

A Probe Into the Mixed Teaching Reform of Python Language Programming

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Abstract: This paper first analyzes the significance of applying mixed teaching to the “Python Language Programming” course, briefly describes the current state of teaching in “Python Language Programming,” and discusses strategies for reforming mixed teaching approaches. The goal is to provide a reference for the innovative development of teaching the “Python Language Programming” course.

Keywords: Python language programming; Mixed teaching; Reform strategy

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1. Introduction

Python Language Programming is a foundational and core course for computer majors. It is a theoretical, practical, and comprehensive course. It emphasizes the cultivation of students’ programming and critical thinking skills, laying a solid foundation for their studies and future employment. Blended teaching, an educational model that combines traditional face-to-face instruction with online learning, has been widely adopted in college education in recent years^[1]. This teaching approach not only inherits the advantages of traditional in-person instruction but also leverages the convenience and abundance of online educational resources, demonstrating unique value in enhancing both the teaching quality of Python Language Programming and students’ learning outcomes.

2. The significance of applying hybrid teaching to Python Language Programming

2.1. Enriching course content and resources

Blended teaching is an approach that combines online instruction with in-person teaching. To some extent, it breaks the limitation of relying solely on classroom demonstrations to learn the knowledge and skills of Python Language Programming. With the help of online teaching platforms, students can access a wider array of

abundant and diverse learning resources. Teachers can also utilize MOOCs and other online platforms to gather and integrate advanced teaching cases, PowerPoint presentations (PPT), and other materials ^[2]. Additionally, blended teaching allows students to engage in professional learning tailored to their individual levels and abilities, overcoming the traditional dependence on textbooks and auxiliary materials. For example, students can practice Python programming software online before class, which addresses the issue of limited time for in-class practice, broadens students' learning channels, and improves the quality of their learning.

2.2. Meet students' personalized learning needs

Blended teaching is an instructional mode that combines the advantages of online learning with traditional face-to-face teaching, providing students with a more flexible and personalized learning path. In the Python Language Programming course, students can select their learning content and pace based on their progress and interests. This teaching approach fully considers students' differences, helping to meet their personalized learning needs ^[3]. Additionally, blended teaching emphasizes the cultivation of students' independent learning abilities. During the online learning phase, students can progress at their own pace and according to their own learning habits. In class, they can actively participate in teaching activities through task-driven approaches, case studies, role-playing, and other interactive methods.

2.3. Improving the quality of computer talent training

In the Python Language Programming course, students can independently study, preview, review, and submit homework on the online teaching platform, while also interacting with classmates and teachers in the discussion area. This mode not only enhances students' learning outcomes but also boosts their enthusiasm and initiative ^[4]. Moreover, through the organic integration of online teaching platforms with offline classroom instruction, students can master the fundamental knowledge and skills of Python programming. They can also engage in teaching activities such as practical projects and case analyses, which fully exercise their programming and innovative abilities, further promoting the depth and breadth of Python Language Programming instruction. As a result, the training quality of computer talent is improved.

3. Python Language Programming teaching status

3.1. The teaching content is not advanced enough

With the rapid development of information technology, Python Language Programming, as an essential programming language course, must integrate its teaching content with cutting-edge technologies in the computer field. However, the teaching content of Python Language Programming in some universities currently lags behind, directly affecting students' interest in learning computer programming languages and their future employment competitiveness ^[5].

On one hand, the content of some teaching materials for Python Language Programming remains at a basic level, lacking coverage of technological advancements such as artificial intelligence and big data. For example, despite being a mainstream programming language, many classic cases of Python applied to artificial intelligence and big data have not been included in the textbooks. On the other hand, the iterative updates of computer programming languages and related technical frameworks occur rapidly. If the teaching content is not revised and updated regularly, it will fail to keep pace with industry developments, thereby limiting the professional abilities and quality of students upon entering the workforce.

3.2. The teaching mode is relatively single

In the teaching of Python Language Programming at some colleges and universities, teachers often rely on traditional face-to-face instruction and practical teaching methods. Although this teaching mode ensures sufficient communication and interaction between teachers and students, allowing for effective guidance, it also has certain limitations^[6].

For example, this approach can lead to an insufficient allocation of teaching resources, especially when there is a large number of students. It becomes challenging to provide one-on-one guidance to each student. Additionally, due to limitations in class hours and classroom space, students are confined to limited teaching resources for practical exercises, which restricts the development of their professional practice abilities to some extent. Furthermore, this single teaching mode struggles to meet the learning needs of students with diverse learning styles and ability levels, thereby affecting the learning outcomes for some students.

3.3. The level of students is uneven

When teaching Python Language Programming, the uneven level of students presents a significant challenge. Each student has different backgrounds, interests, and learning abilities, resulting in widely varying performance and learning effectiveness in the classroom. This unevenness is not only reflected in the mastery and application of basic programming knowledge and skills but also encompasses students' logical thinking, problem-solving, and innovation abilities.

Blended learning can effectively address this issue^[7]. For instance, when imparting theoretical knowledge, students have differing levels of understanding and absorption capacity. Therefore, teachers can encourage students to watch videos of micro-lessons and learn at their own pace. In summary, when reforming and innovating the teaching of Python Language Programming, educators must pay attention to the uneven learning levels among students and carefully design and adjust teaching strategies based on actual learning needs.

4. Python Language Programming mixed teaching reform strategy

4.1. Optimize the teaching content based on the development of the computer industry

With the rapid development of information technologies such as artificial intelligence, big data, and cloud computing, the knowledge system of the computer industry is constantly updating. Therefore, in the Python Language Programming teaching process, teachers should keep up with the latest computer industry developments, and continuously update and adjust the course teaching content^[2]. The blended teaching method can effectively integrate the latest developments in the computer industry into the teaching content of Python Language Programming, thus stimulating students' interest in learning the programming language, broadening their professional vision, and laying a solid foundation for their future career development.

Firstly, teachers should regularly participate in training activities in the computer industry, academic exchange activities, and take temporary jobs in computer enterprises. Thus, they can have a deeper understanding of the latest trends and technological developments in the computer industry. Simultaneously, what teachers learn about consulting and their own learning should also be incorporated into teaching content promptly. For example, teachers can use Python to develop data analysis and machine learning projects before class and upload them to an online teaching platform for students to preview. During class, teachers can then teach programming concepts and skills, guiding students to understand fundamental methods in data processing and model construction. By optimizing the teaching content in this way, students can not only learn

the basic skills of Python Language Programming but also understand the application of programming in solving practical problems ^[3].

Secondly, teachers should also pay attention to interdisciplinary teaching. Python is a widely used programming language, used in many fields such as web development, game design, and scientific computing. Therefore, teachers can expand the specific application cases of Python language in different fields for students in teaching, and guide students to think about how to apply their Python programming knowledge and skills to solve practical problems in different fields, to improve their comprehensive application ability.

4.2. Applying flipped classroom to innovate blended teaching methods

In the teaching of Python Language Programming, the application of flipped classroom mode is very beneficial to promote students' subjective initiative in learning and cultivate students' ability of independent inquiry. Flipped classroom is a teaching mode that combines traditional classroom teaching with the number of information teaching cases. It emphasizes that students watch videos of micro-lessons and read relevant case materials to complete the preliminary cognition of professional knowledge during the pre-class preview. Class time is more used to discuss, practice, and solve the questions that students have doubts about in the preview and the key and difficult points of the corresponding knowledge. In blended teaching under the flipped classroom, teachers are no longer just the imparts of knowledge, but the guides and helpers in the learning process of students ^[4].

The change in the role of teachers helps students to better learn the course according to their own learning pace and interests, to improve the enthusiasm and efficiency of students' learning. At the same time, flipped classrooms also provide teachers with more opportunities to learn about students' learning, and to give more targeted feedback and guidance. When applying flipped classrooms, teachers can make use of Internet resources and online teaching platforms to support students' autonomous learning activities. For example, teachers can create or screen out high-quality Python programming micro-lesson videos for students to watch before class or provide electronic books and online programming software that students can practice at their own pace ^[5].

Concurrently, teachers can also make use of online discussion boards to encourage students to actively communicate with classmates and teachers when they encounter problems, to further improve students' learning efficiency. In blended teaching under the flipped classroom, teachers can devote more class time to practical exercises discussions, and question-and-answer sessions. In such a teaching atmosphere, students can apply their theoretical knowledge to solve practical problems by writing Python programs and participating in project development, which not only helps deepen students' understanding of computer knowledge and skills but also cultivates students' problem-solving ability and teamwork ability.

4.3. Use stratified teaching to improve the quality of classroom teaching

In the mixed teaching reform of Python Language Programming, the use of stratified teaching is one of the effective ways to improve the quality of classroom teaching. Stratified teaching is reasonably divided according to students' learning ability and knowledge level to provide students at different levels with learning content and methods that meet their needs, maximize the potential of each student, and promote their overall development ^[6].

Firstly, teachers need to deeply understand the learning characteristics and needs of different students, including but not limited to students' basic knowledge level, professional learning interest, independent

learning ability, and so on. On this basis, teachers can divide students into the basic layer, promotion layer, and expansion layer, and arrange corresponding teaching content for students at each level. For students at the basic level, teachers should focus on their mastery of basic professional knowledge and skills, and help them consolidate their foundation through specific and intuitive teaching methods. For example, let students practice writing simple programs to deepen their understanding of basic concepts such as variables, cycles, and conditional judgments. For students at the promotion level, teachers need to provide them with more challenges and opportunities to explore. Teachers can introduce project-based learning, encourage students to apply what they have learned in the process of solving practical problems and cultivate their innovative thinking and problem-solving ability.

For students at the extension level, in addition to exercising their comprehensive application ability, they should also stimulate their interest in exploring cutting-edge computer technologies, guide them to participate in the learning of more advanced programming techniques and algorithms, and even encourage them to create project programs by themselves, to improve their practical ability and teamwork ability in comprehensive projects^[7]. In addition, multi-level teaching also requires teachers to adjust the teaching content and methods promptly according to the feedback of students, to ensure that each student can find a suitable learning method for themselves. For example, teachers should use online teaching platforms to conduct hierarchical programming tests for students, to promptly find and solve the problems students encounter in learning.

4.4. Improve teaching evaluation and cultivate students' comprehensive quality

Improving the teaching evaluation system is the key link to improve students' comprehensive quality. Generally, the hybrid teaching of Python Language Programming focuses more on assessing students' mastery of Python language knowledge and skills, ignoring the development of students' practical application ability, innovative thinking, and team cooperation^[8]. Therefore, it is particularly important to build a comprehensive and diversified evaluation system.

Firstly, teachers can improve the content of teaching evaluation based on project-based learning. Teachers can create real or simulated work scenarios for students, let them participate in the whole process of specific Python programming to solve problems and evaluate students' performance in the project. This way can not only test students' application ability of Python programming knowledge and skills but also improve the effectiveness of teaching evaluation.

Secondly, the introduction of multiple evaluation subjects is also a way to improve the quality of teaching evaluation. For example, peer evaluation not only helps to encourage students to learn from and help each other but also enhances students' communication skills and teamwork abilities in the evaluation process. Through the feedback from classmates, students can realize their own strengths and weaknesses more objectively, and then adjust their learning styles more pertinently^[9]. Simultaneously, to better evaluate the comprehensive quality of students, teachers should also design a diversified teaching evaluation index system. In addition to the mastery of professional knowledge, students' logical thinking ability, innovation ability, and teamwork abilities should also be evaluated. In terms of evaluation methods, in addition to the traditional written test, homework reports, group presentations, project results, and other diversified forms can be adopted.

5. Conclusion

To sum up, it is of great practical significance to apply blended teaching to the teaching of Python Language

Programming. Teachers should actively explore and practice the effective strategies of blended teaching mode in the teaching of Python Language Programming, to cultivate more high-quality computer professionals who can adapt to modern development and the needs of the industry.

Disclosure statement

The author declares no conflict of interest.

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