

# Teaching Mode Reform of the Electrical Automation Control Course

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**Abstract:** Under the background of the new era, higher requirements are put forward for colleges and universities to carry out teaching reform. Teachers of electrical automation control courses should update their teaching ideas regularly, innovate teaching methods, and take novel and effective measures to carry out related work. Because electrical automation control courses tend to be technology-oriented, teachers can help students consolidate basic knowledge. They should also focus on developing practical skills so students can easily adapt to future job positions. However, there are many problems in the actual teaching process, which hampers the improvement of the teaching quality to a certain extent. In view of this, this paper presents an in-depth exploration based on theories and practical experiences. It starts with an analysis of the current teaching status of electrical automation control courses in colleges and universities, followed by suggestions to improve them based on their characteristics and students' needs.

**Keywords:** Universities; Electrical automation technology; Teaching status; Optimization strategy

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## 1. Introduction

Rapid socio-economic development and advancements in science and technology have driven progress in many fields, leading to increased demand for talent cultivation. To meet the current trends and industry innovation needs, electrical automation technology teachers in colleges and universities must adapt their teaching approaches. They should align with contemporary developments, focus on professional growth, innovate teaching methods, and optimize curricula to produce highly skilled professionals in electrical automation. In this context, colleges and universities need to develop a scientific talent cultivation plan that integrates job skill requirements with professional course instruction. Alongside theoretical teaching, it is crucial to enhance students' practical skills, ultimately improving their overall competence and preparing them to meet the demands of the modern era. Addressing how to further reform the teaching mode of electrical automation control courses is a key issue currently. This paper will explore this topic in depth, aiming to benefit educators and effectively advance the teaching reform process in the electrical automation field.

## **2. The current teaching status of electrical automation control courses in colleges and universities**

### **2.1. Lack of quality teachers**

College leaders should recognize that the professional knowledge base, practical teaching skills, and overall quality of electrical automation control course teachers are crucial to the effectiveness of their teaching. Therefore, colleges and universities must leverage both the teaching functions of teachers' organizations and family supervision to enhance the faculty team through practical measures. However, investigations reveal that many institutions do not prioritize teachers' training or provide specialized practice training for engineering instructors. Electrical automation and control teachers, in particular, often excel in explaining and expanding knowledge but lack technical skills and practical experience. This lack of emphasis on practical skills training limits the effectiveness of electrical automation and control courses, hindering the comprehensive development of students' practical application abilities <sup>[2]</sup>.

### **2.2. Inadequate practical curriculum**

With the rapid advancement of science and technology, electrical automation technology and equipment are continually being upgraded and optimized, involving increasingly complex theories and technologies. Therefore, colleges and universities should update and supplement the content of electrical automation control courses to stay current with these developments. This includes appropriately adjusting the balance between theoretical and practical courses to promote the integration of scientific knowledge and hands-on practice. This approach not only consolidates students' basic knowledge but also enhances their practical skills and introduces them to industry-relevant knowledge <sup>[3]</sup>. However, there are some deficiencies in the current course settings for electrical automation control. For example, the boundaries between electrification technology and digital technology are not clearly defined, leading to overlapping and repetitive content. This lack of clarity can hinder students from organizing a coherent framework of professional knowledge, thereby limiting their cognitive development and ability to think critically.

### **2.3. Lack of participation in competitions**

Colleges should encourage their students to participate in competitions to promote teaching reform and improve course effectiveness. However, some institutions fail to integrate skills competitions with professional teaching, treating them as separate entities. This disconnect leads to a significant gap between skills competition and professional teaching <sup>[4]</sup>. For instance, some colleges focus solely on practical training for skills competitions without adequately addressing theoretical knowledge. Consequently, some students develop strong practical skills but lack a solid theoretical foundation. Additionally, after skills competitions, some teachers revert to traditional methods that prioritize theory over practice. This creates a persistent disconnect between theory and practice, as well as between competition and teaching. Furthermore, there is often a lack of integration between professional skills and other areas of knowledge, resulting in students who are not well-rounded. As a result, it becomes challenging to produce graduates with a comprehensive understanding of basic knowledge, exceptional practical skills, and high professional quality, which are essential for social development and national progress <sup>[5]</sup>.

## **3. Electrical automation control course teaching model construction path analysis**

### **3.1. Strengthening teacher training**

Colleges and universities should implement effective measures to strengthen the development of teachers,

thereby providing essential support for teaching electrical automation technology. This approach will promote the long-term growth of institutions and enhance the comprehensive literacy of students. To achieve this, colleges and universities must adopt a multi-faceted strategy to improve the overall competency of electrical automation technology teachers. Institutions should regularly organize professional practical training activities for teachers, helping them deepen their understanding of advanced concepts and basic theories through hands-on experience. This will guide teachers in discovering ways to effectively integrate theoretical teaching with practical training, thereby enhancing their professional quality and improving course teaching standards <sup>[6]</sup>. Additionally, colleges should regularly organize practical activities and encourage role exchange between teachers and students, allowing students to lead these activities. This unique environment provides valuable experience and insights for both teachers and students, laying a strong foundation for students' future development. Furthermore, institutions should send outstanding teachers to partner enterprises for on-the-job practice or field visits. This enables teachers to understand the work content and operation modes of the industry, allowing them to adjust teaching programs and optimize curricula based on the professional and distinctive qualities of the enterprise. These steps will help produce high-quality electrical automation technical talents for the innovation and development of the industry <sup>[7]</sup>.

### **3.2. Keeping the teaching curriculum updated**

Colleges and universities need to align their development strategies and teaching plans with the economic needs of the industry and social development goals. For electrical automation technology majors, this means optimizing the curriculum to stay current with the latest trends and advancements. Emphasizing a balanced approach to theoretical and practical teaching is crucial. By adjusting the proportion of theory and practice, institutions can enrich students' knowledge, enhance their practical skills, improve their overall quality structure, and ultimately boost their job readiness and working ability <sup>[8]</sup>. Furthermore, colleges and universities should design targeted teaching activities based on the vocational skills assessment standards set by labor and social security departments. This approach ensures that students can successfully pass these assessments and earn both academic and vocational qualification certificates. In the context of modern education, it is the responsibility of colleges and universities to cultivate high-quality, highly skilled comprehensive talents to meet industry innovation needs. The emergence of advanced technologies in the new era has driven the further innovation and development of electrical automation technology, resulting in continually evolving professional knowledge and innovative technologies. This progression places higher demands on the teaching of this major. Therefore, teachers must optimize the curriculum to keep pace with these changes, incorporating advanced theoretical knowledge and the latest professional research findings. This will enhance the quality of the curriculum, provide students with superior teaching services, and improve their comprehensive abilities <sup>[9]</sup>.

### **3.3. Being innovative in the teaching methods**

It is particularly crucial to build an efficient teaching mode for electrical automation and control courses. To achieve this, it is necessary to boldly innovate the course's teaching methods, stratify the content, and supplement it with case studies <sup>[10]</sup>. The following is a specific strategy analysis:

First, for content stratification, the course should be divided into three levels: basic, improvement, and expansion, based on students' learning foundations and cognitive abilities. The basic layer covers fundamental concepts, principles, and skills of electrical automation control, ensuring that students have a solid grasp of essential knowledge. The improvement layer delves deeper, introducing more complex control system analysis and design methods to cultivate students' comprehensive application abilities. The expansion layer focuses on

cutting-edge technologies and innovative applications, encouraging students to engage in innovative research and practice. Additionally, supplementing the course with case studies is a crucial method for improving teaching effectiveness. By integrating course content with representative practical cases such as industrial automation production lines and intelligent building control systems, students can engage in in-depth analysis. Through these analyses, students are guided to apply their learned knowledge to solve practical problems, thus deepening their understanding and application of theoretical concepts. Furthermore, case studies can stimulate students' interest in learning, enhance their practical abilities, and foster innovative thinking<sup>[11]</sup>. Finally, innovating the course's teaching format is also essential. Adopting a hybrid teaching model that combines online and offline methods, and leveraging network platforms to provide abundant learning resources and interaction opportunities, can further enhance the learning experience.

### **3.4. Implementing reform of the evaluation and assessment system**

College leaders and electrical automation control course teachers must recognize the crucial role of establishing a robust teaching evaluation system throughout the course reform process. Such a system not only guides teachers in adjusting teaching plans but also provides clear direction for students to address deficiencies, ultimately enhancing the effectiveness of course instruction. Specifically, colleges and universities should not solely rely on periodic examinations to evaluate the teaching of electrical automation control courses. Instead, they should actively implement ongoing process evaluations to improve the objectivity and comprehensiveness of the evaluation process. This approach offers clear guidance for students to address gaps in theoretical knowledge and skills, while also providing teachers with valuable insights to adjust teaching plans and optimize curricula effectively<sup>[12]</sup>. Firstly, teachers should uphold the principle of integrating process evaluation with outcome evaluation. This entails not only conducting periodic course exams but also incorporating students' daily homework completion, classroom performance, group assessments, and practical training outcomes into the assessment system. This approach enhances the comprehensiveness of course evaluation while motivating students to pursue knowledge and excellence, thereby elevating the quality of professional course instruction. Secondly, teachers should encourage students to actively engage in various types of teaching evaluation activities, including group peer evaluations, individual self-assessments, and parental feedback. Through these activities, students can conduct comprehensive self-assessments, identify their strengths and weaknesses, and subsequently engage in targeted learning activities to continually enhance their professional capabilities<sup>[13]</sup>.

### **3.5. Highlighting the auxiliary role of information technology**

In developing the teaching model for electrical automation and control courses, leveraging the supportive role of information technology and implementing a content stratification strategy are pivotal for enhancing teaching quality and efficiency. Firstly, information technology facilitates precise content stratification, enabling teachers to segment course content into distinct levels and modules based on students' learning needs and the actual context<sup>[14]</sup>. These levels may include basic knowledge, applied skills, and innovative research layers, each tailored to specific teaching objectives and learning requirements. Secondly, the utilization of information technology involves establishing interactive, resource-rich online learning platforms. These platforms offer students a diverse array of learning resources and tools, such as electronic textbooks, online videos, and simulation software, empowering them to engage in independent learning and exploration tailored to their individual preferences. Thirdly, information technology fosters communication and collaboration between teachers and students through online forums, instant messaging tools, and other means. This facilitates timely responses to student inquiries and provides study guidance, while also enabling interactive learning and

experience sharing among students, fostering a conducive learning environment and collaborative spirit <sup>[15]</sup>. Lastly, teachers can leverage information technology to innovate teaching methods, aiming to harness students' intrinsic motivation and concentration during classroom learning. This approach ultimately enriches teaching content, diversifies teaching methodologies, and cultivates high-quality comprehensive talents in the field of electrical automation technology.

## 4. Conclusion

Teachers of electrical automation technology in colleges and universities must adopt a forward-thinking approach, updating their teaching methods and innovating their classrooms in line with advanced concepts. This involves enhancing teacher training, updating the curriculum to align with current trends, boldly innovating teaching methods, and reforming evaluation systems. Leveraging the supportive role of information technology is crucial in this process. By doing so, students can effectively internalize their learning, enhance practical skills, and ultimately become indispensable talents for the innovation and development of electrical automation technology.

## Disclosure statement

The authors declare no conflict of interest.

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