Education Reform and Development, 2025, Volume 7, Issue 11
https://ojs.bbwpublisher.com/index.php/ERD
Online ISSN: 2652-5372
Print ISSN: 2652-5364

Construction and Practice of AIGC-based Smart Teaching Mode for "File Operations" in Higher Vocational Linux Courses

Kaijia Liu[1], Furong Peng[1]*, Hui Zhang[1], Aitao Li[2]

[1]Shandong Labor Vocational and Technical College, Jinan 250300, Shandong, China
[2]Shandong Construction Training and Vocational Qualification Registration Center, Jinan 250004, Shandong, China

**Author to whom correspondence should be addressed.*

Abstract: Addressing the teaching pain points of the "file operation" module in the "Linux Network Operating System" course in higher vocational education, which involve abstract commands and students' tendency to make mistakes during operations, this study constructs and practices a three-stage teaching model of "demonstration-imitation-application" empowered by AIGC, aiming to integrate it throughout the entire teaching process: before class, personalized preview materials are generated using AIGC to achieve precise "demonstration"; during class, interactive question-answering and standardized guidance are conducted relying on AIGC to support effective "imitation"; after class, comprehensive practical training tasks are dynamically generated through AIGC to promote knowledge transfer and "application". Teaching practice shows that this model effectively improves students' operational standardization and skill proficiency, enhances their ability to transfer knowledge and solve practical problems, and provides a reference path and practical case for the deep integration of AIGC technology and vocational education teaching.

Keywords: AIGC; Linux teaching; File operation; Personalized learning; Teaching mode innovation

Online publication: December 12, 2025

1. Introduction

With the rapid development of cloud computing, big data, and artificial intelligence technologies, the Linux network operating system, as its core cornerstone, plays an irreplaceable role in data centers, network operation and maintenance, software development, and other fields [1]. Higher vocational education aims to cultivate high-quality technical and skilled talents. Proficiently mastering Linux system management and operation has become a core professional competency for students majoring in computer network technology and related fields [2]. Therefore, how to efficiently conduct Linux course teaching and enhance students' practical operation abilities has become an important issue in higher vocational computer education.

However, in traditional Linux course teaching practice, there are significant teaching difficulties in basic

modules such as “file operations”. Linux has numerous commands and abstract syntax, and its character interface operation method has a high threshold for students who are accustomed to graphical interfaces, which can easily lead to fear of difficulties [3]. Students often make frequent errors during practice due to unclear parameter memory and improper path operation, while teachers find it difficult to provide immediate and personalized guidance for each student, resulting in delayed teaching feedback. In addition, the traditional model of “teacher demonstration student imitation” is difficult to stimulate learning initiative, and the singularity of cases also limits the cultivation of students’ knowledge transfer and problem-solving abilities.

In recent years, the rise of Artificial Intelligence Generated Content (AIGC) technology has provided new ideas for solving the aforementioned teaching difficulties. AIGC tools have powerful natural language understanding and content generation capabilities, enabling efficient human-machine natural interaction and real-time creation of contextualized content [4]. In the practical process of this study, DeepSeek and other AIGC tools were used as the core intelligent assistance platform [5] to explore their potential application in Linux teaching scenarios in vocational colleges. Introducing AIGC technology into the teaching process aims to free teachers from repetitive guidance work and provide students with continuous and accurate “intelligent teaching assistant” support.

2. Construction of the “Demonstration Imitation Application” teaching model assisted by AIGC

2.1. Structured process of teaching mode

To integrate AIGC technology into the entire teaching process [6], this study constructed a “demonstration imitation application” teaching mode that runs through three stages: pre-class, in-class, and post-class (**Figure 1**). In the pre class stage, AIGC focuses on precise demonstrations and helps students establish a visual impression of operations by generating personalized preview materials; During the in class stage, emphasis is placed on

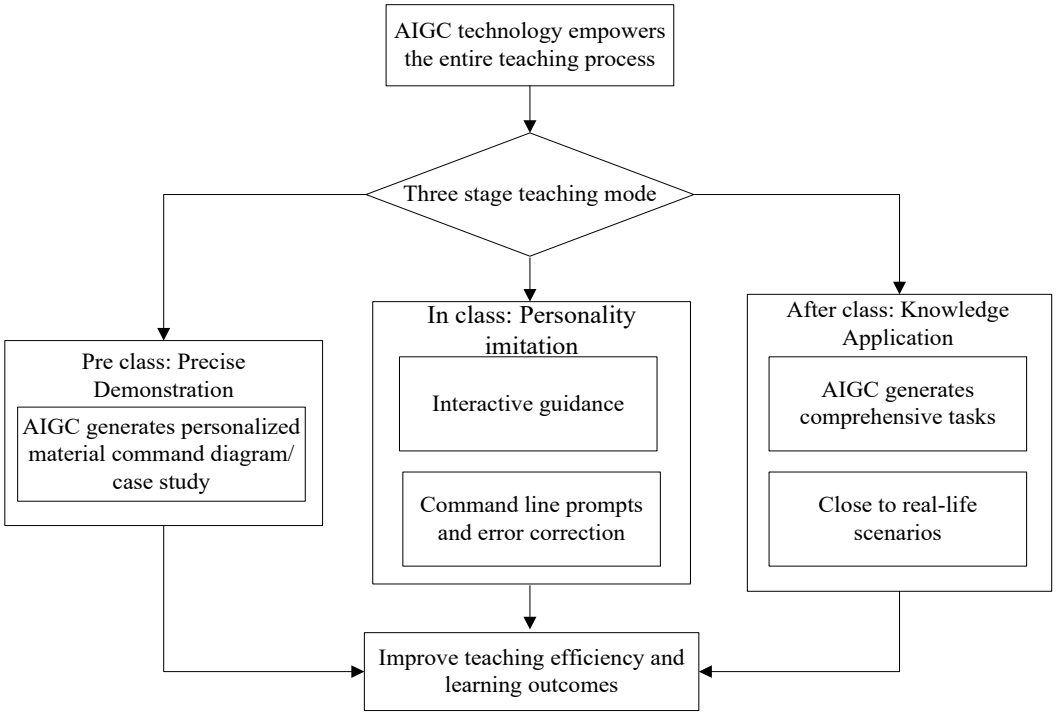

Figure 1. Overall operational process.

standardized imitation, and AIGC serves as an interactive guidance tool to guide students in mastering correct operations through real-time Q&A and error correction; In the post class stage, emphasis is placed on the application of knowledge, and AIGC promotes students to transform their learned knowledge into practical problem-solving skills by generating real-life tasks. This teaching model achieves an organic connection between various links through AIGC technology, forming a complete teaching loop from cognitive construction to ability development, significantly improving teaching efficiency and learning effectiveness.

2.2. Functional role empowerment of AIGC

The effective operation of this teaching mode is attributed to the collaborative empowerment of the three core roles undertaken by AIGC throughout the entire teaching process, as shown in **Figure 2**. As an intelligent generator of teaching resources, AIGC can quickly prepare personalized materials based on teaching objectives and learning data, achieving precise and efficient lesson preparation; As an interactive guide in the practical process, AIGC provides real-time feedback and error correction through natural language dialogue [7], ensuring the standardization and personalized support of students' operational training; As an effective promoter of comprehensive abilities, AIGC drives knowledge internalization and transfer by designing comprehensive tasks in real-life scenarios, cultivating students' engineering thinking and problem-solving skills. These three roles together constitute the core mechanism of AIGC empowering teaching.

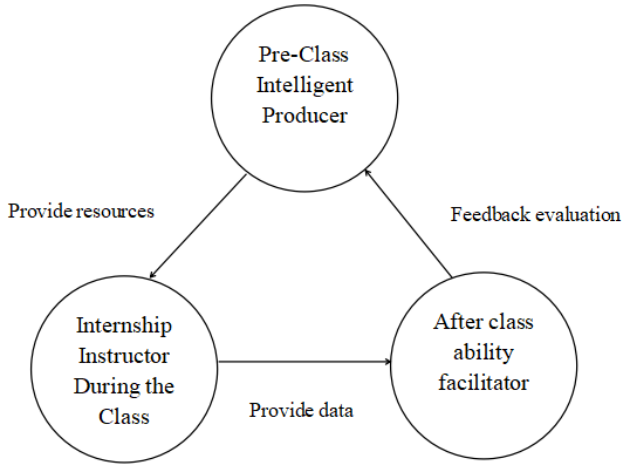

Figure 2. Core roles in AIGC teaching.

3. Specific application practice of AIGC in "File Operation" teaching

3.1. Pre-class: Automatic generation of personalized preview materials

In the pre-class preview stage, use AIGC tools to generate personalized preview materials for students of different foundations and levels, achieving the initial implementation of "teaching according to individual abilities."

For students with zero foundation, AIGC can generate "story-based" preview cards and lower cognitive barriers through real-life metaphors. For example, comparing "files" to "notebooks", "directories" to "folders," using "create a new notebook" to explain the touch command, "copy notes" to explain the cp command, and "organize desktop" to explain the purpose of the mv and rm commands. This type of intuitive mapping effectively lowers the cognitive threshold, helps students establish a sensory understanding of command-line operations, and clears conceptual barriers for classroom learning.

For students who already have a foundation, AIGC will generate an exploratory task list to guide them to independently build their knowledge system through project practice. For example, design a project management task: create a project directory, use the touch command to create a draft.exe file, use the cp command to back up, create a soft link through ln, and use the find command to search for specific text files. This task-driven mode transforms traditional passive knowledge reception into an active exploration process, effectively stimulating students' interest in learning.

AIGC also provides efficient data generation support for teachers, allowing them to quickly create three types of practical preview materials: command comparison charts that visually display the differences in options for commands such as cp; Provide case studies and preventive measures for misoperation of high-risk commands such as RM using the Operation Safety Compass; scenario exercises are designed around common problem scenarios. These resources combine production efficiency with targeted teaching, laying a solid foundation for the smooth implementation of subsequent classroom teaching.

3.2. In-class: Interactive guidance and standardized training

In the practical session of the class, AIGC integrates into the learning environment through dialogue as an "intelligent teaching assistant". If students encounter difficulties while operating commands such as touch, cp, mv, etc., they can ask AIGC questions in natural language at any time. The system generates targeted diagnostic feedback and step-by-step operational suggestions through semantic understanding, forming an interactive mechanism of "question and answer." This method effectively avoids repeated trial and error caused by details errors, while improving operational efficiency and enhancing students' learning confidence [8].

To address the issue of difficulty in memorizing command options, the system supports interaction in natural language. For example, when students ask colloquial questions such as "how to copy the entire directory", AIGC can accurately respond with specific command formats and explain the meaning of parameters. Part of the AIGC integrated terminal tools also provide command auto completion and parameter prompt functions, further reducing students' memory burden.

When completing comprehensive training tasks such as "log file management", AIGC can guide students to operate step by step according to standardized processes, and cultivate their rigorous operational logic through standardized guidance. The system also pushes personalized exercise content based on students' actual performance: providing advanced challenge tasks for proficient operators, arranging targeted consolidation exercises for those with weak foundations, and achieving differentiated teaching.

For teachers, AIGC effectively undertakes repetitive guidance work, enabling them to focus on teaching organization and thinking guidance. By examining the interaction records between students and AIGC, teachers can accurately grasp common difficult problems and provide focused explanations in the classroom, thereby devoting more energy to heuristic teaching and personalized guidance, and improving teaching effectiveness.

3.3. After-class: Dynamic case design and knowledge transfer training

In the post-class stage, AIGC promotes knowledge transfer and ability expansion by generating comprehensive tasks of real-life scenarios. Taking "Server Log File Archiving Management" as an example, this task requires students to comprehensively use commands such as mkdir, cp, mv, rm, find, etc. to complete the classification, archiving, and cleaning of log files, effectively improving their knowledge integration and practical abilities.

Based on the interaction records between students and AIGC during class, the system can generate a "learning feedback report" that reflects their common errors and accurately identifies the problem. For example, in case

of improper use of the chmod command, the system will prompt "Suggest reviewing the differences between numerical and symbolic permission modes" and provide corresponding learning resources and improvement suggestions.

Based on students' learning trajectories, AIGC will also intelligently push advanced content such as shell script writing and file permission management, to help students build a systematic knowledge system. At the same time, by designing project-based tasks such as "personal blog site construction," students are guided to complete the entire process from directory creation to log maintenance, cultivating engineering thinking and problem-solving skills in real project practice, and achieving a leap from knowledge mastery to ability development.

4. Analysis of application effectiveness

To systematically evaluate the effectiveness of the teaching mode, this study conducted a DeepSeek-based teaching practice on 91 students majoring in computer network technology [9]. Data was collected through skill tests, questionnaire surveys, and classroom observations, and the following analysis results were obtained.

In the process of teaching practice, the introduction of AIGC technology has brought significant teaching improvements to the "file operation" unit. Its innovative real-time interactive feature effectively improves students' practice experience, and the system provides instant Q&A and error correction functions, building a virtuous learning cycle of "learning while doing and answering questions." The course survey results show that the vast majority of students believe that this function significantly reduces the sense of frustration in the learning process, and this timely and effective support method has a significant promoting effect on maintaining students' learning motivation and exploratory desire.

The application of AIGC has driven a profound change in teaching methods [10]. By intelligently analyzing students' questioning content, AIGC can accurately identify individual knowledge weaknesses and provide precise, targeted guidance. Teaching practice has shown that after systematic training, students have significantly improved in the standardization of command usage. Of particular note is that students with different levels of foundation can make effective progress on their respective foundations, fully reflecting the unique advantages of differentiated teaching.

Through carefully designed work scenario simulation tasks, AIGC effectively promotes the organic connection between skill learning and career application. In the process of completing a series of practical tasks, students not only consolidate their command operation skills, but more importantly, enhance their in-depth understanding of practical work logic. Student feedback indicates that this problem-oriented teaching approach significantly enhances their ability to transform abstract command knowledge into practical problem-solving skills.

AIGC has also significantly optimized the rational allocation of teaching resources. The intelligent guidance support provided by the system allows teachers to free themselves from repetitive Q&A and devote more energy to course design and in-depth analysis of key issues. Classroom observation records show that teachers have significantly increased their time spent on heuristic teaching and personalized guidance, and this shift in teaching focus has had a positive impact on improving overall teaching quality.

5. Conclusion

This study systematically integrates AIGC technology into Linux file operation teaching, and constructs an

intelligent teaching mode that runs through pre-class, in-class, and post-class. Practice has proven that this model has achieved significant results in improving teaching efficiency, regulating operational behavior, and promoting knowledge transfer, providing a valuable path for vocational education curriculum reform.

There are still some limitations to this study: the accuracy and adaptability of AIGC in handling complex operational scenarios need to be improved; The balance between intelligent assistance and students' independent thinking ability needs further exploration; In addition, the dependence of teaching mode on technological facilities also limits its promotion to a certain extent.

Future research will focus on exploring implementation plans in low-tech environments, deepening the collaborative mechanism between intelligent assistance and teacher-led teaching, in order to build a more balanced and effective new paradigm of human-machine collaborative teaching. With the continuous development of artificial intelligence and educational concepts, the deep integration of AIGC and vocational education will provide important support for the construction of a high-quality education system.

Disclosure statement

The authors declare no conflict of interest.

References

[1] Zhou J, Tao F, Chen D, 2025, Data-Driven Teaching Optimization of Linux Curriculum. Fujian Computer, 41(09): 96–101.

[2] Zuo H, 2024, Thoughts on Promoting the Connotative Development of Ideological and Political Courses in Higher Vocational Colleges. Henan Education (Higher Education), (S1): 67–68.

[3] Feng L, 2025, Practice and Reflection on AI-Based Online-Merge-Offline Teaching Model: Taking Linux Network Operating System Course as an Example. Information and Computer, 37(13): 242–244.

[4] Xu H, 2025, Research and Practice on Teaching Reform in Higher Vocational Colleges under the Background of AIGC Era: Taking Linux System Application Course as an Example. Information and Computer, 37(13): 182–184.

[5] Guo G, 2025, Research on the Integration Path of DeepSeek AI Platform into Talent Cultivation in Universities. Silk Road Review, (09): 67–74.

[6] Huang Q, Wang Y, Wei L, et al., 2025, An Empirical Study on Python Gamification Teaching Strategy in Private Universities Based on AIGC. Computer Education, (10): 156–162.

[7] Wu P, Jiang W, Zhang X, 2025, Research on Core Elements of the "AIGC + Education" New Education Model. Information and Computer, 37(19): 200–202.

[8] He H, Chen Q, 2025, Application Exploration of AIGC in Ideological and Political Design of Linux Operating System Course in Higher Vocational Colleges. Computer Knowledge and Technology, 21(08): 140–143.

[9] Wang K, Guo M, 2025, Analysis of DeepSeek Intelligence Integration in Computer Network Course Teaching Practice. Computer & Telecommunication, (06): 83–89.

[10] Lan L, 2025, Exploration on AIGC Technology Empowering Practical Teaching of Computer Fundamentals in Higher Vocational Education. Education Reform and Development, 7(8): 243–248.