Computer AI-assisted Higher Vocational English Teaching in the Development of Global Competence in Nautical Professions

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Abstract. This paper explores the application of computer AI technology in vocational English teaching for maritime students, focusing on its role in cultivating global competence. The study begins with an examination of the current state and challenges in vocational English education, highlighting the unique demands of teaching English within the maritime industry and the broader requirements for global competence. It then provides an overview of AI technology, detailing its development, current applications in education, and the associated advantages and challenges. The core of the paper is dedicated to the application of AI in vocational English teaching. It discusses how AI can enhance curriculum design, personalize content recommendations, and assist in learning assessments and feedback. AI tools offer significant potential for tailoring educational materials to meet the specific needs of maritime students, improving engagement, and providing real-time, adaptive feedback

Keywords: AI in Education; Vocational English Teaching; Maritime Industry; Global Competence; Personalized Learning

1 Introduction

With the accelerated process of globalization and the booming development of the international shipping industry, the global competence of seafaring professionals is increasingly required. Global competence includes not only professional skills, but also cross-cultural communication ability, international vision and English language ability. The traditional teaching methods of English for higher vocational education have been difficult to meet the actual needs of nautical students, especially in the context of globalization, how to improve students' comprehensive ability has become an important task of teaching reform. In recent years, the rapid development of computer AI technology has brought new opportunities to the field of education, especially in enhancing teach-ing effectiveness and personalized learning[1].

AI-assisted teaching, as an emerging education model, has gradually attracted the attention of educators by intelligently analyzing students' learning data and providing personalized teaching suggestions and feedback. In higher vocational English teaching,

AI technology can help teachers better understand students' learning needs, provide tailored learning resources, and enhance students' language application ability through intelligent interaction. Especially in the field of nautical professions, AI technology can not only optimize the curriculum design and enhance students' language skills, but also strengthen students' cross-cultural communication skills, laying a solid foundation for them to compete in the global shipping market[2].

This study will explore the application of computerized AI-assisted higher vocational English teaching in the development of global competence in the maritime profession, aiming to reveal how AI technology can improve the teaching effect through accurate data analysis and intelligent learning support.

2   The Current Situation and Challenges of Higher Vocational English Teaching

2.1   The Current Situation of English Teaching in Higher Vocational Education

Higher vocational English teaching is an important part of the vocational education system, aiming to improve students' English language ability to meet the actual needs in their future careers. At present, higher vocational English teaching mainly adopts traditional teaching methods, including classroom lectures, vocabulary and grammar exercises, and training in listening, reading and writing skills. However, these traditional methods have certain limitations in meeting the needs of vocational English teaching. The curricula of many higher vocational colleges and universities still focus on general English and lack professional English training related to specific occupational fields, which prevents students from effectively applying the language skills they have learned in the real workplace[3].

In terms of teacher strength, many higher vocational colleges and universities face the problem of low professionalization of the English teaching staff, and the teachers' lack of practical experience and industry knowledge limits the practical applicability of the course content. In addition, the lack of teaching resources is also a common problem, and many institutions lack quality teaching materials and modern teaching tools suitable for vocational English teaching. In order to cope with these challenges, teaching reform is imperative, and it is necessary to optimize the curriculum and improve the quality of teaching by combining the needs of the industry[4].

2.2   Connotation and Requirements of Global Competence

Global competence is a key competency that individuals should possess in the face of increasingly complex cross-cultural interactions and global issues in the context of the era of globalization. It goes beyond a superficial understanding of global affairs and encompasses multiple levels of skills and knowledge that enable individuals to cope

comfortably in the global arena. The core elements of global competency include intercultural communication skills, global perspective, international understanding, and critical thinking[5].

Intercultural communication skills are an important component of global competency. It is not just about being able to communicate in different languages, but also about understanding and respecting the differences between cultures and being able to interact effectively in groups with different cultural backgrounds. This competency requires students to be able to master language while being sensitive to cultural differences, avoid cultural misunderstandings, and adapt and adjust in a multicultural context[6].

Global Perspective emphasizes an individual's ability to view issues from a global perspective and to understand the far-reaching impact of globalization on various industries and fields. Individuals with global perspectives are able to look beyond local and national limitations, focus on major events and changes taking place around the globe, and understand how these events are interrelated and their impact on the global social, economic and political systems. International understanding, on the other hand, is an integral part of global competence. Students need to understand the cultures, histories, economies and political systems of different countries and regions so that they can be more comfortable in cross-border cooperation. This competency requires not only a certain amount of knowledge, but also an open mind and an attitude of tolerance, an ability to understand and respect other people's cultural backgrounds and values.

2.3   Limitations of Artificial Intelligence Technology

Although artificial intelligence technology is increasingly widely used in the field of education and has shown significant advantages in personalized learning and intelligent tutoring, its limitations should not be ignored. First of all, in terms of emotional understanding, existing AI systems are often difficult to accurately recognize and understand the emotional state of students. Education is not only the transfer of knowledge, but emotional and social skills are equally crucial. Traditional AI systems are largely data-driven, making it difficult to gain deep insights into students' emotional fluctuations, such as anxiety, frustration, or excitement, during the learning process. This lack of emotion may lead to AI failing to meet students' actual needs when providing feedback, which in turn affects learning outcomes.

In addition, AI faces challenges in creativity development. While AI is capable of generating creative works, such as music, artwork, or text, the realization of such creativity is often based on the recombination of pre-existing data rather than true innovation. Human creativity often stems from unique life experiences, emotional experiences, and a deep understanding of the world, qualities that current AI technology lacks. While AI can simulate creative behavior, it struggles to achieve emotional resonance and deep innovation, which makes it limited in fostering creativity in students.

Finally, ethical and privacy issues are also challenges that cannot be ignored in the application of AI in education.AI systems usually require a large amount of student data for training and optimization, and how to effectively utilize this data while safeguarding data privacy remains a complex topic. Therefore, it is important to pay more attention to

these limitations in future educational practices, and to continuously optimize AI technologies through interdisciplinary research and cooperation in order to better serve the educational field.

3   Overview of Computer AI Technology

3.1   History and Current Status of AI Technology

The development history of Artificial Intelligence (AI) can be traced back to the 1950s and was first proposed by computer scientists with the goal of simulating human intelligent behavior. Early AI research was mainly focused on theoretical level exploration, such as machine learning algorithms and logical reasoning. With the continuous increase in computing power and the rise of big data, AI technology has made breakthroughs in the past decades. In the 1980s, the emergence of expert systems enabled AI to make remarkable achievements in specific fields. At the beginning of the 21st century, the emergence of deep learning algorithms and the popularization of cloud computing further boosted the rapid development of AI, especially in the fields of image recognition, speech processing and natural language processing In the early 21st century, the emergence of deep learning algorithms and the popularization of cloud computing further promoted the rapid development of AI, especially in the fields of image recognition, speech processing and natural language processing.

Today, AI is widely used in various industries, from healthcare and finance to autonomous driving and smart manufacturing. In the field of education, the application of AI technology has also attracted widespread attention. Modern AI systems are equipped with complex perceptual capabilities, such as speech recognition, machine translation, intelligent recommendation, etc., which can process information on a large scale and provide personalized services for users. Currently, the application of AI technology in education is becoming more and more widespread, especially intelligent learning platforms and automated teaching evaluation systems, which are gradually changing the traditional teaching mode.

3.2   Application of AI in Education

As AI technology matures, the education sector is gradually introducing it into all aspects of teaching and learning. the application of AI in education not only improves teaching efficiency, but also provides students with a personalized learning experience. Intelligent teaching systems are one of the most common applications of AI in education, and such systems can automatically generate personalized learning content based on students' learning progress and knowledge mastery. By analyzing students' learning data, AI systems are able to intelligently recommend appropriate learning resources and provide targeted practice questions to help students check for gaps.

In addition, AI is also widely used in language learning, especially in English teaching, where voice recognition technology can correct students' pronunciation errors in real time and help them improve their speaking skills. Intelligent tutoring systems are also becoming popular, and these systems can answer all kinds of questions raised by

students and guide them to independent learning through natural language processing technology. In terms of exams and assessments, AI is also able to quickly correct homework and test papers through automated systems, saving teachers' time while providing more objective evaluations.

Overall, the application of AI in education not only improves the quality of teaching, but also greatly enhances students' interest in learning and autonomy. At the same time, AI technology can provide real-time feedback on students' learning status through data analysis, which provides an important basis for the optimization of teaching content.

3.3   Advantages and Challenges of AI-assisted Teaching

The advantage of AI-assisted teaching is its ability to personalize students' learning needs. By analyzing students' learning data, the AI system can tailor a learning plan for each student, helping them master knowledge at a pace that suits them. This personalized learning experience can enhance students' learning efficiency, enabling them to have more opportunities for deeper inquiry while mastering basic knowledge. In addition, AI technology can help teachers save a lot of time, especially in repetitive tasks such as homework correction and learning assessment, which can be done efficiently and accurately by AI systems.

However, AI-assisted teaching also faces some challenges. First of all, the limitations of the technology cannot be ignored. Although current AI systems perform well on specific tasks, it is still difficult to completely replace the role of teachers in complex educational situations. Teaching is not only the transmission of knowledge, but also includes emotional communication, thinking guidance and other aspects, which are not fully realized by current AI technology. Secondly, data privacy is also a major challenge for AI in education. Students' learning data, once misused or leaked, will pose a threat to their privacy and security. Finally, the successful implementation of AI-assisted teaching also relies on the technological literacy of teachers, and the advantages of AI technology will not be fully realized if teachers do not have sufficient AI knowledge and operational skills.

Therefore, although AI shows great potential in education, there are still challenges in various aspects such as technology, privacy and teacher training that need to be addressed to realize the full-scale implementation of AI-assisted teaching.

4   AI Application Strategies for Global Competency Development

4.1   Artificial Intelligence in Education

The application of Artificial Intelligence (AI) in education is driving global competitiveness, but the technical details are just as crucial in terms of implementation. First, the architectural design of an AI system usually includes a data layer, a computing layer, and an application layer. The data layer is responsible for collecting data from different educational environments, including students' learning activities, test results

and interaction records. These data are integrated through a learning management system (LMS) and other tools to form a unified data pool.

At the computational layer, algorithm selection is key to realizing AI functionality. Commonly used machine learning algorithms include supervised learning (e.g., decision trees and random forests), unsupervised learning (e.g., cluster analysis), and deep learning (e.g., convolutional neural networks). Supervised learning is used to predict student academic performance, while unsupervised learning is used to identify learning patterns. For example, clustering algorithms can help identify students with different learning styles in order to provide personalized learning advice. Deep learning algorithms demonstrate their powerful feature extraction capabilities when processing complex data (e.g., videos and images), which is particularly important for adapting to different educational scenarios.

The data processing process is a core step to ensure the effective operation of the AI system. First, in the data collection stage, educational organizations obtain students' learning data through various channels. Next, the data preprocessing step cleans and normalizes the raw data to eliminate noise and inconsistencies. After that, key features will be extracted through feature extraction techniques to enhance the training effect of the model. Finally, the model is trained and validated to ensure the accuracy and reliability of the algorithm in real-world applications.

4.2   AI-supported Cross-cultural Communication Training

AI technology plays an important role in intercultural communication training. While traditional intercultural communication training is often limited to book knowledge or a small amount of language practice, students can experience intercultural communication more realistically and dynamically through AI technology.AI-powered virtual reality (VR) and augmented reality (AR) technologies can simulate multicultural scenarios, allowing students to interact with characters from different cultural backgrounds in an immersive way, thus enhancing their intercultural communication skills in real-life scenarios. communication skills.

In addition, AI can simulate language expressions and communication styles of different cultures through natural language processing (NLP) technologies. For example, students can have a conversation with a virtual foreigner through an AI-driven dialog system to feel the differences in tone, polite phrases and expressions in different cultural contexts in real time. This not only helps students improve their language skills, but also deepens their understanding of cultural differences and avoids cultural conflicts in actual communication.

5   Summary

This paper explores the application of computerized AI technology in higher vocational English language teaching, particularly its potential for developing global competence in nautical students. First, it examines the current situation and challenges of English language teaching in higher vocational education, especially the industry-specific needs

and complex language skill requirements faced in nautical majors. Next, the article analyzes the connotation of global competence and emphasizes the importance of intercultural communication, global perspective, and critical thinking for students' career development. The development of AI technology in education, such as natural language processing and intelligent teaching systems, supports personalized teaching, real-time feedback, and intercultural communication. The article also explores how AI can help with curriculum design, personalized recommendations for teaching content, and assist with learning assessment to improve student learning outcomes and cross-cultural communication skills. Finally, the strategic application of AI technology in global competency development shows that virtual reality and language simulation systems provide students with more realistic communication environments and help them to improve their English communication skills.AI technology brings a broad application prospect for higher vocational English teaching and global competency development.

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