Research on Teaching Reform of Electrical and Electronic Technology in Higher Vocational Colleges under the background of Internet

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ABSTRACT: With the rapid development of Internet technology and the promotion of teaching reform, new technologies and applications continue to emerge, while traditional books and teaching methods cannot meet the needs of students. Taking electrical and electronic technology as an example, the course involves computer, communication, control and other disciplines, which needs to cultivate students' comprehensive quality and interdisciplinary ability. However, limited class time and teacher-oriented teaching mode are not enough to support the expansion of the breadth of this subject. In order to meet the requirements of the Internet era, the course of electrical and electronic technology needs to be innovated and reformed constantly, introduce new teaching methods and teaching resources, and cultivate high-quality talents with practical ability and innovative consciousness.

KEY WORDS: Internet plus; Higher vocational education; Electrician and electronics; transformation of education

1.Background and Significance

With the rapid development of Internet technology and the promotion of teaching reforms, traditional theoretical teaching faces new demands and challenges. New technologies and applications continue to emerge, and traditional textbooks and teaching methods cannot meet the needs of students. Traditional theoretical teaching focuses more on theoretical analysis and circuit calculations, while neglecting practical hands-on abilities. It is difficult to achieve the requirements of current diversified education models and employment positions for vocational graduates, such as "integration of production and education" and "integration of job competitions and certification". Taking electrical and electronic technology as an example, the curriculum involves multiple disciplines such as computer science, communications, and control. It requires the cultivation of students' comprehensive qualities and interdisciplinary abilities. However, the limited classroom time and teacher-dominated teaching models are not sufficient to support the expansion of the breadth of this subject.

In order to adapt to the requirements of the Internet era, the curriculum of electrical and electronic technology needs constant innovation and reform. It needs to introduce new teaching methods and teaching resources to cultivate high-quality talents with practical abilities and innovative consciousness. The significance of its reform lies in the following aspects:

The reform of electrical and electronic technology curriculum in the Internet era can cultivate students' practical skills, innovative thinking, and problem-solving abilities through multimedia teaching, practical teaching, and project-driven learning, and provide an effective and convenient means for the breadth and depth of professional knowledge learning, thus improving students' comprehensive qualities.

The reform of electrical and electronic technology curriculum in the Internet era can strengthen cooperation with the industry, introduce practical projects and cases, enhance students' hands-on abilities and practical problem-solving abilities, increase their employment competitiveness, and promote industry-academia cooperation.

Electrical and electronic technology is an important foundation for the development of modern society. Through curriculum reform, talents with innovative consciousness and practical abilities can be cultivated, promoting technological innovation and social progress.

2.Advantages of the Internet+ Era in Teaching Reform

The Internet era has brought significant impacts to traditional teaching methods and has provided various feasible approaches for cultivating high-quality talents with practical abilities and innovative consciousness in educational reform. In comparison to traditional teaching models, the Internet+ era has several advantages:

Firstly, abundant learning resources. The Internet provides a wealth of online learning resources, including instructional videos, online courses, e-books, and more. Students can choose suitable learning materials according to their needs. Moreover, Internet technology emphasizes students' self-directed learning abilities. Students can freely select learning paths based on their interests and learning progress, enabling personalized learning. This fosters students' autonomy and self-discipline, and facilitates the shift from a teacher-centered approach to a student-centered one in traditional teaching. Through the use of the Internet and digital technologies, teachers can also access a rich array of open educational resources, such as open courses, instructional videos, textbooks, etc. These resources can help teachers provide diverse and engaging instructional content, stimulating students' interest in learning and their spirit of exploration.

Secondly, a flexible and immersive learning environment. Internet technology enables learning to transcend time and space limitations. Students can engage in learning anytime and anywhere. The Internet offers various teaching aids and resources, such as instructional videos, interactive teaching software, simulation platforms, etc., which enhance students' learning outcomes and interests. Online learning platforms and virtual classrooms provide opportunities for communication and interaction between students and teachers, as well as among students themselves. This breaks the constraints of time and physical location in traditional teaching, addressing the contradiction between limited

class time and intensive subject knowledge.

Thirdly, data analysis and personalized instruction. Internet technology allows for the collection and analysis of students' learning data, providing teachers with more feedback information and guidance for personalized instruction. Teachers can provide precise guidance and support based on students' learning situations and progress.

In summary, the application of Internet technology in teaching provides students with more open, flexible, and diverse learning methods, promoting the globalization and personalization of education. At the same time, educators need to adapt to this transformation and actively explore effective teaching models and strategies to enhance educational quality and students' learning outcomes.

3.Challenges in the Reform of Vocational Education in Electrical and Electronic Technology in the Internet Era

(1) Need for updating talent development objectives: The rapid technological advancements in the Internet era and the emergence of new electronic technologies and applications continuously change the demands for electrical and electronic technology talents. Traditional technical skills are no longer sufficient to meet the requirements of the Internet era. This poses higher demands on curriculum updates and the professional competence of teachers. Therefore, curriculum reform needs to keep up with the development of new technologies, reconsider talent development objectives, and focus on cultivating students' innovation abilities, teamwork skills, and cross-cultural communication abilities, enabling them to adapt to the career development needs of the Internet era.

(2) Challenge of integrating theory and practice: The Internet era emphasizes practical application, while traditional electrical and electronic technology courses often prioritize theoretical knowledge impartation. Therefore, in curriculum reform, greater emphasis needs to be placed on the design of practical components, providing students with more practical opportunities and project-based learning to develop their hands-on skills and problem-solving abilities. Teachers should break the traditional sequencing of knowledge chapters, anchor them in project-based production, infuse theoretical knowledge points, and shift the emphasis from knowing how to solve problems to the ability to identify, debug, and create in teaching, strengthening hands-on and practical skills.

(3) Need for interdisciplinary integration: Electrical and electronic technology in the Internet era is no longer an isolated discipline but closely related to computer science, communication technology, and other fields. Therefore, curriculum reform needs to consider incorporating knowledge from related disciplines into electrical and electronic technology courses, cultivating students' interdisciplinary abilities, and enabling them to tackle complex technical issues.

(4) Distance education and online learning: A significant characteristic of the Internet era is the prevalence of distance education and online learning. Curriculum reform needs to explore how to utilize the Internet and online learning platforms to provide more flexible and convenient teaching methods, allowing students to access learning resources anytime and anywhere, and engage in online practices and discussions.

Overall, the reform of vocational education in electrical and electronic technology in the Internet era faces challenges such as the rapid pace of technological updates, integration of theory and practice, interdisciplinary fusion, distance education and online learning, and the need to update talent development objectives. To address these challenges, continuous updating of curriculum content, strengthening of practical components, integration of knowledge from related disciplines, exploration of flexible and convenient teaching methods, and redefining talent development objectives are necessary to cultivate high-quality electrical and electronic technology talents who can adapt to the demands of the Internet era.

4.Effective Approaches to Teaching Reform in the Internet Era

When implementing teaching reforms in electrical and electronic technology courses in the context of the Internet, several aspects should be considered:

(1) Update and expand teaching content, promote diversified teacher training: In the Internet era, knowledge and applications in electrical and electronic technology are constantly evolving. Teachers need to stay updated with industry trends and the latest technologies and incorporate them into the curriculum, exposing students to the latest practices and applications. To meet the teaching demands of the Internet era, teachers should participate in relevant training and professional development courses to enhance their Internet technology application abilities and instructional design skills. Additionally, collaboration with industry partners can help update teaching content by transforming technical points from production applications into project-based learning, further bridging the gap between teaching and cutting-edge industry practices.

(2) Introduce online learning resources and implement blended learning: Utilize Internet resources to enrich curriculum content. Teachers can incorporate online learning platforms, instructional videos, simulation software, and other resources to assist students in better understanding and mastering concepts and practical aspects of electrical and electronic technology. By integrating online learning seamlessly into traditional face-to-face instruction through a blended learning approach, students can benefit from classroom teaching for understanding and grasping foundational knowledge, while online learning platforms provide more opportunities for practical experiences and in-depth learning materials, enabling students to engage in self-directed learning, consolidation, and extension of their acquired knowledge.

(3) Strengthen practical and project-based teaching, stimulate active student learning: Provide a teaching environment driven by practical experiences and projects through Internet technology. Students can participate in projects and practical activities related to electrical and electronic technology, consolidate classroom knowledge through watching experimental videos, utilizing virtual laboratories,

simulation software, and engaging in post-class practice groups. They can gain hands-on experience and problem-solving abilities by circuit construction, debugging, and project creation, thereby deepening their understanding of theoretical knowledge and enhancing their application skills.

(4) Establish collaboration and communication platforms, provide personalized learning support: Build collaboration and communication platforms using Internet technology to facilitate student cooperation and knowledge sharing. Students can engage in discussions, blogs, forums, and other means to exchange ideas, share learning experiences, and solve problems. Teachers can create online courses, design interactive and exploratory learning tasks and projects, encouraging students to engage in self-exploration, collaborative learning, and the development of problem-solving abilities. Additionally, teachers can track student progress and performance through online learning platforms and provide personalized tutoring and guidance based on individual student needs, assisting them in overcoming learning difficulties.

(5) Regular project showcases and evaluations, encourage student reflection and summarization: Schedule regular project showcases and evaluations where students present their project outcomes to peers and teachers. This promotes student motivation, confidence, and provides timely feedback and assessment, aiding students in further improving and enhancing project quality. Encourage students to reflect on and summarize their project experiences, allowing them to review the entire project process, consolidate theoretical knowledge and practical experiences, reflect on challenges and solutions encountered, as well as their own growth and achievements.

By implementing these innovative approaches, teaching can become more flexible, personalized, and expand beyond the limitations of classroom time, fostering active student participation and independent learning. Simultaneously, teachers need to continually enhance their digital literacy and instructional abilities, adeptly utilizing the Internet and digital technologies to support teaching. Teaching reform needs to comprehensively consider teaching objectives, student needs, and the teaching environment. This comprehensive instructional model helps stimulate students' interest and motivation for learning, ultimately achieving higher-quality teaching outcomes and student achievements.

5.Prospects for Teaching Reform

Analyzing the advantages of advancing teaching reform in the era of the Internet and digital technology, and considering the existing practices and diverse teaching models that have been adopted, there are still areas for improvement in the teaching process of this particular field:

(1) Development of "Online Laboratories": By leveraging existing laboratory equipment, the development of online laboratories can provide virtual experimental environments for electrical and electronic technology experiments using Internet technology. Students can design, simulate, and debug circuits through online platforms, observe real-time circuit performance, and analyze data. This approach eliminates the limitations of limited traditional laboratory resources, allowing students to conduct experiments at any time and place, providing greater flexibility and convenience.

(2) Remote Internships and Engineering Projects: Vocational colleges can collaborate with businesses to provide opportunities for remote internships and engineering projects, enabling students to apply their knowledge of electrical and electronic technology in real work environments. Students can remotely participate in actual projects and engage in online communication and guidance with industry engineers. This internship and project-driven teaching model allows students to apply theoretical knowledge to practical engineering tasks, fostering problem-solving skills and professional competence.

By implementing these improvements, teaching in the field can be further enhanced, allowing students to access practical experiences and real-world applications in a more flexible and convenient manner. These advancements leverage the power of the Internet and digital technology to bridge the gap between theory and practice, cultivating students' abilities to solve real-world problems and enhancing their professional readiness.

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