An analysis on the Application of Action-oriented Teaching Method in Computer Teaching Reform in Colleges and Universities

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Abstract: At present, the reform of higher education emphasizes the cultivation of practical ability and innovative thinking. Under this background, college computer courses face the need of innovation in teaching methods. Through analyzing the application of action-oriented teaching method in computer education, this paper aims to put forward effective teaching strategies to enhance students' practical operation ability and innovative thinking. It is found that the action-oriented teaching method can significantly improve students' learning initiative and problem-solving ability, and bring positive changes to the field of computer education.

Keywords: Action-oriented teaching method; College computer education; Practical ability; Innovative thinking

Introduction:

In the higher education system, computer education plays a crucial role. Education reform constantly promotes the innovation of teaching methods, and action-oriented teaching method has become an important direction of reform because of its practical and interactive characteristics. This paper analyzes the application and effect of action-oriented teaching method in computer education, aiming at providing theoretical and practical guidance for the reform of computer education in colleges and universities.

1. Theoretical basis of action-oriented teaching method

1.1 Core principles of action-oriented teaching

Learning by doing is the core of action-oriented teaching. This approach emphasizes that the acquisition of knowledge and skills should be achieved through direct participation and practical operation, rather than relying solely on theoretical learning. In computer science education, this means that students need to master complex concepts and techniques through programming practices, software development projects, and lab work. For example, by designing and implementing a small software project, students gain a better understanding of the practical applications of programming languages, algorithm design, and software engineering. This approach to learning not only improves students' technical skills, but also promotes their in-depth understanding of the field of computer science. The student-centered teaching concept is another core principle of action-oriented teaching. In this model, the role of teachers changes to that of mentors and facilitators, while students are encouraged to proactively explore problems and independently find solutions. This approach is particularly important in computer education because it promotes creative thinking and self-directed learning in students. For example, when dealing with programming challenges, students are encouraged to think independently and explore multiple possible solutions, thereby deepening their problem-solving skills and critical thinking.

1.2 Comparison between action-oriented teaching method and traditional teaching method

Interactive contrast is the key to understanding the differences between action-oriented and traditional teaching methods. Compared with traditional teaching methods, action-oriented teaching pays more attention to the interaction between teachers and students and between students. In the context of computer education, this interaction is achieved through team projects, peer reviews, and group discussions. Through this interaction, students not only receive feedback and guidance from teachers, but also broaden their horizons and improve their understanding through communication with peers. This interactivity enhances the engagement and dynamics of the learning process, helping to build a more collaborative and communicative learning environment. The comparison of teaching

effect is also an important dimension to consider. The action-oriented teaching method shows significant advantages in knowledge acquisition and skill improvement. For example, in computer programming teaching, by actually writing code and implementing projects, students are able to gain a deeper understanding of programming languages and software development processes. An action-oriented approach helps students translate theoretical knowledge into practical skills through practical applications and problem solving activities. This approach not only enhances students' academic achievement, but also enhances their ability to innovate and adapt to future career challenges [1].

2. The application of action-oriented teaching method in computer education

2.1 Curriculum design and implementation

In computer science education, action-oriented pedagogy requires major adjustments in course content to better align with the actual needs of the discipline. This adjustment mainly involves the close combination of theoretical knowledge and practical operation. For example, when teaching programming languages, in addition to explaining syntax and concepts, specific programming tasks need to be designed for students to actually write and test code. This approach not only helps students better understand the theory, but also enhances their practical programming skills. Similarly, programs can be designed around project-based learning activities in areas such as software engineering, database management, and network technology, enabling students to learn and grow while solving real-world problems.

Innovation in teaching methods is also a key component of action-oriented teaching. By adopting diverse teaching methods such as project driven and case analysis, computer science courses can become more vivid and practical. For example, by introducing real-world software development projects, students can learn and apply their skills in a simulated career environment. Case studies help students understand how complex computer systems and algorithms are applied in real-world situations. These methods not only increase students' engagement and interest, but also promote their in-depth understanding of the course content.

2.2 Evaluation of teaching effect

The success of action-oriented teaching methods depends to a large extent on the continuous evaluation of the effectiveness of teaching. In computer education, this usually involves assessing students' practical and problem-solving skills. For example, students' skills in programming, software development, and systems analysis can be quantified through regular practical tests and project assessments. By observing students' performance in solving practical technical problems, teachers can assess students' critical thinking and innovation skills. This assessment not only helps to determine whether students have successfully mastered the course content, but also reveals which teaching methods are most effective. Teaching feedback and adjustment is an important link to ensure that teaching methods always meet the needs of students and subject development. In action-oriented computer education practices, it is crucial to gather feedback from students, which can be done through questionnaires, group discussions, or individual interviews. Based on this feedback, teachers can adjust course content, teaching methods and assessment criteria to ensure maximum teaching effectiveness. For example, if students are generally struggling with a certain programming concept, the teacher may need to redesign the teaching method for that section or add more hands-on exercises. Through this continuous adjustment and optimization, the teaching process will be more in line with the needs of students, thus improving the overall teaching quality [2].

3. Challenges and coping strategies

3.1 Resource and Support Issues

The implementation of action-oriented pedagogy is faced with a challenge in terms of resource allocation. The effective allocation of teaching resources is the key to support this teaching method. In computer science education, this includes, but is not limited to, the provision of adequate computer hardware, software, and networking facilities, and the creation of laboratories and workspaces to facilitate hands-on learning. For example, students need access to the latest programming tools and development environments, as well as adequate server resources to test and deploy their projects. To support project-focused learning, schools may need to invest in more collaborative Spaces that enable students to work and learn in teams. Administrative and strategic support are equally important. University administrations play a key role in promoting educational reform, and they need to provide the necessary support and resources to promote the implementation of action-oriented pedagogy. This may involve increasing budget allocations to support the upgrading and maintenance of teaching resources. At the same time, it is essential to develop and implement strategies for teaching reform, which may include encouraging teachers to participate in professional development, providing incentives for teaching innovation, and ensuring that teaching methods are aligned with industry standards and the needs of the future job market.

3.2 Teachers' ability and students' adaptability

Teachers play a key role in the implementation of action-oriented pedagogy, so their professional development is critical. Teachers need to continuously upgrade their professional skills, including knowledge of the latest computer science trends, improved project management skills, and teaching methods related to hands-on learning. For example, teachers may need to take refresher courses in areas such as agile software development, data science, or artificial intelligence. At the same time, it is necessary to update and improve teaching methods, which may include learning how to design and manage project-based courses and how to effectively evaluate students' practical work. The adaptability of students is also important. It is a challenge to guide students to adapt to action-oriented teaching methods and maximize their learning outcomes. This needs to start with curriculum design to ensure that students gradually adapt to this new way of learning. Teachers can help students transition through initial mentoring projects, gradually guiding them toward a more independent mode of working. At the same time, providing additional support, such as regular counseling and feedback sessions, also helps students get help when they are struggling. Building a learning environment that encourages exploration and innovation can help students overcome initial resistance to new approaches to better adapt and benefit from them [3].

Concluding remarks:

The action-oriented teaching method shows remarkable advantages in the reform of computer education in colleges and universities, which helps to improve students' practical ability and innovative thinking. However, in order to realize its full potential, it is necessary to pay attention to the problems of resource allocation, teacher training and student adaptability. In the future, through continuous optimization of teaching strategies and improvement of teaching quality, action-oriented teaching is expected to play a greater role in the field of higher education.

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