

# The Exploration of “Online + Offline” Mixed Teaching Mode of Electrical Automation Technology Professional Courses in Higher Vocational Colleges

Chunhong Li, Hao Zhang\*

Anhui Water Conservancy Technical College, Hefei 231603, Anhui Province, China

\*Corresponding author: Hao Zhang, lchhlby@163.com

**Copyright:** © 2024 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

**Abstract:** With the development of the digital age, information technology (IT) is being gradually applied to all walks of life, especially in the education industry to promote the process of education reform. In this paper, the “online + offline” mixed teaching mode of electrical automation technology courses<sup>[1]</sup> in higher vocational colleges is discussed, the current teaching status is analyzed, and the targeted teaching implementation strategy is put forward. By putting students as the main body of teaching activities, the improvement of teaching efficiency is promoted and experience for the development of electrical automation technology professional courses is accumulated.

**Keywords:** Higher vocational colleges; Electrical automation; Blended teaching

**Online publication:** May 20, 2024

## 1. Introduction

Amidst the development of the current era, education reform continues to deepen. Higher vocational colleges, from the perspective of information technology, are promoting the improvement of the quality of talent training in alignment with the market demand. Through innovative teaching methods, they aim to better meet the needs of students. In the teaching of electrical automation technology, teachers can innovate new teaching methods to break the shackles of traditional teaching, improve students’ enthusiasm for knowledge exploration, and promote their comprehensive literacy through the implementation of mixed teaching modes, thus laying the foundation for the development of better higher vocational education<sup>[2]</sup>.

### 1.1. “Online + offline” mixed teaching mode

In the mixed teaching activities of higher vocational colleges, online teaching refers to teachers expanding the teaching resources of electrical automation technology with the help of information platforms. Offline teaching is when teachers guide students to learn professional skills through the application of multimedia

devices in actual classroom teaching activities and promote the improvement of teaching efficiency through the implementation of blended teaching. The development of blended teaching breaks the shackles of traditional teaching concepts, promotes the diversification of teaching, and helps to achieve better education results.

### **1.1.1. Offline teaching mode**

In offline teaching activities, teachers and students can directly communicate. However, in the traditional teaching of higher vocational colleges, in the offline classroom of electrical automation technology, the teacher is the leader of teaching and often adopts the irrigation teaching method. Students often lack the enthusiasm for exploration in knowledge learning and are prone to various problems. For example, it is difficult for teachers to explain knowledge and students lack enthusiasm for knowledge exploration, which hinders the improvement of classroom efficiency and affects their enthusiasm for learning.

### **1.1.2. Online teaching mode**

With the continuous development of information technology, the online teaching mode is gradually popularized. In the teaching activities of higher vocational colleges, attention is paid to the opening of various online courses and the construction of corresponding high-quality courses. Due to the popularization of information technology, students can learn online, which can be well adapted to the learning of various information courses, and are more willing to accept various teaching methods<sup>[3]</sup>. However, this cannot completely replace the offline teaching mode, only through the development of blended teaching, can ensure the improvement of teaching efficiency. The development of online teaching cannot be separated from the support of the network platform, which has high requirements for students' autonomous learning ability and online teachers.

## **2. The characteristics of “online + offline” blended teaching**

### **2.1. Teaching and classroom mixing**

In the blended teaching mode, online teaching mainly takes IT as the basis to provide more abundant teaching resources for professional teaching and guide students to carry out independent learning through online platforms in addition to traditional offline learning. Compared with the traditional offline teaching mode, it is difficult for students to master difficult professional knowledge in a short time<sup>[4]</sup>. Teachers can summarize key knowledge into teaching videos for students to watch repeatedly, expand the courses on electrical automation technology, and provide summary documents for students to review knowledge.

### **2.2. Mixture of learning styles**

In traditional professional classroom teaching, students learn passively<sup>[5]</sup>. Generally, students only get knowledge from the teacher's explanation and seldom carry out independent exploration, hence they have a poor grasp of knowledge. In online knowledge learning, students can utilize the network platform to watch the provided videos repeatedly to analyze the key points. Implementing blended teaching in electrical automation technology courses in higher vocational colleges enables students to learn at their convenience, better control the learning time, control their learning situation, develop a good habit of independent learning, realize the organic integration of classroom learning and independent learning, and promote their long-term development<sup>[6]</sup>.

### **2.3. Mixed assessment methods**

The traditional classroom assessment in higher vocational colleges mainly adopts the examination method to grasp the knowledge of students. This assessment method only summarizes the students' knowledge

periodically and investigates the learning effect of students at a certain stage. In the implementation of online teaching, students can carry out periodic tests to better apply the knowledge learned flexibly, deepen their impression of knowledge, and enhance their literacy.

### **3. The current situation of electrical automation technology courses in higher vocational colleges**

#### **3.1. The courses do not meet the requirements of the post**

Currently, practical and theoretical teaching has been carried out in higher vocational colleges with the professional teaching of electrical automation technology <sup>[7]</sup>. Students are required to enroll in enterprises for internships. The traditional teaching mode still occupies the dominant position, and the teacher is the core of teaching. Due to the development of science and technology, many new technologies have emerged in the electrical automation industry. However, the teaching content of the course has not been adjusted, resulting in a deviation between the course content and the job demand. Hence, it is difficult to train professional talents who meet the needs of the times.

#### **3.2. Difference in the quality of students**

In the teaching activities of higher vocational colleges, students encounter problems in the process of knowledge learning, such as learning difficulties and learning quality deviation, which increases the difficulty of teaching management. The composition of students in higher vocational colleges is more complex, including liberal arts and science students. Many students enter the school with the help of a single entrance examination, whereas only a few are admitted through the college entrance examination. This results in the obvious differences among students. In addition, due to the poor learning foundation of students and the lack of self-discipline and consciousness in the study of knowledge, the implementation of teaching activities is hindered.

### **4. The implementation strategy of the mixed teaching mode of electrical automation technology major courses in higher vocational colleges**

#### **4.1. Optimize the course content and implement professional teaching**

##### **(1) Pre-class stage**

In the course of electrical automation technology, vocational colleges can encourage teachers to pay attention to pre-class teaching activities and formulate corresponding learning plans for students with the help of blended teaching <sup>[8]</sup>. In the actual implementation of online and offline teaching, teachers can adopt the corresponding teaching platform to better conduct relevant teaching activities and provide convenience for students' independent learning <sup>[9]</sup>. Students can complete pre-class learning tasks through the online platform, such as uploading course assignments and searching for electrical automation-related content. At the same time, students can sort out the questions arising from their preview activities and teachers can carry out targeted teaching activities based on this.

##### **(2) Class stage**

Firstly, there are many problems in the courses of electrical automation technology implemented in higher vocational colleges, with the more common problem being that many students lack learning ability and the improvement of comprehensive literacy is hindered. In traditional teaching activities, teachers overly focus on the explanation of knowledge and neglect the differences among students, resulting in a lack of students' enthusiasm for learning <sup>[10]</sup>. Therefore, in the professional classroom

teaching of electrical automation technology, teachers can strengthen the utilization of online teaching platforms. This can help teachers better monitor students' attendance and expand the teaching period to a certain extent. At the same time, with the help of the online platform, teachers can grasp the knowledge levels of students, establish the important and difficult contents of professional teaching, promote the change of the roles of teachers and students, respect the principal position of students, encourage students to actively participate in knowledge exploration activities, create a good teaching environment for them, and promote the significant improvement of teaching efficiency <sup>[11]</sup>.

Secondly, teachers need to conduct warm-up activities during offline teaching, guide students to carry out preview activities with the help of the optimization of teaching content, grasp students' pre-class learning levels, and adjust the teaching plan. In actual professional classes, teachers can take random roll calls through online platforms to help students focus and improve their class participation. At the same time, teachers can use the online platform to deliver teaching content, help students more intuitively grasp the electrical automation-related content, understand the precautions in practical operation, and promote the improvement of teaching effectiveness <sup>[12]</sup>.

Finally, higher vocational colleges need to pay attention to the adjustment of teaching content and integrate it into the new technology of the industry. Teachers need to understand the situation of students and carry out targeted teaching to enhance students' practical ability and development. With this, the problems in teaching can be identified and corrected, and the teaching effectiveness can be improved.

### (3) The after-school stage

In the exploration activities of traditional offline teaching, it is difficult to control the actual situation of students. However, the development of online teaching mode not only builds a bridge of communication between teachers and students and provides convenience for teacher-student exchanges but also provides convenience for students' independent learning. Teachers can intuitively judge students through factors such as time taken for homework completion to better adjust the teaching activities <sup>[13]</sup>. Students can also review the videos of electrical automation-related micro-lessons after class to lay a foundation for future professional knowledge exploration.

## **4.2. Strengthen teaching reflection and improve teaching effectiveness**

Through the application of online platforms, teachers can conduct personalized tutoring for students to improve their learning effect. Meanwhile, teachers need to think about the implementation of the blended teaching mode, identify any shortcomings, and make targeted adjustments to promote the improvement of teaching effectiveness. For example, in the field of electrical automation, the automatic control system has a higher advantage, the system's reliability is strong and has been widely used in this field, which is one of the knowledge students must master. The application of a hybrid teaching mode allows for diversified knowledge teaching, helps students better understand knowledge, deepens their mastery of relevant theoretical knowledge, and promotes the improvement of the learning effect. At the same time, teachers can design electrical automation exercises according to the student's characteristics from multiple perspectives, including basic and practical exercises. Students are encouraged to complete the relevant homework via the online platform so that teachers easily access it.

## **4.3. Adjust teaching evaluation and improve curriculum quality**

Teachers need to pay attention to after-class evaluation, deepen students' impression of knowledge through

after-class activities, and produce a more intuitive understanding to make targeted adjustments to teaching activities. With the implementation of the blended teaching mode, teachers can evaluate students' knowledge-learning effect through online platforms, answer questions online, and help them better understand their shortcomings. In addition, in the practical teaching of electrical automation technology courses, teachers need to pay attention to the development of teaching evaluation, collate, and summarize students' learning data with the help of online platforms, and objectively evaluate it. Teachers can also utilize questionnaire surveys to collect students' opinions to optimize and adjust the methods of blended teaching <sup>[14]</sup>. Through the optimization of teaching evaluation methods, the evaluation results can be more objective, help students better grasp the learning problems, improve the teaching effect, make the teaching design more scientific and complete, and cultivate high-quality talents.

## 5. Conclusion

The implementation of the mixed teaching mode integrates the advantages of online and offline teaching and takes students as the center of teaching, which enables them to obtain a better environment for knowledge exploration, optimize the teaching process, and help improve the outcome of talent training <sup>[15]</sup>. At the same time, the application of the mixed teaching mode helped promote the improvement of personnel training efficiency and helped students master the latest technology to gradually become high-quality talents in line with social needs, thus laying a solid foundation for future employment.

## Disclosure statement

The authors declare no conflict of interest.

## References

- [1] Chang Q, 2023, Exploration of "Online + Offline" Mixed Teaching Mode for Electrical Automation Technology Major Courses in Higher Vocational Colleges. *China Transition from Military to Civilian*, 2023(24): 153–154.
- [2] Li H, 2023, Research on Online and Offline Mixed Teaching Mode of "Electrical Control Technology" Course in Higher Vocational Colleges. *Journal of Shandong Electric Power College*, 26(5): 59–63.
- [3] Yang X, Guo Y, Jia X, et al., 2022, Research on Teaching Innovation of "Electric Power System Relay Protection" Based on Online and Offline Hybrid. Institute of Education Science, Chinese Academy of Management Science. *Proceedings of the Webinar on Educational Theory Research and Practice (Topic 2)*, Shangqiu Institute of Technology, 2022: 4.
- [4] Cao L, 2020, Application of Hybrid Teaching in PCB Design Course of Higher Vocational Colleges. *Hubei Agricultural Mechanization*, 2020(14): 79–80.
- [5] Fu F, 2020, A Preliminary Study on Project-Based Teaching Reform of Electrical Automation Major in Higher Vocational Colleges. *Agricultural Staff*, 2020(11): 267.
- [6] He S, Lu Y, 2023, Design and Practice of SRL Mixed Teaching Model in Automation Course. *Electronic Technology*, 52(8): 121–123.
- [7] Zhang L, 2023, Problems and Countermeasures of Hybrid Teaching in Higher Vocational Colleges – Taking the Course "Chemical Instrumentation and Automation" as an Example. *Industry and Technology Forum*, 22(14): 205–206.
- [8] Xiong J, Duan X, 2023, Design of new hybrid Teaching Mode in Higher Vocational Colleges based on Intelligent

Education Platform. *Journal of Changzhou Polytechnic of Information Technology*, 22(3): 23–26.

- [9] Chen H, Ren L, Niu J, 2023, Research and Practice of “BOPPPS + Matching” Online and Offline Mixed Teaching Mode – A Case Study of Electronic Design Automation Course. *Shanxi Youth*, 2023(7): 106–108.
- [10] Zhang W, Xie D, Wang Y, et al., 2023, Research and Practice of Multi-process Assessment under Blended Teaching Model. *Science and Technology Wind*, 2023(8): 37–39.
- [11] Wang B, 2022, Exploration and Practice of Blended Teaching Mode of “Automatic Production Line Installation and Commissioning” Course. *Equipment Manufacturing Technology*, 2022(12): 157–160.
- [12] Hao C, Yao J, 2022, Research and Application of Online and Offline Hybrid Teaching in Automation of Storage and Transportation Instruments. *Office Automation*, 27(3): 15–17 + 27.
- [13] Ding Y, Wu J, Wu J, 2021, Application of Hybrid Teaching Mode in Electrical Automation Major. *Electronic Testing*, 2021(15): 137–138 + 94.
- [14] Zeng Y, Li P, Wu J, 2021, Exploration on Hybrid Teaching Mode of “Automation Professional English.” *Journal of Electrical and Electronic Teaching*, 43(3): 24–27 + 32.
- [15] Li C, Zhang Q, 2021, Research on Online and Offline Hybrid Teaching Mode of “Internet+” – A Case Study of “Basic Automation of Chemical Equipment and Instrument” Course. *Science and Education Literature Review (Shangten-day issue)*, 2021(1): 80–81.

**Publisher’s note**

Bio-Byword Scientific Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.