Research on Intelligent Teaching of Mining Technology in Universities

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Abstract: With the continuous acceleration of social production progress, the mining industry is also constantly deepening its development, and significant progress has been made in related technologies in mining work. More and more intelligent devices are being applied in mining technology. In China's exploration of industrialization and informatization in the new century, new requirements have been put forward for the mining technology of mineral resources. Therefore, how to apply intelligent information technology to mining technology majors in universities has gradually become the main focus of higher education.

Keywords: Mining technology major; Intelligence; Teaching research

In the current era, artificial intelligence and big data technology are rapidly developing, and intelligence has become an inevitable new trend in social progress. In the context of the intelligent era, the teaching mode of universities also needs to make corresponding changes. As the main place to improve the quality of students, its teaching form plays a crucial role in the growth of students and also bears the obligation to achieve national rejuvenation. Therefore, universities should improve traditional teaching models based on intelligent teaching, continuously enhance their ability to face new challenges, and achieve the fundamental task of cultivating morality and talent.

I. What is Intelligent Mining Technology Specialization

With the continuous development of science and technology, mining technology majors can use advanced computer networks, big data, and artificial intelligence technologies to carry out mining operations. The application of these new technologies is an important breakthrough in the mining field. At the same time, it can improve the efficiency of mining operations in production automation, intelligent scheduling, and automation equipment control by leveraging key technologies such as machine vision, sensors, and wireless communication, thereby promoting the development of mining operations to a higher level of automation and intelligence. Through the application of intelligent technology, the specific workflow of mining equipment can be monitored as a whole, and remote control of mining equipment can also be carried out to optimize production processes, improve production efficiency, and reduce operating costs for mining work. Therefore, with the support of digitization and intelligence, unmanned operations can be carried out in geological surveying, resource management, and mining design, significantly improving the efficiency and core competitiveness of mining operations.

II.The significance of intelligent mining technology specialization

1. Beneficial for improving production efficiency and safety

Traditional mining operations require a large amount of human support to complete, and also require real-time on-site monitoring. This work mode is highly inefficient and poses significant safety risks. However, applying intelligent technology to mining equipment can minimize human error, achieve autonomous operation and intelligent decision-making, greatly improve the accuracy of mining operations, and thus improve production efficiency. At the same time, intelligent technology can also monitor in real-time and have an early warning system, which can help workers discover potential safety hazards, significantly reduce the frequency of accidents, and effectively ensure the safety of miners. Firstly, intelligent mining technology is based on artificial intelligence and Internet of Things technology. By improving traditional mining equipment in this way, intelligent operations can be achieved and mining efficiency can be improved. For example, in intelligent excavation technology, the entire workflow of excavation, support, anchoring, and transportation can be fully mechanized, and after observation, its production efficiency can be improved by nearly 40%. At the same time, mining equipment will also be equipped with detection and early warning functions, so that the intelligent system can detect environmental parameters in the mine in real time, such as monitoring and displaying changes in gas concentration, humidity, temperature, and other environmental parameters. If the values are abnormal, they will be transmitted to the staff for timely processing through the alarm system, which can effectively ensure the safety of miners. Secondly, the application of intelligent technology will reduce the number of workers in traditional work modes, ensuring that unmanned workers can work normally and further improving production efficiency.

2. Helps improve resource utilization efficiency

Intelligent technology can be precisely controlled at every stage of the mining process. Therefore, compared to traditional mining techniques, it can avoid the occurrence of excessive exploitation and waste of resources. Moreover, intelligent technology can also assist workers in intelligently classifying and processing mining waste, reusing resources that have already been abandoned but still provide partial usage functions. This helps to reduce environmental pollution, lower the cost of waste treatment, minimize the impact on the environment, and increase resource utilization. Moreover, intelligent technology can also monitor the surrounding environment in real-time during mining operations, such as air quality and water quality, evaluate the impact of mining activities on these factors, help workers achieve scientific and reasonable mining arrangements, provide relevant technical support for sustainable resource utilization, and also serve as a scientific

basis for environmental protection. In addition, intelligent technology can precisely control various aspects of the mining process, including excavation, transportation, and ventilation. Through this method, mining plans can be optimized, inefficient operations can be reduced, and resource extraction efficiency can be improved.

3. Helps maintain sustainable development of resources

With the continuous development of the economy, the global demand for energy and mineral resources is also increasing, and traditional mining models are difficult to meet this demand due to human factors, outdated technology, and environmental influences. To extract and utilize resources more efficiently and environmentally friendly in the mining industry, the assistance of intelligent technology is crucial. It can extract and utilize mineral resources in a more environmentally friendly manner, providing strong support for the sustainable development of the industry. At the same time, intelligent technology can further promote the transformation and upgrading of the mining industry, help complete more complex and difficult mining operations, promote the continuous updating of processes, technologies, and products, and inject new vitality into the innovative development of the industry. In addition, the application of intelligent technology can effectively improve the overall work efficiency of the mining industry, enabling it to extract and utilize resources more efficiently and environmentally friendly. This also helps to meet the global demand for energy and resources and promote economic development. Finally, the application of intelligent technology also requires increasing talent. Intelligent technology requires professional operators and technicians. Therefore, the mining industry can also promote the improvement of talent quality, promote innovative development of the industry, and promote the transformation and upgrading of the industry, thereby promoting the development of the entire industry. This will also improve the utilization rate of resources and help maintain sustainable development of resources in future mining operations.

III. Intelligent teaching strategies for mining technology majors in universities

1. Update course content and teaching methods

For mining technology majors, intelligent teaching should not only be based on traditional theoretical knowledge, but also have a sense of keeping up with the times. With the continuous development of social technology, timely updating of course content and teaching methods is an important work content in current university education. Firstly, university teachers should have the ability to determine teaching priorities and introduce new courses based on industry needs and technological development trends. Therefore, teachers should constantly pay attention to relevant industry forums and collaborate with enterprise technical personnel to jointly develop course teaching content, ensuring the timeliness and cutting-edge nature of the curriculum. Based on the existing curriculum system, add courses related to intelligent technology, such as the application of artificial intelligence, principles and operations of intelligent mining, and mining Internet of Things technology, to continuously broaden students' knowledge and enhance their understanding and proficiency in intelligent technology. In addition, corresponding teaching methods should also be optimized. With the support of new technologies, modern teaching technology has also produced more teaching methods. Teachers of mining technology majors in universities can continuously enrich their teaching methods through modern science and technology such as multimedia teaching, virtual reality technology, and online courses. The application of these technologies can significantly improve students' understanding of abstract knowledge, facilitate their more intuitive understanding of concepts and principles, and continuously improve their learning effectiveness. In addition, professional teachers can also adopt project-based learning and problem oriented teaching methods, using questions related to the course content to determine the main exploration direction of project-based learning, allowing students to engage in independent thinking, taking them as the main body of the teaching process, guiding them to cooperate in teams, enabling students to have a deeper understanding of the actual needs of technology, with the main goal of improving their practical abilities, continuously providing them with opportunities for practical operation, and enabling students to learn and master intelligent technology in practice.

2. Strengthen the construction of teacher teams

The level of the teaching team determines the learning level of students. Therefore, in the process of promoting intelligent teaching of mining technology majors in universities, improving the teaching level of the teaching team is a very important part. A teacher team with rich practical experience and advanced teaching concepts can provide students with more professional guidance. Firstly, universities can introduce excellent teachers with rich teaching and practical experience, especially those who have outstanding achievements in mining technology intelligence. They can bring new teaching concepts and methods to the teaching team of the university, thereby improving the overall teaching level. At the same time, universities should also provide continuous professional training for their teachers, continuously improving their professional skills and practical abilities, in order to better guide students. Experts and teachers from relevant fields can also be invited to hold seminars together to exchange and discuss new technologies and industry trends, broaden the perspectives of teachers, improve their forward-looking understanding of the industry, and continuously adapt to the needs of intelligent teaching. Secondly, influenced by the characteristics of the mining technology profession, it is itself related to many disciplinary fields. Therefore, universities can break down disciplinary barriers, carry out interdisciplinary cooperation activities, establish effective communication channels, encourage teachers from different disciplines to exchange and cooperate, and continuously improve their teaching level. Finally, we should attach importance to team management and evaluation mechanisms. Universities should update corresponding teaching objectives and tasks for teachers based on the changes in mining technology majors, and establish and improve relevant assessment and incentive systems. For teachers who have achieved outstanding results in teaching activities, universities should provide corresponding incentives, including academic honors, material rewards, or professional title promotions, to continuously stimulate the enthusiasm of teachers to innovate in

teaching activities. At the same time, it is necessary to regularly assess and evaluate the teaching achievements of the teaching team, based on student feedback, to judge the teaching quality and classroom effectiveness of teachers. Through this method, teachers can adjust their teaching methods in a timely manner, continuously improve the teaching level of professional teachers, and promote the development of intelligent mining technology in higher education.

3. Building a research and innovation platform based on professional intelligence

In the intelligent teaching process of mining technology majors in universities, intelligence can be the main research direction to establish scientific research mechanisms and build communication platforms. The establishment of this platform can provide a platform for improving teaching quality and cultivating innovative talents. Universities should clarify the development goals of research platforms, with research on the intelligence of mining technology as the main development direction. They should integrate high-quality professional knowledge resources both on and off campus, form a resource sharing mechanism, and provide basic guarantees for cultivating innovative talents. In addition, the construction of scientific research and innovation platforms also needs to pay attention to collaboration between teams. Teachers and students can be included in the platform for cooperation, encouraging members to help each other, enhancing the connection between teachers and students. At the same time, practical research and exploration of intelligent mining technology can be carried out to help students have a deeper understanding of the necessity of industry intelligence, thereby stimulating their practical interest and innovative spirit, cultivating their practical ability and problem-solving ability, and improving their familiarity with the professional intelligence of mining technology, thus laying a solid foundation for subsequent learning.

In summary, in the context of the continuous development of science and technology and big data intelligence, universities should also improve their own response capabilities, change their teaching ideas in the intelligent teaching of mining technology, clarify the development trend of mining technology intelligence, and timely update teaching content and methods to create an intelligent learning atmosphere for students. Through various teaching methods, students can improve their learning interests and practical abilities, enhance their core competitiveness. At the same time, universities should also continuously improve the teaching level of professional teachers, increase their understanding of intelligent mining technology, formulate development directions and provide training opportunities for teachers, continuously improve their teaching ability, and promote the continuous development of intelligent teaching in mining technology.

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Fund Project: Research on Experiential Teaching Path for Mining Engineering Integration with Virtual Reality Digital Scene, Project Number: JXJG-22-36-4. Project type: Provincial research project on teaching reform in higher education institutions in Jiangxi Province.