

Exploration of the Application of Artificial Intelligence in Computer Science Teaching in Higher Vocational Education

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Abstract: *Vocational colleges are one of the main carriers for cultivating advanced technical talents. From the perspective of educational development and talent growth, it is necessary to continuously strengthen management work and enhance their educational capabilities, including computer majors. This article takes the shortcomings of current vocational computer education as the starting point, analyzes the application advantages of artificial intelligence in vocational computer education, and explores the specific methods of its application. It discusses the construction of intelligent work systems, emphasizes database construction and application, attaches importance to system updates and improvements, and strengthens security management, providing ideas and methods for the application of artificial intelligence technology and improving vocational computer education.*

Keywords: *Artificial Intelligence; Vocational Colleges; Computer Science Major; Teaching Application*

1. Preface

Artificial Intelligence (AI) is one of the important products of the continuous development of information technology, mainly emphasizing the use of modern technological principles, methods, and equipment to simulate and extend human intelligence, with the characteristics of interdisciplinary intersection. Since the introduction of artificial intelligence technology, it has quickly gained attention and application, providing varying degrees of support for various industries, including education. As for the computer major in vocational colleges, it attaches great importance to cultivating advanced technical talents, and the rapid changes and development of information technology and computer technology require vocational colleges to update teaching activities in combination with technological development while organizing regular teaching work. This provides a certain space for the application of artificial intelligence technology[1]. Analyzing its application advantages and methods in the teaching of computer majors in vocational colleges has certain practical significance.

2. Shortcomings in current vocational computer education

2.1 The method is relatively simple

The current teaching work of computer majors in vocational colleges is generally complete, which can meet the needs of students to absorb theoretical knowledge and participate in practice. However, the overall approach is still relatively single and cannot comprehensively improve the quality of students' growth. This problem varies among different schools, including a single mode of knowledge dissemination and a lack of cutting-edge theories. Some schools believe that classroom teaching and collective practice are the core methods, which are experienced, stable, and efficient, and can serve students' growth[2]. Individual differences and group demands of students cannot receive sufficient attention, such as some students having a solid grasp of basic knowledge, and simple classroom teaching and collective practice are difficult to improve their learning effectiveness, which is not conducive to their comprehensive growth.

2.2 Lack of Coverage

Some vocational colleges focus more on improving students' skill levels to enhance their practical

abilities when organizing computer major teaching, and do not attach enough importance to theoretical education and research ability education, resulting in low coverage and incomplete teaching work. As vocational colleges believe that they position themselves as "cultivating technical talents" rather than "comprehensive talents", they place practical teaching at the center of their teaching work, guiding students to polish their practical abilities through on campus practice, training base teaching, school enterprise cooperation, and other methods. The trend of practical education is good. When students wish to learn about theories, cutting-edge knowledge in computer science, and the latest developments, the assistance that schools can provide may be limited, and the comprehensiveness of students' growth may be insufficient[3].

2.3 Difficulty in Interaction

Currently, some vocational colleges organize computer science teaching in a traditional way, which has certain advantages in terms of efficiency, standardization, and experience, but there are shortcomings in terms of interaction. In offline teaching work, teachers need to provide knowledge to all students, and the teacher-student ratio is not completely reasonable. When students have different confusions due to differences in learning ability, learning situation, and educational foundation, teachers find it difficult to meet the needs of all students, and guidance is challenging. In online teaching mode, teachers also teach multiple students, and students' questions and confusion need to be raised separately. Although interaction is relatively convenient, it is still affected by teaching methods and mechanisms, and cannot reach the ideal level. Students' doubts are difficult to quickly resolve, and learning progress and quality decrease to varying degrees[4].

2.4 Difficulty in Extending Development

From a general perspective, computer science is similar to other majors in that it requires students to participate in learning and practice for a long time to achieve comprehensive mastery of knowledge and optimize practical abilities. During their school years, students need to balance the learning needs of various subjects, and their mastery of some professional knowledge may not be strong enough, which also puts forward certain requirements for extended teaching. Currently, some vocational colleges do not attach great importance to extended teaching and cannot provide continuous services to students outside of the classroom and campus[5]. After learning computer related theories on campus, students hope to consolidate them after class and during holidays. It is difficult for them to receive professional guidance from school or other channels, and their interest and enthusiasm for learning cannot be stimulated, which may ultimately affect their learning outcomes.

3. The application advantages of artificial intelligence in the teaching of computer majors in higher vocational education

3.1 Strong service capability

The application of artificial intelligence in the teaching of computer majors in vocational colleges has the basic advantage of strong service capabilities, which helps to address the current problem of a single teaching method in this major. Due to the emphasis on practical teaching in vocational colleges, the proportion of theoretical teaching is relatively small, and students lack solid mastery of basic knowledge and theoretical research ability. With the support of artificial intelligence technology, teachers and schools can guide students to download DEEPSEEK or other intelligent software using electronic computers, smartphones, etc. On the basis of regular learning, relevant artificial intelligence technology software can be used for theoretical learning, retrieval of relevant theories, cutting-edge knowledge, etc., and browsing. Considering that vocational college students do not have much academic pressure, their after-school and holiday time can be used for independent learning, and artificial intelligence can be used to compensate for possible deficiencies in theoretical teaching.

3.2 Wide coverage

Compared with the conventional teaching mode, the application of artificial intelligence in vocational computer major teaching also has the characteristic of strong coverage, which can serve as a supplement to conventional teaching, optimize teaching content and form, and make it more diversified. In the process of organizing teaching in some vocational colleges, due to limitations such as funding

and space, they cannot provide students with comprehensive practical training opportunities. With the support of artificial intelligence technology, schools can use computers to build virtual practice systems, guiding students to practice their learned knowledge through virtual design, virtual programming, and virtual demonstrations, improve their practical skills, and achieve an increase in the coverage effect of teaching work. Conversely, for vocational colleges that focus on practical teaching and internship guidance, artificial intelligence technology can serve theoretical education, use artificial intelligence to screen and process resources, and provide them to students. This can reduce the energy consumption of students collecting knowledge and organizing learning on their own, and improve learning efficiency.

3.3 High interaction efficiency

The application of artificial intelligence technology can help improve the interactive efficiency of computer teaching in higher vocational education. This improvement is focused on two aspects: first, artificial intelligence has strong information processing capabilities, which can partially replace teacher-student interaction based on problem analysis; second, artificial intelligence can serve real-time information management, even if the interaction needs are dynamic and irregular, artificial intelligence technology can be used to provide services. Vocational colleges can use artificial intelligence technology to conduct analysis, collect common problems in computer teaching and students' learning difficulties, build a database, open to all teachers and students, guide them to access and browse relevant content according to their learning needs at any time, and partially replace teacher-student interaction with human-computer interaction to meet students' learning needs. On this basis, artificial intelligence services can be opened up in classroom teaching to encourage students to use artificial intelligence for retrieval, actively analyze various problems, obtain answers, and leverage the advantages of artificial intelligence technology in human-computer interaction to serve students' learning.

3.4 Scalability

The application of artificial intelligence in the teaching of computer majors in vocational colleges has the advantage of scalability, which is also reflected in two aspects. Firstly, the application threshold of artificial intelligence is relatively low, and it can provide students with a wide range of learning services. The second is the standardization of artificial intelligence technology, which facilitates students to organize remote teaching and real-time intervention. Students can download artificial intelligence software using smartphones or electronic computers according to the teaching objectives and personal learning plans of their school's computer major, and use their after-school and holiday time for learning. The cost of smart devices and artificial intelligence technology software is relatively low, and most students can bear the related expenses. At the same time, vocational colleges themselves can also organize and manage, calling on students to download intelligent software with the same form and program assignment methods. The school will provide centralized remote information transmission and education related services, such as teachers remotely sending raw resources, students using artificial intelligence software for processing, browsing and learning, etc. Strong extensibility is the fundamental advantage of information technology teaching, and artificial intelligence technology further enhances the extended application experience, which is conducive to students' continuous learning.

4. Application methods of artificial intelligence in teaching computer majors in higher vocational education

4.1 Building an Intelligent Work System

In future work, in order to effectively leverage the advantages of artificial intelligence technology and serve the teaching of computer majors in vocational colleges, it is recommended that vocational colleges first attempt to build intelligent work systems. In practical work, it is necessary to pay attention to two elements: hardware configuration and the correlation between various elements within the system.

In terms of hardware configuration, it is advocated to take the computer cluster as the core and determine the specific size of the computer cluster according to the teaching needs of the school. Considering the high requirements of computer science for information processing and modeling, the parameters of computer clusters should be appropriately strengthened, as shown in Table 1:

Table 1: General parameters of hosts and extensions within a computer cluster

Device	Number of units	Virtual memory (GB)	Video memory (GB)	Storage space (GB)
Host	1~2	32	16	2048
Extension	5~10	8~16	4~8	512

If the school has a large scale and high teaching pressure, the above parameters should also be further optimized to match the characteristics of computer science and serve the stable application of artificial intelligence technology. In addition, it is recommended that schools build carrier networks and Ethernet based on modern technologies such as 5G to ensure fast transmission of various types of information. The system is mainly associated with three types of elements: management elements, namely teachers and academic staff, learning elements, namely students, and data elements, namely teaching resources. Among them, teaching resources exist in the form of databases, and teachers, academic staff, and students should maintain their connection with the system through at least two ways. During the school period, wired connection is the main method to ensure interaction quality and information transmission efficiency. In the case of management and demand outside the school, wireless channels can be provided. Due to the virtual nature of artificial intelligence technology and computer related knowledge, wireless connection also meets application and learning needs, and improves work flexibility.

4.2 Emphasis on database construction and application

In the process of applying artificial intelligence technology, it is necessary to consider the dynamic characteristics of students' learning of computer professional knowledge, and to utilize the advantages of artificial intelligence technology in the form of databases to form rich resources for students to browse, download, and apply. Keyword processing can be used to process various types of data resources. If the school attempts to provide the latest computer science research theories and uses information technology to collect massive amounts of raw information, it can process the raw information with the support of artificial intelligence technology and set keywords:

[Computer; Frontier Theory; Development Trends; Intelligent Technology] (Keyword Set)

Substitute the keyword set into the computer, use computer software to memorize it, and then use artificial intelligence technology to filter various types of raw information. Any information that meets the requirements of the keyword set will be screened out and included in the database for students to use as a cutting-edge information service teaching for computer professional research theory. Other information that does not meet the characteristics of the keyword set will be eliminated, and artificial intelligence technology will be used to support information processing, improve work efficiency, and quickly build, enrich, and optimize databases to serve student learning. Other computer related information, assessment score processing, and teacher teaching effectiveness evaluation data can also be quickly completed through artificial intelligence technology to achieve satisfactory levels of database construction and application.

4.3 Emphasize system updates and improvements

In the teaching of computer science majors in vocational colleges, it is difficult to achieve the construction of artificial intelligence and its working systems overnight. Vocational colleges need to continuously analyze its application situation and make necessary improvements. It is recommended to use dynamic tracking to analyze the system application situation.

Dynamic tracking includes two stages: feedback from teachers and students, and proactive analysis by the school. In terms of feedback from teachers and students, the analysis is mainly based on the teaching situation of the computer major, providing valuable information from the front line of teaching and learning. As reported by students, the current artificial intelligence service system in schools has limited information, making it difficult to solve learning difficulties in some computer majors. Higher vocational colleges can try to enrich the database, or associate their AI service modules with the Internet sharing pool, to ensure that students can retrieve and obtain rich computer expertise through AI technology. The school's proactive analysis mainly attempts to start from a technical perspective, and invites professionals familiar with computer technology, artificial intelligence technology, and their applications to conduct functional analysis of the school's teaching system, solve possible technical defects and problems, and maintain and improve its basic functions.

4.4 Strengthen safety management

The application of artificial intelligence in the teaching of computer majors in higher vocational education has improved teaching flexibility, resource richness, and diversified methods. However, as artificial intelligence mainly relies on computers and networks to provide services, attention should also be paid to network security issues in practical work, including virtual security issues, as well as possible offline anomalies, emergencies, etc.

It is recommended that universities introduce information security mechanisms during the construction of artificial intelligence teaching systems, using a parallel approach of node protection and real-time protection to address security threats from public networks or other external devices, and shield them from the teaching network and work platform. At the same time, vocational colleges should also strengthen the construction of backup systems, using independent computers as backup carriers, and leveraging artificial intelligence technology to periodically start the backup system to copy and migrate teaching related resources to the system. Even if the main system encounters abnormalities or database crashes, the backup system can still be started to serve teaching work and meet the general needs of students learning computer professional knowledge.

5. Conclusion

In summary, the application of artificial intelligence in the teaching of computer majors in higher vocational education has certain positive value, which helps to improve teaching quality, expand work ideas, and should be valued in future work. From the current situation, some vocational colleges have problems such as single teaching methods, insufficient coverage, and difficult interaction when organizing computer major teaching, and the extension of teaching work is also relatively limited. With the help of artificial intelligence technology, the above problems have been addressed to a certain extent. Its specific application should be based on the construction of intelligent work systems, strengthen database construction and system updates and improvements, and from the perspective of security management, enhance the comprehensive benefits of artificial intelligence applications, directly serve the teaching of computer majors in vocational colleges, and promote the growth of students and the overall development of the school.

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