

Research on the impact of the development of artificial intelligence on the assessment of electricians' job performance

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Abstract

This article explores the impact of the development of artificial intelligence on the assessment of electrician's work permit, and analyzes the changes in the assessment items, forms, teaching modes, and textbook compilation of electrician's work permit. With the integration of smart grid and AI technology, the assessment content has increased to include data analysis, automation equipment operation, network security protection, etc; The assessment format emphasizes the combination of practical operation and theory, adopting a blended learning approach of online and offline teaching; The teaching mode emphasizes personalized learning; Textbook development should incorporate ideological and political elements into the curriculum, adopt a modular structure, and strengthen the application of new technologies. These changes aim to cultivate electrical professionals who can adapt to the demands of the new era.

Keywords

Artificial Intelligence; Electrician's Work Permit; Assessment Items; Textbook Writing; Course Ideology And Politics

1. Significance of the project

With the rapid development of technology, artificial intelligence (AI) has had a profound impact in various fields. In the electrical industry, the application of AI technology has not only changed traditional work methods, but also put forward new requirements for the assessment of electrician job certificates. The electrician's work permit is a necessary document for electricians to engage in electrical equipment installation, maintenance, and other work. The changes in its assessment content and form reflect the changing demand for skilled talents in the electrician industry. This article will delve into the impact of the development of artificial intelligence on the assessment of electrician certification, including the content of assessment items, changes in assessment forms, teaching modes and forms, and explore

how to integrate ideological and political elements into the curriculum and the development of electrician certification textbooks.

2. Changes in the assessment items for electrician's work permit

(1) Traditional assessment items

The traditional electrician qualification assessment mainly includes two parts: theoretical knowledge and practical operation. The theoretical knowledge section covers electrical safety knowledge, circuit fundamentals, electric drive principles, electrical safety regulations, first aid methods for electric shock, and relevant electrical engineering regulations. The practical operation section focuses on testing the candidates' operational skills and emergency response abilities, such as electrical circuit installation, equipment debugging, and troubleshooting[1].

In the context of smart grid, electricians need to master the operation of smart devices such as smart meters and sensors. For example, electricians need to be able to analyze data collected through smart meters to optimize electricity usage. This requires electricians to have certain information technology application capabilities, such as data reading, processing, and transmission.

Mastery of power information and communication technology is also crucial. With the application of IoT technology in the power system, electricians need to understand the relevant communication protocols and equipment to ensure smooth information transmission in the power system.

(2) Data analysis and processing capabilities

Electricians need to master the abilities of electricity load forecasting, distributed power source access data analysis, etc. Traditionally, electricians may rely more on experience to determine power load conditions, but in smart grids, a large amount of data needs to be processed through professional data analysis methods. For example, by analyzing historical electricity consumption data, predicting the future electricity load for a certain period of time, providing a basis for the dispatch of the power system[2].

Data analysis also involves fault diagnosis in the power system. By monitoring various parameters in the power system, such as voltage, current, frequency, etc., and using data analysis algorithms, fault points can be quickly and accurately located, improving the reliability and stability of the power system[3].

(3) Ability to maintain and operate automated equipment

The operation and maintenance of automated control systems (such as SCADA systems) have become one of the core skills. SCADA systems are widely used in the monitoring and scheduling of power systems[4]. Electricians need to understand the architecture, functions, and operating methods of the system in order to be able to maintain and repair it in a timely manner in case of system failures.

The operation of the demand side management platform is also a skill that electricians need to master. Through the demand side management platform, electricians

can manage users' electricity demand by implementing measures such as peak and valley electricity prices and demand response to improve the operational efficiency of the power system[5].

(4) Network security protection capability

With the networking of terminal devices such as smart meters, the power system is facing the risk of network attacks. Electricians need to have basic skills in identifying and defending against network attacks, such as understanding common types of network attacks (such as DDoS attacks, SQL injection, etc.), configuring firewalls, and using intrusion detection systems.

Electricians also need to understand the network security policies and regulations of the power system, ensure compliance with relevant safety regulations during operation, and prevent network security incidents caused by improper operation[6].

(5) Interdisciplinary collaboration ability

In the construction and operation of smart grids, electricians need to collaborate with cross disciplinary personnel such as software engineers and data analysts. This requires electricians to have certain communication and coordination skills, and be able to work together with other professionals to solve problems.

For example, in data analysis projects in the power system, electricians need to collaborate with data analysts to provide accurate power data and assist them in understanding the operational characteristics of the power system for better data analysis and mining.

3. Changes in the assessment format of electrician's work permit

3.1 Traditional assessment methods

The traditional form of electrician certification assessment is mainly divided into theoretical testing and practical operation assessment. Theoretical tests are usually conducted in the form of paper papers or computer-based exams, mainly to assess candidates' mastery of electrical engineering related theoretical knowledge. The practical operation assessment tests the operational skills of candidates by completing specific tasks such as electrical circuit installation, equipment debugging, and troubleshooting.

3.2 The changes in assessment forms brought about by the development of artificial intelligence

(1) Mixed online and offline assessment

With the development of online education technology, the assessment form of electrician certification is gradually shifting towards a mixed online and offline assessment. The online assessment section can use online platforms to test theoretical knowledge, and candidates can log in to the system within the specified time to complete the questions. This method has the advantages of high flexibility and low cost, making it convenient for candidates to conduct assessments anytime and any-

where.

The offline assessment section focuses on examining the candidates' practical operational abilities. By completing specific tasks in practical operating environments, such as installation and debugging of electrical equipment, troubleshooting, etc., the skill level of candidates can be more comprehensively evaluated.

(2) Intelligent assessment system

The intelligent assessment system utilizes AI technology to achieve automation and intelligence in the assessment process. For example, in theoretical assessments, the system can automatically adjust the difficulty of questions based on the candidate's answer situation, in order to more accurately evaluate the candidate's level of knowledge mastery.

In practical operation assessment, the intelligent assessment system can monitor the examinee's operation process in real time through sensors and cameras, and automatically record and analyze the examinee's operation data. This can objectively evaluate the operational skills of candidates and reduce the influence of human factors.

(3) Emphasize the combination of practical operation and theory

With the development of smart grids and AI technology, the assessment of electrician certification places more emphasis on the combination of practical operation and theory. In the assessment process, candidates are not only required to master solid theoretical knowledge, but also to be able to apply theoretical knowledge to practical operations.

For example, when assessing power system fault diagnosis, candidates not only need to understand the theoretical methods of fault diagnosis, but also need to verify the effectiveness of these methods through practical operation. This requires candidates to pay attention to the combination of theory and practice in the preparation process, and improve their comprehensive skill level.

4. Changes in the teaching mode and form of electrician certification

4.1 Traditional teaching mode

The traditional training mode for electrician certification mainly relies on offline teaching. Training institutions or schools will arrange professional teachers to provide face-to-face teaching for students, including theoretical knowledge explanations and practical demonstrations. Students can interact and communicate with teachers in class, raise their own questions, and receive answers.

4.2 The changes in teaching modes brought about by the development of artificial intelligence

(1) Online learning platform

With the development of online education, online learning platforms have become

one of the important modes of electrician certification training. Students can learn theoretical knowledge related to electrical engineering anytime and anywhere through online platforms, without being limited by time and location. Online learning platforms usually provide rich teaching resources, such as video tutorials, online tests, learning forums, etc., to facilitate students' independent learning and consolidation of knowledge.

For example, some training institutions will develop specialized electrician certification training apps or online learning websites, through which students can learn. The platform will provide personalized learning advice based on students' learning progress and grades, helping them better grasp knowledge and skills.

(2) Personalized learning path

AI technology can develop personalized learning paths for students based on their learning situation and needs. By analyzing students' learning data, such as learning time, answer accuracy, etc., the system can understand students' knowledge mastery level and weak links, and recommend suitable learning resources and practice questions for them.

For example, for students who have already mastered the basic knowledge, the system can recommend some advanced learning content, such as advanced applications of smart grids, integration of new energy technologies, etc; For students with weak basic knowledge, the system can provide some consolidation exercises and explanation videos for basic knowledge.

(3) Virtual Reality (VR) and Augmented Reality (AR) technologies

VR and AR technologies can provide a more intuitive and vivid learning environment for electrician certification training. Through VR technology, students can immerse themselves in the installation and debugging process of electrical equipment, as if operating it in an actual operating environment. This helps students better understand and master operational skills.

AR technology can overlay virtual information onto real scenes, providing learners with a richer learning experience. For example, in the teaching of fault diagnosis for electrical equipment, AR technology can overlay virtual fault information and troubleshooting steps on actual equipment to help students better understand and remember.

5. The integration of ideological and political elements in the training of electrician certification

5.1 The Importance of Course Ideology and Politics

Integrating ideological and political elements into the training of electrician certification is of great significance for cultivating electrician talents with noble professional ethics and social responsibility. Course ideological and political education not only helps improve students' comprehensive quality, but also guides them to establish correct worldviews, outlooks on life, and values, laying a solid ideological foun-

dition for their career development.

5.2 The integration of ideological and political elements into the curriculum

(1) Combining the characteristics of electrical technology course content

In the teaching content of electrical technology courses, knowledge points related to ideological and political elements can be explored and integrated. For example, when introducing knowledge of power safety, some power accident cases can be introduced to guide students to recognize the importance of safe operation and cultivate their safety awareness and sense of responsibility through case analysis.

When explaining the operating principles of the power system, it is possible to introduce the development process and achievements of China's power industry, and inspire students' national pride and patriotism. At the same time, it can also guide students to pay attention to environmental issues and social responsibility in the development process of the power industry, and cultivate their environmental awareness and sense of social responsibility.

(2) Adopting diverse teaching methods

In the teaching process, diverse teaching methods can be used to integrate ideological and political elements into the curriculum. For example, through case analysis, group discussions, role-playing, and other methods, students can learn ideological and political knowledge through participation, and improve their ideological and moral qualities.

For example, in group discussions, a topic related to the development of the power industry can be set up, such as "How to achieve a balance between economic benefits and environmental protection in the development of the power industry", and students can be divided into groups to discuss and express their own opinions. Through this approach, not only can students develop a spirit of teamwork and communication skills, but they can also be guided to think deeply about social responsibility issues in the development of the power industry.

(3) Emphasize the exemplary role of teachers

Teachers play an important exemplary role in electrician certification training. The words, actions, professional ethics, and sense of social responsibility of teachers can have a subtle impact on students. Therefore, teachers should pay attention to their own cultivation and quality improvement, lead by example, and set a good example for students.

For example, teachers should strictly abide by professional ethics standards and complete teaching tasks conscientiously and responsibly during the teaching process; In the process of communicating with students, we should respect their individual differences and pay attention to their growth and development. Through the exemplary role of teachers, students can be guided to establish correct professional and value systems.

6. Compilation of Electrician Qualification Certificate Textbook

6.1 Characteristics of Traditional Textbook Writing

Traditional electrician certification textbooks usually focus on the systematic and complete theoretical knowledge, and are divided into chapters according to the disciplinary system of electrical technology. The textbook covers basic knowledge of electrical engineering, circuit theory, electrical equipment, electric drive, safe use of electricity, and other aspects. In the process of writing textbooks, emphasis is placed on logic and organization, making it convenient for students to systematically learn and master electrical knowledge.

6.2 The Impact and Suggestions of Artificial Intelligence Development on Textbook Writing

(1) Modular structure

With the continuous development of technology in the electrical industry, the content of textbooks also needs to be constantly updated and adjusted. Adopting a modular structure can make textbooks more flexible and easy to update. For example, the textbook content can be divided into modules such as circuit foundation, electrical equipment, power drive, safety electricity, smart grid technology, etc. Each module can be written and updated relatively independently, making it convenient for teachers to choose and combine according to teaching needs.

In the smart grid technology module, the concept, architecture, key technologies, and application examples of smart grid can be introduced in detail, allowing students to understand the development trends of smart grid and the new requirements for electrical skills.

(2) Strengthen the writing of new technology application content

With the increasing application of new technologies such as artificial intelligence, big data, and the Internet of Things in the electrical industry, textbooks need to strengthen the writing of content on the application of these new technologies. For example, the working principles and application methods of smart devices such as smart meters, sensors, and automation control systems can be introduced; Can explain how to use big data technology for load forecasting and fault diagnosis in power systems; Can introduce the application of IoT technology in power system monitoring and scheduling, etc.

By strengthening the writing of new technology application content, students can understand the cutting-edge technologies and development trends in the electrical industry, and cultivate their innovative consciousness and practical ability.

(3) Integrating ideological and political elements into the curriculum

In the process of textbook writing, attention should be paid to integrating ideological and political elements into the curriculum. This can be achieved by setting up dedicated chapters on ideological and political education or by incorporating ideological and political content into the process of learning knowledge points. For ex-

ample, when introducing the development process of the power industry, students can be guided to recognize the achievements and challenges faced by China's power industry, and their patriotism and sense of responsibility can be stimulated; When explaining power safety knowledge, the importance of safe operation can be emphasized, and students' safety awareness and professional ethics can be cultivated. At the same time, textbooks can also guide students to deeply consider social and ethical issues in the electrical industry, such as the rational use of power resources and environmental protection, through case analysis, thinking questions, and other methods, cultivating their sense of social responsibility and civic awareness.

(4) Emphasize guidance on practical operations

The assessment of electrician's work permit focuses on the combination of practical operation and theory, so the textbook should pay attention to the guidance of practical operation in the writing process. Students can be guided to practice by setting experimental projects, operating procedures, precautions, and other methods. For example, when introducing the installation and commissioning of electrical equipment, detailed descriptions of the operation methods and precautions for each step can be provided, accompanied by corresponding illustrations and photos, to facilitate students' understanding and operation.

At the same time, textbooks can also provide some common problems and solutions in practical operations, helping students to find timely solutions when encountering difficulties in the practical process.

7. Conclusion

The development of artificial intelligence has had a profound impact on the assessment of electrician certification, not only changing the content, form, teaching mode and format of assessment items, but also putting forward new requirements for the compilation of textbooks. In order to adapt to the development needs of the electrical industry in the new era, the assessment of electrician certification needs to pay more attention to the combination of practical operation and theory, the cultivation of interdisciplinary collaboration ability, and the integration of ideological and political elements into the curriculum. At the same time, the compilation of textbooks also needs continuous innovation and improvement to better meet the needs of electrical talent cultivation. By continuously reforming and innovating the assessment of electrician certification and textbook compilation, more electrician talents who can meet the needs of the new era can be cultivated, making greater contributions to the development of the electrician industry.

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