

# Research on the Teaching Reform of College Computer Basic Courses Driven by Intelligent Technology

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**Abstract:** With the rapid development of artificial intelligence technology, the education sector is facing new development opportunities and challenges. As a high-ground for cultivating high-level professionals, colleges and universities play a crucial role in educational reform. This article briefly summarizes the significance and challenges of the teaching reform of computer basic courses, and proposes paths for the teaching reform of college computer courses driven by intelligent technology, hoping to promote the teaching reform of these courses.

**Keywords:** Intelligent technology; Colleges and universities; Computer basic courses

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## 1. Introduction

The Third Plenary Session of the 20th Central Committee of the Communist Party of China clearly proposed promoting the digital construction of education and enabling curriculum reform with smart technology. With the informatization development of society and the continuous emergence of emerging information technologies, the current situation of teaching computer basic courses in colleges and universities no longer matches the requirements of the industry. Therefore, promoting the reform of computer majors in colleges and universities, promoting the systematic integration of artificial intelligence with education, teaching, and learning, and enhancing the effectiveness of overall curriculum-based and comprehensive disciplinary education are inevitable ways for colleges and universities to improve classroom teaching quality and adapt to the development of the times.

## 2. Significance of the teaching reform of college computer basic courses

With the continuous deepening of educational reform, the teaching reform of college computer basic courses has become crucial. From the perspective of enhancing students' information literacy, by integrating cutting-edge teaching content such as programming thinking training and basic big-data processing theory, and using advanced

teaching methods such as problem-based learning (PBL) and group collaborative learning, it helps students build a complete computer knowledge system, strengthen their computer operation and information technology application abilities, and thus enhance students' information literacy, enabling them to cope with the challenges of future digital work and life with ease<sup>[1]</sup>. As the digital transformation of industries accelerates, computer technology has become a key element in the development of various industries. Guided by the integration of industry and education, the teaching reform adopts practical teaching models such as project-driven and case-based teaching to deeply integrate the curriculum content with industry standards, cultivate students' professional skills and innovative thinking, meet the needs of enterprises for highly adaptable and innovative talents, and improve students' competitiveness in the job market<sup>[2]</sup>. With the advancement of educational reform, the reformed courses will pay more attention to the cultivation of students' practical problem-solving and innovative abilities. By offering computer courses related to innovation and entrepreneurship and encouraging students to participate in practical activities such as software design and application development, it can stimulate students' entrepreneurial enthusiasm and innovative spirit, tap their potential in the field of scientific and technological innovation, and continuously supply innovative talents for the national innovation-driven development strategy.

### **3. Challenges faced by the teaching of college computer basic courses in the new era**

#### **3.1. Rapid technological upgrades and difficulty in updating textbook content**

The rapid development of computer technology has brought opportunities as well as many challenges to the education field. In particular, the problem of lagging textbook content updates is quite prominent. Cutting-edge technologies such as cloud computing, big data, and artificial intelligence are emerging continuously, and the computer knowledge system is evolving rapidly<sup>[3]</sup>. However, due to the complicated processes of compilation, review, and publication of college computer textbooks, their content is difficult to keep up with the pace of technological development. This makes it difficult for students to access the latest and most practical knowledge during their studies, which not only affects learning outcomes but may also cause students to struggle to adapt to the rapidly changing workplace environment after graduation. In addition, the rapid technological updates also place higher demands on teachers' teaching abilities. Teachers need to constantly learn new knowledge to introduce the latest technical content and cases into the classroom. This not only increases teachers' teaching burdens but also requires colleges and universities to increase investment in teacher training and teaching resource updates to ensure that the teaching quality keeps pace with the development of the times<sup>[4]</sup>.

#### **3.2. Diverse student demands and difficulty in meeting them with unified teaching**

Against the backdrop of the information age, the widespread application of computer technology has made it a key support for interdisciplinary integration. This trend has led to significant diversification in college students' demands for computer technology. Students have natural differences in cognitive abilities and interest preferences. In the field of computer learning, some students are deeply interested in programming, thinking and algorithm design in software development, while others prefer the theories and applications of cutting-edge fields such as data analysis and artificial intelligence<sup>[5]</sup>. The traditional unified teaching model emphasizes using the same teaching content and methods for all students. Although this model has certain advantages in large-scale teaching, it is difficult to meet the personalized needs of students. For students with a weak foundation, the unified teaching content may lead to cognitive overload, making it difficult for them to effectively absorb knowledge. For students with a solid foundation, the simple repetitive content cannot fully stimulate their

learning motivation and potential. Therefore, college computer teaching needs to explore student-centered teaching models such as stratified teaching and project-based learning. By creating diverse learning situations, these models can meet the learning needs of different students, promote students to actively construct knowledge systems, and improve teaching effectiveness.

### **3.3. High requirements for practical operation abilities and mismatch with theoretical teaching**

In the process of college computer teaching, there is an imbalance between the cultivation of practical operation abilities and traditional theoretical teaching. This contradiction restricts the output of high-quality computer talents. The characteristics of the computer discipline determine that the mastery of its knowledge system does not rely solely on theoretical memorization but requires deepening and consolidation through repeated practical operations<sup>[6]</sup>. However, the traditional theoretical teaching model is deeply influenced by behaviorist theory, placing the focus of teaching entirely on the mechanical instillation of knowledge. Teachers dominate the output of knowledge in the classroom, and students passively receive it. This model makes the teaching process lack interactivity, greatly reducing students' opportunities for practical operations. As a result, students have difficulty combining the theoretical knowledge they have learned with practical applications, and their practical abilities develop extremely slowly. In terms of teaching resources, many colleges and universities have limited investment in the procurement and update of computer teaching equipment. The hardware facilities in laboratories are outdated and cannot meet the requirements of current industry development for computer technology. Moreover, the shortage of practical sites means that students often face problems such as competing for equipment and limited operation time during practical operations<sup>[7]</sup>. In terms of the construction of the teaching staff, some teachers have long been confined to the campus environment, lack practical experience in front-line enterprises, and their knowledge reserves remain in the past. Therefore, they find it difficult to integrate the latest technical applications and cases in the industry into the classroom during teaching, resulting in targeted and practical guidance for practice.

## **4. Reform paths for higher vocational computer basic courses driven by intelligent technology**

### **4.1. Innovating the teaching model to promote teaching reform**

With the rapid development of science and technology, various intelligent technologies are increasingly being applied in the education field, driving the innovation of education and teaching. For college computer basic courses, the teaching model has also been renovated accordingly, and the online-offline blended teaching model has been widely used. This teaching model breaks the shackles of time and space, enabling students to make full use of online resources for autonomous learning and providing students with a good personalized learning experience<sup>[8]</sup>. Teachers can also integrate high-quality teaching resources through online platforms, effectively enhancing the attractiveness and effectiveness of teaching content. However, although personalized learning gives students more autonomy, it largely depends on human decision-making and flexibility.

To further tap the potential of personalized learning, constructing a learner profile model based on artificial intelligence technology has become the key. By collecting students' learning behavior data and using algorithms such as collaborative filtering and knowledge modeling, it is possible to accurately analyze individual differences among students and customize personalized learning paths. Personalized learning based on artificial intelligence

technology has significant advantages. With data-driven and algorithms at its core, it can not only help students learn efficiently but also gradually cultivate students' computational thinking and innovative abilities according to their cognitive development laws, enabling students to develop good learning habits and promoting the more scientific and efficient development of computer basic courses.

#### **4.2. Reconstructing the curriculum content to enhance educational quality and efficiency**

College computer basic courses, as a comprehensive discipline, cover a wide range of basic computer theoretical knowledge and applied practical skills. In the teaching process, teachers make full use of massive online teaching materials, plan teaching content according to the characteristics of students from different majors, and produce this content into micro-courses. They also provide targeted extended learning materials for students at different learning ability levels to achieve the goal of differential teaching<sup>[9]</sup>. However, implementing differential teaching often increases teachers' workloads. With the rapid development of intelligent technologies such as deep learning and machine learning, the above-mentioned dilemma has been effectively alleviated. Teachers can use intelligent technologies to accurately analyze students' needs, adjust teaching content and strategies, predict students' learning effects, identify students' knowledge blind spots, and design teaching activities accordingly. At the same time, it can also reduce teachers' unnecessary burdens.

For example, Content Technologies Inc. in the United States has applied deep-learning technology to the education field, sorting and integrating existing curriculum resources. Through this technology, various educational materials are accurately identified and rearranged to generate customized books and learning materials that meet students' needs. At the same time, with the powerful analysis ability of the technology, the originally complex and obscure learning content is disassembled into clearly structured and easy-to-understand modules, reducing the learning difficulty for students, effectively improving students' learning efficiency, and providing a successful example for the optimized utilization of educational resources. In the future, accurate curriculum content design and the construction of learner profile models will become the core elements of realizing personalized learning. This is not only an inevitable trend for the education field to adapt to the development of the times but also an important way to improve educational quality and promote the all-round development of students.

#### **4.3. Improving teaching methods to enhance teaching quality**

Classroom teaching is the main front of education. Its teaching quality is directly related to students' knowledge acquisition and ability cultivation and plays a decisive role in students' learning achievements. To ensure the teaching quality of the classroom, it is necessary to break the shackles of the traditional single-teaching model, adopt a more open, inclusive, and diversified teaching model, integrate task-based, project-based, and problem-based learning, establish an interdisciplinary joint lesson-preparation mechanism, and normalize the 'AI + X' teaching model to truly implement the student-centered teaching concept and meet students' diverse planning needs<sup>[10]</sup>. The integration of artificial intelligence technology can break down resource barriers, integrate educational resources, achieve the optimized allocation of teaching resources, and improve teaching effectiveness. Reconstructing classroom content based on big data and optimizing teaching arrangements can ensure that teaching content keeps up with the pace of the times. At the same time, with the help of big-data technology, it is possible to accurately analyze students' learning behaviors, provide a decision-making basis for teachers, and help teachers teach precisely. This not only helps teachers better control the teaching rhythm but also enables personalized tutoring according to individual differences among students, implementing the



principle of teaching students according to their aptitudes and promoting students' in-depth learning<sup>[11]</sup>.

At present, in the context of educational reform, the reform of college computer basic teaching is also being gradually promoted. Teachers have changed the traditional teaching model and have gradually tried to apply diversified teaching methods in the classroom. Full-time teachers usually design teaching plans flexibly according to teaching objectives, course content, and students' learning situations, and choose teaching methods such as flipped classrooms, blended teaching, and case demonstrations to improve the teaching quality of the classroom. With the help of intelligent robots, AI teaching assistants, etc., teachers can organize classroom activities more efficiently<sup>[12]</sup>. For example, teachers can innovatively implement the flipped-classroom model, set extracurricular autonomous learning goals for students, and guide students to learn independently. Teachers can spend more time on classroom discussions and answering questions, enhancing students' participation and depth of thinking. At the same time, students are encouraged to master learning methods of independent exploration and combination of learning and questioning, cultivating independent thinking abilities, improving teaching effects, and achieving the improvement of teaching quality.

#### **4.4. Relying on artificial intelligence to improve the level of teaching management**

Teaching management is the core content of school management work, undertaking responsibilities such as supervision and coordination of various links in the teaching process. How to reform teaching management and comprehensively improve the quality of education is an important issue facing colleges and universities. For college computer basic courses, the teaching method is usually collective teaching<sup>[13]</sup>. However, students' learning foundations, interests, and acceptance abilities vary, resulting in uneven teaching effects and making educational management work rather difficult. It is difficult to achieve comprehensive coverage by relying solely on teachers' manual management, and the school's basic information system also struggles to meet the requirements of refined management. The introduction of artificial intelligence technology can achieve accurate collection and analysis of student data, help teachers understand the learning situation of students, develop personalized teaching plans, improve management efficiency, and ensure the quality and effectiveness of classroom teaching. An intelligent teaching management system based on data-driven and algorithm models can efficiently collect and process massive amounts of data information. Through this intelligent teaching management system, it is possible to accurately identify students' learning difficulties and needs, automatically generate learning suggestions, track and evaluate learning effects in real-time, provide accurate teaching support for teachers, help teachers adjust curriculum plans in a timely manner, and optimize classroom teaching designs, thus improving the quality and efficiency of teaching services. In addition, with the help of intelligent devices and intelligent processing technologies, teachers can also be assisted in handling some daily affairs, such as attendance records and homework grading, reducing their workloads and enabling them to focus on teaching innovation<sup>[14]</sup>. This can not only build a learning database for students, facilitating teachers to access and use students' individual data information, but also, based on these data, conduct in-depth mining through intelligent systems, further improving the scientificity and effectiveness of teaching management.

#### **4.5. Optimizing teaching evaluation to strengthen teaching effects**

Teaching evaluation has multiple functions, covering aspects such as supervision, diagnosis, and feedback. It is an important means of providing a decision-making basis, improving teaching quality, and ensuring teaching effects. For college computer basic courses, the evaluation methods for teachers' teaching work include interviews, questionnaires, peer reviews, and teacher self-evaluations, showing diverse characteristics. However, traditional

evaluation methods have great limitations due to factors such as personal biases, subjective influences, and data incompleteness, resulting in evaluation results lacking objectivity and scientificity<sup>[15]</sup>. With the development of artificial intelligence and other technologies and their application in the education field, by collecting multi-modal data such as teachers' and students' voices, facial expressions, body postures, classroom interactions, and physiological signals in classroom teaching, constructing classroom language, behavior, and emotion assessment data sets, and then using artificial intelligence technology to automatically identify and analyze these data sets, it is possible to achieve diversified intelligent evaluations of classroom teaching, promoting evaluation innovation through technological innovation. This provides new ideas and ways to solve problems such as unobjectivity, unfairness, and incompleteness of evaluations.

However, these traditional evaluation methods have certain limitations. Personal biases, incomplete data, subjective experience-based analysis by experts, and interference from non-teaching factors may all lead to evaluation results lacking scientificity, professionalism, and objectivity. With the development of artificial intelligence technology, its application in teaching evaluation provides a new way to solve the above-mentioned problems.

However, although artificial intelligence can change the traditional evaluation system and improve the efficiency and accuracy of teaching evaluation, over-reliance on artificial intelligence tools to measure people based on large-scale data-quantified indicators may also lead to a lack of comprehensiveness and depth in evaluation. It can be seen that artificial intelligence cannot be the sole criterion for teaching evaluation. We should always keep in mind that the intelligentization of educational evaluation is not for the sake of intelligence but to serve as an auxiliary tool for teachers to conduct teaching analysis and reflection. It should be deeply integrated with traditional evaluation methods to promote the reform of modern educational evaluation.

## 5. Conclusion

In summary, in the context of the intelligent era, the integration of technical means such as artificial intelligence with education and teaching is continuously deepening, providing various possibilities for the innovation of education and teaching methods and offering students a more convenient and intelligent teaching experience. Facing the new situation, colleges and universities, as the key positions for knowledge inheritance and innovation, should seize the opportunities of the times and promote the integration of education and teaching with modern technology. By comprehensively implementing measures in aspects such as innovating teaching models, reconstructing curriculum content, improving teaching methods, enhancing the level of teaching management, and optimizing teaching evaluation, new vitality for educational development can be stimulated, and new achievements can be made in curriculum teaching reform.

## Disclosure statement

The author declares no conflict of interest.

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