

# Research on University Teaching Reform Method Based on Python Application

Zhen Li

Jiangsu Maritime Institute, Nanjing 211100, Jiangsu, China.

**Abstract :** Python is an interpreted high-level language that embodies the characteristics of interaction, portability, and object-oriented. Its powerful functions are applicable in many operating systems, and the toolkit is also complete, in order to improve basic computer teaching in universities quality and efficiency, the article combines past Python teaching and scientific research experience, discusses how to carry out university teaching reform based on Python, and provides reference for the development of computer basic teaching and programming teaching in the future.

**Keywords :** Python; Computer Foundation; Programming; Teaching Reform

Under the background of the rapid development of economy and science and technology, the construction of various new technologies such as cloud computing, big data and artificial intelligence based on the Internet ecological model has penetrated all walks of life in my country and even the country, making industrial production and service models are showing a trend of large-scale and substantial changes, and the results achieved cannot be ignored. Along with this, how to keep up with the trend of the times, university teaching and continuous development and progress is worthy of in-depth thinking by university education and teaching staff. University computer foundation is a compulsory course. Students must familiar with and master computer-related skills. It is very necessary to carry out the teaching reform of university computer foundation courses.

## 1. The necessity of opening Python language in basic computer teaching in colleges and universities

In the traditional university computer basic teaching, the programming language used has always been mainly C/C++ or Java language, which are the most widely used computer programming languages in today's era. However, in the "Internet +" era, when analyzing and processing massive amounts of data, especially in the fields of data acquisition, simulation modeling, and data visualization, C/C++ and Java are no longer the best choices. Python language extends and develops the expression form of high-level language, simplifies the computer programming process to a certain extent, and significantly improves the efficiency of programming based on Python language.

From the perspective of the cultivation of computer thinking, C/C++ and Java have a very high emphasis on grammar, which is not applicable to non-English majors. In the whole process of transforming traditional applied skills education to the cultivation of computer thinking, the reform of teaching content is extremely important. As far as programming language teaching in computer foundation is concerned, the choice of a programming language that is compatible with the development trend of the technological age has become a prerequisite and basis for optimizing teaching effects and improving students' computer ability, especially programming ability.

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In comparison, the teaching value embodied by the Python language is higher, and its technological trend has been responded to and supported by many foreign universities. For example, Stanford University in the United States has opened Python programming courses since 2009, and the number of courses has been increasing with an average of 4 courses per year. As of 2015, Stanford University has opened 22 courses related to the Python language. Courses, and completed the replacement of the previous Java language and part of the C/C++ language courses.

Accompanied by the rise and rapid development of new concepts and technologies such as big data and cloud computing, the contemporary information society has also put forward more and more stringent requirements for college students, that is, based on the mastery of basic computer skills and a certain degree of programming ability to smoothly solve non-universal computer problems in daily work or study, and achieve effective understanding and good practice of computational thinking. This development trend of informatization can provide content reform based on basic computer teaching and programming teaching.

In the field of computer basic teaching, the development and change of the teaching content of its programming curriculum design belongs to the normal process of technological update and iteration. Since the 1990s, the teaching of basic computer programming has undergone more than one large-scale change. The once-popular languages such as Pascal and Fortran have been gradually replaced by C/C++ and Java. After entering the 21st century, the original programming language teaching has remained unchanged for a long period of time. The languages used in the teaching of basic computer courses have always been C/C++ and Java as important languages. The reason for this relatively stable situation is not that the above teaching content has fulfilled the teaching expectations. Its essence is that the historical limitations embodied in the specific technological era have restrained it. At present, the use of Python to replace C/C++ with Java has entered an important stage in the development of computer-based programming language teaching. The change in teaching content will affect the computer of college students in the next ten years or even longer. The cultivation and promotion of thinking and basic computer application skills have a great impact, and education and teaching staff in colleges and universities need to fully understand this point and attach great importance to it.

## **2. University computer basic teaching reform based on Python**

### **2.1 Thinking of teaching reform**

Analyze the composition of basic computer courses in universities, including two major links: theoretical teaching and practical teaching. From the perspective of theoretical teaching, teachers mainly provide students with a better understanding of the basics of computer software and hardware through explanations and communication in class, and answering questions after class, so as to be proficient in computer thinking and related algorithm ideas. In fact, basic computer courses are what college students have to contact and learn in the first and second semesters after enrolling. Their learning foundation is closely related to the computer education they received in high school. For students with a higher level of learning, they may have participated in relevant knowledge-based competitions in high school. However, for students in remote areas and unsatisfactory family conditions, it is more difficult for them to contact these. Therefore, the basis between students is likely to be very different. It is obviously unreasonable to ignore this factor and teach them the same teaching content. In consideration of this practical problem, colleges and universities can implement a hierarchical teaching strategy similar to English teaching. When students are asked to take an entrance mock exam, they can add computer foundation and related programming language tests. At the same time, consider the students' self-selection tendency to an appropriate degree, divide students into different levels according to the final evaluation results, let them study in different classes, develop differentiated teaching progress, and give full play to the concept of teaching in accordance with their aptitude. However, as far as the current class management system is concerned, this kind of teaching plan has a relatively large impact and is not easy to implement, so other strategies need to be formulated. This is the application of a flexible and basic programming language. Python language is easy to get started, and its powerful functions can help teachers formulate targeted teaching strategies for students of different levels, and optimize the effect of basic computer teaching.

### **2.2 Implementation of practical teaching mode based on Python online platform and project teaching**

University computer basic teaching builds a Python online teaching platform based on the consideration of actual teaching conditions. After that, it implements a new model of practical teaching combined with project teaching concepts, and conducts

innovative practical design of teaching content such as computer basics and Python programming. Specifically: Teachers use the Python online teaching platform to design teaching courseware, knowledge points, and related project cases to ensure the individualization and suitability of various teaching content; students log on to the platform system and follow the teaching arrangements made by the teacher and their own actual conditions. The learning situation is combined with the relevant theoretical knowledge in advance to mobilize their subjective initiative in the classroom learning process; further, students conduct practical teaching training in class on the platform. Once there are doubts or problems, they can first contact other. If the students still communicate, they can ask the teacher for further advice to fully reflect the teaching philosophy of “student-centered and teachers play the role of guide”. Finally, students can further understand, digest and absorb on the platform after class knowledge, based on the project-driven guiding role, really improves the ability to discover, analyze and solve problems in the event process, and realize the enhancement of computer basic level and practical programming ability.

Based on the support of the Python online teaching platform, the basic practical teaching of computer is carried out under the driving effect of the project teaching mode. Students can preview themselves before class and know their own shortcomings in advance. If they encounter problems in the learning process, they can take many times watch video tutorials or courseware and other teaching resources to make full and effective use of networked resources. In addition, you can also communicate with other students and teachers online, which is beneficial to their personalized and self-paced learning. Stimulate their interest and enthusiasm in learning, in line with the talent training needs of applied universities.

### 3. Conclusion

In the computer field, the development of all programming languages cannot be separated from the development of the times. The Python language has the characteristics of openness, conciseness, and efficiency, and it has a wealth of standard libraries and third-party toolkits. It has obvious advantages when processing different types of data. Teaching reform and practice show that Python’s input and output, data manipulation, data visualization, and deep neural network functions are very powerful. Its computing ecology has gradually formed and is beginning to mature. Students can quickly accept Python application modules with strong writing capabilities. It is of great benefit to the improvement of its interest in learning and basic computer skills.

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