to enterprise for long-term training due to teaching arrangements and personal reasons.

The ultimate goal of the above proposed collaboration mode is: applying for special funding support from government after the collaboration has begun to take shape, so as to achieve further development and realize the new mode of university-enterprise collaboration, namely "industrial college". This way, enterprises would actually involve in the personnel training team, especially to promote the practical teaching ability of teachers in the school to a new level. The Provincial Education Department would also give strong financial support to schools for such collaboration models. Furthermore, enterprise influences would be expanded gradually through collaboration, and ultimately greatly benefit enterprise development. If social service contributions were outstanding, enterprises would be bound to be more easily supported by the government, virtuous cycle forms. After operations become stable, it can also provide training services for new employees and students in the whole region and even the whole country, and supplement the shortage of wind power vocational training base in Inner Mongolia.

5. Conclusion

This paper mainly takes the way of improving teachers' practical teaching ability under university-enterprise collaboration as the theme, analyzes the relevant system of colleges and universities and teachers' understanding of the improvement of practical teaching ability, summarizes the role and influence of the university-enterprise collaboration mode on the improvement of teachers' practical teaching ability, and reflects on the problems existing in the current cooperation. On the basis of the above work, an innovative cooperation model is proposed. In order to carry out in-depth cooperation with enterprises, it is necessary to start with practical teaching cooperation, and gradually create conditions for the establishment of "industrial college" so that enterprises can deeply participate in the whole process of talent training. In this process, teachers' practical teaching ability can be effectively improved, and favorable conditions can be created for the improvement of students' practical ability. Finally, it can provide services for staff training in the new energy industry. Compared with the previous collaboration mode, the advantages of this mode are that both sides are beneficiaries. Universities have improved the strength of practical teaching and enhanced the employment competitiveness of students. Enterprise visibility has been im-

proved and can enjoy preferential policies of the government. Only by effectively realizing the “win-win” of university-enterprise collaboration rather than blindly seeking, can it be healthy and long-term development.

Acknowledgements

This work was financially supported by The 13th Five-Year Plan of Educational Science in Inner Mongolia Autonomous Region in 2019 (NGJGH2019249) and the first batch of this work was financially supported by Le Er Xue Educational Technology Co., Ltd., Ministry of Education’s collaborative education project in 2021 (202102554021).

This work was financially supported by New Engineering Research and Practice Project of the Ministry of Education (No. E-ZDH20201607), University-Industry Collaborative Education Program of the Ministry of Education (No. 202002144039).

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- Ding, Y. Q. (2019). Exploration of Ways to Improve Teachers’ Practical Ability in Applied Universities. *Educational Modernization*, 6, 139-140.
- Gao, C. K., Zhao, F., & Cui, H. (2018). On the Improvement of Teachers’ Practical Ability by School-Enterprise Cooperation Mechanism in Applied Universities. *Modern Economic Information*, 6, 458.
- Qiu, F. (2019). Research on Improving Teachers’ Practical Ability Based on School-Enterprise Cooperation—A Case Study of Electronic Information Specialty of Xiangnan University. *Science and Technology Information*, 17, 132-133+135.
- Sun, K., Yan, C. X., & Zhen, Q. et al. (2020). Research on Engineering Practice Mode of New Engineering Based on Internship-Pre-Job Training-Employment Linkage. *Education and Teaching Forum*, 49, 225-226.
- Wang, Y. L. (2016). The Ways to Improve the Practical Ability of Applied University Teachers. *Journal of Hunan City University (Natural Science Edition)*, 25, 313-314.
- Zheng, S. M. (2017). Taking School-Enterprise Cooperation as an Opportunity to Improve the Practical Teaching Ability of Teachers in Local Undergraduate Colleges. *Journal of Hunan University of Science and Technology*, 38, 109-111.
- Zhou, H. M., & Huang, Z. Q. (2021). Practice of Improving Practical Ability of Applied University Teachers under the Background of Integration of Industry and Education—A Case Study of Longyan University of Fujian Province. *Teacher Education Forum*, 34, 21-24.