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Teaching Reform and Practice of the College Computer CAP Course Integrating AIGC

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Abstract: The College Computer CAP (Chinese Advanced Placement) is a common prerequisite computer course offered by many universities in China. It plays a vital role in bridging computer education between high schools and universities. However, with the development and widespread application of AIGC (Artificial Intelligence Generated Content) technology, the outdated teaching content and practices struggle to meet the requirements for cultivating students' knowledge, skills, and information literacy in the intelligent era. Based on an analysis of the necessity of introducing AIGC technology into the College Computer CAP course, this paper elaborately presents the teaching reform and practice carried out on this course at Northwest A&F University, which integrates AIGC technology in teaching content and practices. In terms of teaching content, this reform deeply integrates the introduction and practical application of AIGC technology and some practical intelligent tools. In teaching practices, this reform uses AIGC technology to assist in personalized learning resource recommendation, intelligent learning guidance and Q&A, and the generation of diverse practical teaching cases. The corresponding reform and practice content proposed in this paper has significant reference value for universities offering the same course.

Keywords: AIGC technology; College computer; CAP; Intelligent tools; Intelligent applications

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1. Introduction

The College Computer CAP is a public basic course offered by many universities across China to the whole school. It aims to strengthen the connection between high school and college computer education and make up for the deficiencies in students' basic computer knowledge, basic computer applications, and information literacy during the middle school stage. Currently, the existing College Computer CAP at Northwest A&F University mainly adopts an online-offline blended teaching model. With the rapid development of information technology, blended teaching, which combines traditional face-to-face teaching with online teaching, has gradually become the mainstream teaching mode [1]. The blended teaching model breaks the batch-oriented and standardized talent-training model of traditional teaching and positively contributes to the individuation of talent training and the balance of teaching resources [2]. However, in actual application, blended teaching is limited by the diversity

and standardization of online resources, the openness of the platform, as well as the balance between teachers' classroom-design capabilities and students' participation [3]. The College Computer CAP course faces similar challenges, with issues such as some teaching content being difficult for students to understand and apply, and insufficient classroom teaching interaction.

With the continuous development and popularization of artificial intelligence technology, students' expectations for classroom teaching are constantly rising [4]. They hope to have a more vivid, interesting, and practical learning experience in the classroom, rather than just dull theoretical explanations and simple experimental operations [5]. The emergence of AIGC (Artificial Intelligence Generated Content) technology has brought unprecedented opportunities for innovation in the field of education and teaching. By leveraging AIGC technology, these new expectations of students can be met. Through intelligent generation, simulation experiments, online interaction, etc., it can provide students with a more diversified and personalized learning experience, promoting their all-around development [6]. Therefore, the application of AIGC technology in the teaching reform of courses like the College Computer CAP has broad prospects.

2. The necessity of integrating AIGC technology into the college computer CAP course

AIGC technology refers to a multi-modal content production method that uses artificial intelligence technology to generate text, images, audio, video, etc. This technology combines advanced technologies such as deep learning, natural language processing, and generative models, enabling computer systems to simulate the human creative process and automatically generate diverse and personalized content with high creativity and authenticity [7]. In recent years, AIGC technology has made breakthroughs in fields such as natural language processing, computer vision, and speech recognition [8]. In the education field, by integrating advanced natural language processing and generation algorithms, AIGC can not only independently generate high-quality educational content such as course texts, charts, and teaching resources but also simulate intelligent teaching guidance in interactive dialogues, showing great potential and application value [9]. This innovative model not only expands students' learning methods but also provides them with a broader development space. Currently, with the continuous progress and widespread application of AIGC technology, the education field is embracing a new situation of digital transformation, which not only brings unprecedented opportunities for change to education but also shapes the future direction of education [10].

3. Teaching content reform of the college computer CAP course integrating AIGC

Currently, the teaching content of the College Computer CAP course mainly includes six modules: computer systems, Windows operating system applications, Internet applications, Word document processing technology, Excel data processing technology, and presentation design and production. Among them, except for the computer system, which is a classic teaching content with few specific practical involvements, the other five modules have some intelligent tools to assist in improving learning and work efficiency. However, the introduction of these tools and their basic principles is barely covered in the current teaching content. Without changing the original modules, this reform mainly makes the following adjustments to the teaching content:

(1) In the Windows operating system application section, based on the teaching of the operating system concept, principles, and some basic operations it supports, the teaching of the intelligent agent concept

and its basic principles, as well as some useful Windows-system intelligent tools like Copilot, Windows AI Studio, Windows ML, and the intelligent application control SAC, along with their basic functions and operations, is added.

(2) In the internet application section, based on the teaching of the search engine concept and some basic information-retrieval operations it supports, the teaching of AIGC technology and its basic principles, as well as some useful AIGC information-retrieval tools like Wenxin Yiyan, Tongyi Qianwen, Zhipu Qingyan, and Kimi, which are newly supported by search engines, along with their basic functions and operations, is added.

(3) In the Word document processing technology, Excel data processing technology, and presentation design and production sections, based on the teaching of some basic operations supported by the tools, the teaching of some practical Office intelligent add-ins and their functions and basic operations is added. The specific new teaching content is as follows:

(A) An overview of AI-empowered Office work: This includes the advantages of AI tools in learning and scientific research, the threats and potential hazards of AI tools to scientific research ethics, and how to use AI tools reasonably in scientific research.

(B) Introduction to extremely useful Office intelligent tools: This covers the function introduction, download, and installation methods of three Office intelligent add-ins, namely Office AI Assistant, Bug-free Box, and iSlide.

(C) How to use AI tools to assist in Word document processing? This includes the shortcut functions provided by the Office AI Assistant in the Word ribbon, such as AI error-correction/correction, AI creation, universal translation, image-to-text conversion, convenient typesetting, typesetting optimization, and table-related functions. It also includes the functions of Bug-free Box in the Word ribbon, such as content typesetting, wonderful functions, system enhancement, table processing, and teacher-specific area functions.

(D) How to use AI tools to assist in Excel data processing? This includes the functions provided by the Office AI Assistant in the Excel ribbon, such as content entry, formatting, text extraction and splitting, numerical processing, information entry, and batch image insertion. It also includes the functions of Bug-free Box in the Excel ribbon, such as system enhancement, data processing, financial tools, table processing, and teacher-specific tools.

4. Teaching practice reform of the college computer CAP course, integrating AIGC

In addition to integrating the principles and applications of AIGC technology into the content of the College Computer CAP course, this course reform also integrates AIGC technology into teaching practices, guiding students to correctly understand and use this new technology, combining theoretical knowledge with practical experience, and inspiring students to transform the learned technology into practical applications [11,12]. In the College Computer CAP course, this course reform mainly uses AIGC technology to assist in the following aspects.

4.1. Personalized learning resource recommendation

In the College Computer CAP course, freshmen from different regions and majors usually have different skill levels and learning interests. Through AIGC technology, personalized learning resources can be recommended

according to students' learning history, grades, and behavior data. For example, for students with a weak foundation, supplementary materials for basic knowledge points and practice questions can be recommended; for students interested in cutting-edge AIGC technology, AIGC can recommend relevant cases of generating specific text, images, audio, and video content, technical papers, and online courses. Through personalized resource recommendation, AIGC technology can help each student obtain learning content suitable for them, improving their learning efficiency.

4.2. Intelligent learning guidance and Q&A

The College Computer CAP course contains a large amount of theoretical knowledge and practical skills. AIGC technology can simulate the thinking process of experts and provide students with intelligent learning guidance. At the same time, due to its intelligent Q&A and natural language processing capabilities [13], it can answer students' questions in real-time during and after class. For example, when explaining data processing technology, AIGC can generate data processing tasks for students to practice in a virtual environment; when students encounter difficulties in the learning process, AIGC can provide solutions according to students' specific problems, sort out and summarize knowledge points, and help students better understand the course content. In practical classes, when students are processing documents, data, and making presentations, they may encounter various problems that do not meet the expected results. By having a conversation with artificial intelligence, corresponding solutions can be quickly obtained, and the knowledge is presented coherently. Through intelligent guidance and Q&A, students can master knowledge in practice and improve their problem-solving ability and efficiency.

4.3. Generation of diverse practical teaching cases

Diverse practical teaching cases are an important foundation for cultivating students' innovative literacy and practical application ability. In the specific implementation of the blended teaching model, theoretical teaching is mainly carried out online, while practical teaching is mainly carried out offline. To cultivate students' innovative literacy and practical application ability, practical assignments can be given to students based on the theoretical knowledge taught in online theory classes, requiring them to collect practical application scenarios related to their majors. AIGC can be an important auxiliary tool for students to collect relevant practical teaching cases. Based on real-world practical application scenarios, AIGC technology can help students generate practical projects and cases that meet the requirements of their professional backgrounds, providing a convenient learning platform for students to experience professional practices [14,15].

5. Summary

This paper explores the necessity and specific measures of introducing AIGC technology into the teaching reform and practice of the College Computer CAP course. By analyzing the advantages of AIGC technology and its potential in the education and teaching field, its important role in improving teaching quality, enhancing students' learning interest, and cultivating their innovative ability is clarified. In this reform practice, Northwest A&F University not only updated the teaching content by introducing the principles of AIGC technology and the teaching of related intelligent tools but also made full use of AIGC technology in teaching practices to achieve personalized learning resource recommendation, intelligent learning guidance and Q&A, and the generation of diverse practical teaching cases. These reform measures not only enrich the teaching methods but also

significantly improve students' learning efficiency and interest, providing strong support for cultivating students' practical ability and innovative thinking.

Looking ahead, with the continuous progress of AIGC technology and the deepening of its application, there is still broad space and potential for the teaching reform of the College Computer CAP course. On the one hand, further exploration can be carried out on the in-depth integration of AIGC technology in curriculum design and implementation, such as developing an intelligent course platform based on AIGC technology to achieve more accurate teaching management and personalized learning path planning. On the other hand, the application of AIGC technology in interdisciplinary teaching can be strengthened. By generating interdisciplinary practical cases and projects, students' understanding and mastery of the application of computer technology in different fields can be promoted, and their ability to solve problems across disciplines can be cultivated.

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