Exploration and Practice of Artificial Intelligence Empowerment Course Textbook Construction Based on Job Course Competition Certificate - Taking the Course of "Digital Image Recognition Technology" as an Example

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Abstract

In the current era of rapid development of artificial intelligence technology, the construction of curriculum and textbooks is of great significance in cultivating talents that meet the needs of the times. This study takes the construction of the course textbook "Digital Image Recognition Technology" as an example to explore in depth the path of artificial intelligence empowerment based on on-the-job course certification. By analyzing the connotation and value of the integration of job, course, competition, and certification, this article elaborates on the application advantages of artificial intelligence in curriculum and textbook construction. Combined with practical cases of vehicle road cloud, it provides a detailed introduction to the construction practices of curriculum content reconstruction, teaching mode innovation, and textbook writing optimization. Research shows that this construction model can effectively enhance students' professional literacy and practical abilities, enhance their employment competitiveness, provide reference for curriculum and textbook construction, and promote the deep integration of education and industry.

Keywords

Post course competition certificate; artificial intelligence; Che Lu Yun; Curriculum and textbook construction; Digital Image Recognition Technology.

1. Introduction

With the comprehensive advent of the era of artificial intelligence, image recognition technology, as a key field of artificial intelligence, has been widely and deeply applied in many industries such as security monitoring, medical image diagnosis, and vehicle road cloud intelligent transportation. This undoubtedly puts forward more stringent requirements for the cultivation of relevant professional talents, and also requires curriculum and textbook construction to keep up with the pace of the times and constantly innovate. The integration mode of "job course competition certificate" is guided by job requirements, organically combining course teaching, skill competitions, and vocational certificate acquisition, aiming to comprehensively cultivate students' comprehensive vocational abilities and interdisciplinary application abilities. By leveraging artificial intelligence to empower the construction of course materials, actively adapting to the new forms of engineering curriculum reform brought about by the transformation of knowledge production modes, making teaching content more in line with the needs of practical positions such as intelligent transportation, enhancing the scientific and innovative nature of teaching methods, and strengthening students' understanding and application abilities of knowledge. Taking the construction of the course textbook "Digital Image Recognition Technology" as the starting point, exploring the artificial intelligence empowerment model based on on-the-job course competition certification is of great practical

significance for improving the quality of talent cultivation and meeting the development needs of the vehicle road cloud intelligent transportation industry.

2. The connotation and value of artificial intelligence empowerment

2.1. The connotation of artificial intelligence empowerment

The construction of course textbooks empowered by artificial intelligence refers to the use of artificial intelligence technologies, such as machine learning, computer vision, natural language processing, etc., to optimize and innovate various aspects of course textbooks. In terms of course content, the use of artificial intelligence technology can accurately analyze industry trends and job demands, select the most cutting-edge and practical knowledge to integrate into the curriculum, and ensure the timeliness and practicality of teaching content. For example, by analyzing a large number of application cases of image recognition technology in the field of vehicle road cloud, extracting key knowledge points, and updating the content of the "Digital Image Recognition Technology" course on image recognition in intelligent transportation scenarios.

In terms of teaching methods, artificial intelligence can achieve personalized teaching. With the help of intelligent teaching systems, tailored learning plans and teaching content are provided for each student based on their learning progress, knowledge mastery, study habits, and other data. For example, when the system detects that students have difficulty understanding the character segmentation algorithm chapter in the license plate recognition project, it automatically pushes more relevant learning resources such as case analysis and video explanations to help students overcome difficulties.

In terms of textbook writing, artificial intelligence can assist in organizing and formatting textbook content, as well as constructing knowledge graphs. Using natural language processing technology to make the language in textbooks more accessible and logically rigorous, while constructing a visual knowledge graph to facilitate students' understanding of the relationships between knowledge points and improve learning outcomes.

2.2. The value of artificial intelligence in the construction of course materials that integrate on-the-job courses, competitions, and certifications

Enhance the pertinence of teaching content: Artificial intelligence technology can track industry development trends and changes in job skill requirements in real time. By mining and analyzing massive industry data, accurately grasp the specific requirements of image recognition technology talents in fields such as vehicle, road, and cloud, and adjust course teaching content in a timely manner. The close alignment between the knowledge learned by students and the actual job requirements greatly enhances their competitiveness in the job market.

Strengthen the diversity and flexibility of teaching methods: Traditional teaching models have limitations in meeting the learning needs of different students. The integration of artificial intelligence has led to a more diverse and flexible teaching approach. With the help of virtual reality (VR) and augmented reality (AR) technologies, immersive learning environments can be constructed. Taking the vehicle road cloud image recognition scene as an example, students can immerse themselves in it to carry out simulated practical operations, which greatly enhances the fun of learning and the level of student participation. The intelligent teaching platform strongly supports the blended learning mode of online and offline integration, breaking through the constraints of time and space. Students can independently choose the appropriate learning path based on their actual situation.

Promote the expansion and deepening of teaching evaluation dimensions: Traditional teaching evaluation systems often use exam scores as the core measurement indicator, which has significant shortcomings in the comprehensive assessment of students' comprehensive literacy

and diverse abilities. Artificial intelligence technology can achieve diversified teaching evaluation by collecting data on students' classroom performance, homework completion, practical operation process, and other aspects. By using big data analysis and machine learning algorithms, students can be comprehensively and objectively evaluated. Such evaluation results can not only reflect students' learning outcomes, but also identify their learning strengths and weaknesses, providing a basis for personalized teaching.

3. Advantages of Course Textbooks Based on Job Course Competition Certificates

3.1. Curriculum content reconstruction based on job requirements

Through research on relevant positions in the vehicle road cloud intelligent transportation industry, we aim to gain a deeper understanding of the application scenarios and skill requirements of image recognition technology in practical work. Based on these research results, reconstruct the content of the course "Digital Image Recognition Technology". Increase the teaching weight of practical application cases such as license plate recognition, vehicle classification, and road sign recognition in vehicle road collaboration, and combine theoretical knowledge points with practical work scenarios to enable students to better understand and master the knowledge. According to changes in job skill requirements, update course content in a timely manner, introduce the latest image recognition algorithms and technologies, and ensure that students' knowledge is synchronized with industry development.

3.2. Innovation of teaching mode promoting learning through competition

Integrating skill competitions into curriculum teaching to promote learning through competitions. Organize students to participate in various competitions related to image recognition technology. During the preparation process, students need to comprehensively apply their knowledge and skills in image recognition to solve practical problems encountered in the competition. This not only helps to arouse students' enthusiasm for learning and cultivate their innovative thinking, but also effectively improves their performance ability in team collaboration, significantly enhancing their practical and hands-on operation level. Teachers can adjust the teaching content and pace according to the requirements of the competition project, integrate the knowledge and skills points from the competition into daily teaching, and make teaching more practical.

3.3. Optimization of Textbook Compilation Incorporating Vocational Certificate Standards

When writing the textbook "Digital Image Recognition Technology", fully integrate the standards and requirements of relevant professional certificates. Refer to the examination outline of the Artificial Intelligence Application Engineer Vocational Skills Certificate issued by the Ministry of Industry and Information Technology of China, and include the knowledge points related to image recognition principles, algorithm applications, system development, etc. in the textbook content. Set up practice questions and case analysis in textbooks that are similar to the types of vocational certificate exam questions, to help students familiarize themselves with the exam format and requirements, and improve their pass rate in obtaining vocational certificates. While studying courses, students are also prepared to obtain relevant vocational certificates, which increases their competitiveness in employment.

4. Practice of Empowering Curriculum Textbook Construction with Artificial Intelligence

4.1. Enrich course teaching resources based on the demand for on-the-job course certificates

Guided by the educational philosophy of integrating "job, course, competition, and certification", we utilize artificial intelligence technology to comprehensively collect and organize teaching resources that meet the needs of the curriculum. Thoroughly analyze the actual requirements of digital image recognition technology for positions such as Chelu Cloud Intelligent Transportation, as well as the scope of knowledge points involved in vocational skills competitions and vocational certificate exams. Based on this, carry out resource collection work to achieve the organic unity of "teaching artificial intelligence well" and "teaching with artificial intelligence".

Using web crawling technology, collect a wide range of information related to image recognition technology from major professional websites, academic databases, open source code platforms, etc., covering academic papers, industry reports, open source code, teaching videos, etc. These resources should not only reflect the cutting-edge theories of image recognition technology, but also be closely integrated with practical job application scenarios, competition question types, and certificate assessment points to incorporate experimental teaching content into the curriculum.

Utilize natural language processing techniques to finely classify and annotate the collected resources. Classify according to job skill modules, competition themes, certificate exam outline chapters, etc., to create a knowledge graph , which facilitates students to accurately search and use resources based on their own learning goals and needs.

Develop an AI based teaching resource management platform. This platform has intelligent search and recommendation functions, which can provide personalized resource recommendations for students based on different requirements of "job, course, competition and certification". When students input "Image Recognition Technology Based on Deep Learning Algorithms in the Vehicle Road Cloud Scene", the platform can not only quickly recommend relevant papers, video tutorials, and open source code examples, but also associate and display resources such as case studies of the algorithm in practical job applications, possible question types in competitions, and exam point analysis in certificate exams, helping students comprehensively and deeply grasp knowledge and develop computational thinking.

4.2. Based on the certification standards of on-the-job courses, achieve personalized teaching

With the help of an artificial intelligence learning analysis system, real-time monitoring and analysis of students' learning data are carried out based on the standards and requirements of the "on-the-job course competition certificate". The system comprehensively collects data from students' classroom learning, online learning, homework completion, competition participation, and preparation for obtaining vocational certificates, including study time, answer situation, operation steps, competition performance, certificate simulation exam scores, etc.

By conducting in-depth analysis of data, we can gain precise insights into students' learning progress, understanding and absorption of knowledge, as well as the learning difficulties encountered in various stages of the "on-the-job course competition". Analyze students' operational errors in job practice simulation tasks and identify their shortcomings in mastering job skills; Research students' performance in competition training and identify their weak links in solving practical problems and innovative thinking; Compare the simulated exam scores of

students' certificates with the standard requirements, and clarify their deficiencies in the knowledge points of certificate assessment.

Based on the analysis results, develop personalized learning plans for each student. For students who have a fast learning pace and excel in mastering job skills and competition performance, more challenging extended learning content is recommended, such as participating in actual vehicle road cloud project development, participating in high-level industry competitions, etc., to help them enhance their professional competitiveness and lay the foundation for obtaining higher-level vocational certificates. For students who have difficulty understanding knowledge points, targeted tutoring materials and practice questions will be pushed to provide them with detailed explanations of algorithm principles, practical case analysis, and targeted programming exercises to help them overcome learning bottlenecks.

In addition, utilizing intelligent tutoring systems to provide real-time Q&A services for students. When students encounter problems related to job practice, course learning, competition preparation, or certificate exams during the learning process, they can ask questions to the intelligent tutoring system at any time. The system uses natural language processing technology to understand students' questions and searches for relevant answers from a knowledge base that integrates knowledge related to "job, course, competition, and certification" to provide accurate and professional answers to students' questions.

4.3. Combining the elements of on-the-job course competition certificates to enhance the scientificity and accuracy of teaching evaluation

Establish a teaching evaluation system based on artificial intelligence, fully integrating the elements of "on-the-job course competition certification", to achieve comprehensive and scientific evaluation of students' learning process and learning outcomes. In addition to traditional exam scores, comprehensively collect multidimensional data such as students' classroom participation, homework completion quality, practical project performance, competition results, and vocational certificate acquisition.

Utilize machine learning algorithms to comprehensively analyze these data and construct a student learning profile that covers all aspects of their abilities, including job, course, competition, and certification. By analyzing data on students' code writing standards, algorithm optimization abilities, problem-solving strategies, and other aspects in job practice projects, evaluate their job skill levels; Evaluate students' competitive literacy based on their performance in competitions, such as teamwork ability, innovative thinking ability, and ability to cope with pressure; Measure the ability of students to obtain vocational qualifications based on their pass rate in the vocational certificate examination and their learning attitude and progress during the preparation process.

At the same time, visualization technology is used to present the evaluation results in intuitive chart form to teachers and students. Teachers can use these charts to timely understand students' learning situation in various aspects of the "on-the-job course competition certificate" and adjust teaching strategies. If students have insufficient skills in their job practice, teachers can add course teaching content or practical training; Students generally have weak innovation abilities in competitions, and teachers can organize specialized training activities on innovative thinking. Students can subjectively and clearly recognize their own strengths and weaknesses, and make targeted learning improvements to fully prepare for their future career development.

5. Implementation effect and reflection

5.1. Implementation effect

Improvement of students' professional competence: Through the construction practice of teaching materials empowered by artificial intelligence based on on-the-job course

competitions, students have a deeper understanding of image recognition technology in the course of "Digital Image Recognition Technology". In terms of the ability to solve practical problems, students are able to independently complete single image recognition projects using the knowledge they have learned, such as license plate recognition systems based on traditional manual features, vehicle recognition and classification systems based on deep learning, road obstacle detection systems, etc.

Excellent competition results: The teaching model of promoting learning through competitions has achieved good results, and students have performed outstandingly in various image recognition technology competitions. The student team also achieved excellent results in various competitions. These achievements not only enhance the school's reputation, but also further stimulate students' learning enthusiasm and innovative spirit.

Improvement in the acquisition rate of vocational certificates: The optimization of textbook compilation that integrates vocational certificate standards gives students an advantage in obtaining the vocational skills certificate for artificial intelligence application engineers. More students have obtained vocational certificates upon graduation, enhancing their competitiveness in the job market. In the job market, students majoring in this field have received widespread attention and recognition from companies related to Chelu Cloud, and the quality of employment has significantly improved.

5.2. Reflection

Limitations of technology application: Although artificial intelligence technology has played an important role in curriculum and textbook construction, some limitations have also been discovered in the practical process. For example, intelligent teaching systems still have certain deviations in understanding students' complex problems, and sometimes cannot provide accurate and effective solutions; The update speed of some artificial intelligence teaching resources cannot keep up with the pace of industry development, and it is necessary to further strengthen the dynamic update mechanism of resources.

The challenge of teacher competency requirements: The construction of course materials empowered by artificial intelligence has raised higher demands on teachers' abilities. Teachers not only need to have solid professional knowledge, but also need to master the application methods of artificial intelligence technology and be proficient in using various intelligent teaching tools. However, currently some teachers' abilities in the application of artificial intelligence technology still need to be improved, and teacher training needs to be strengthened to enhance their level of information technology teaching.

Insufficient response to individual differences among students: Although personalized teaching has been implemented, the attention to individual differences among students is not comprehensive enough in practical operation. Some students with learning difficulties still need more one-on-one tutoring and support. How to further refine personalized teaching plans to meet the learning needs of students at different levels is a problem that needs to be further studied in the future.

6. Conclusion and Prospect

6.1. Research Conclusion

This study takes the course of "Digital Image Recognition Technology" as an example to explore the construction mode of artificial intelligence empowerment course textbooks based on on-the-job course competitions. The research results show that this construction model can effectively promote the improvement of course teaching quality, enhance students' professional competence, strengthen their practical operation ability, and thereby enhance students' competitive advantage in the job market. Empowered by artificial intelligence, course

content is more in line with job requirements, teaching modes are more innovative and diverse, and textbook writing is more scientific and reasonable. At the same time, some problems were also identified in the practical process, such as limitations in the application of technology, the need for teachers to enhance their abilities, and further attention to individual differences among students.

6.2. Future prospects

Deepen the application of artificial intelligence technology: Continuously pay attention to the development of artificial intelligence technology and explore its new applications in curriculum and textbook construction. Utilizing artificial intelligence generative technology to automatically generate personalized learning materials and practical projects for students; Introducing an artificial intelligence adaptive learning system to achieve more precise personalized teaching.

Strengthen the construction of the teaching staff: increase the training efforts for teachers, carry out special training on the application of artificial intelligence technology, and encourage teachers to participate in relevant academic research and teaching practice activities. At the same time as establishing a communication and cooperation mechanism among teachers, promote the sharing of experience and achievements in AI enabled curriculum and textbook construction among teachers, and jointly improve teaching level.

Improve personalized teaching system: Further study students' learning characteristics and needs, and improve the personalized teaching system. Through more in-depth data analysis and theoretical research on learning, develop more precise personalized teaching strategies to ensure that every student can achieve full development in course learning.

6.3. Conclusion

The construction of AI enabled course textbooks based on job course competitions is an important measure to meet the needs of the times. Although it faces some challenges in the practical process, through continuous exploration and improvement, it will undoubtedly make greater contributions to cultivating more high-quality technical and skilled talents.

Acknowledgements

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