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The Influence of Python on Logical Thinking and Analysis of Teaching Countermeasures

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Abstract. As a programming language that perfectly fits artificial intelligence and big data analysis technology, the Python language is simple and efficient, easy to learn and easy to understand, which can make students focus more on the problem itself than the details of programming technology, so as to effectively improve the students' logical thinking ability to solve problems. This paper analyzes the characteristics and advantages of Python language, takes the computer network course as an example, and puts forward the countermeasure analysis to carry out Python programming teaching.

Keywords: Python, Logical Thinking, Teaching Countermeasures

1 Characteristics of Python and its Influence on Logical Thinking

As a programming language that perfectly fits artificial intelligence and big data analysis technology, Python has soon become the language with the highest market share because of its simplicity, efficiency, easy to learn and easy to understand. Due to the Python is completely open source, its development and maintenance are carried out by the public community, so its reliability is high.

1.1 The First Characteristics and Influence

First of all, because of the open source of Python language, its class library is very rich, function is also very perfect and powerful. Furthermore, Python language has good scalability and portability, and can easily connect various modules, function libraries, middleware and other products to achieve secondary development on this basis [1]. It can be said that many times some basic functional software has been implemented on the Internet, all you need to do is find it and make good use of it. This kind of inclusive development idea can promote the diversified development of logical thinking very well.

Owing to the Python language is very flexible, programmers can modify the source code of the open source part according to their own ideas and requirements, program on the basis of predecessors, reduce the repeatability of work, reduce the development cycle of programs, and even make existing programs into other software [2]. By continuously and deeply studying this freely combined, embedded, extended programming mode of Python, and mixed with other development languages or development environments, it can effectively promote students' understanding and understanding of the problem itself, strengthen their logical thinking ability and improve their comprehensive quality.

1.2 The Second Characteristics and Influence



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Secondly, Python language grammar, programming is relatively simple. Rather than traditional development languages such as C/C++, Java, Python blocks many technical detail operations such as pointers, using an interpreter is a ready-to-know development language[3]. It is suitable for non-software programming students to learn initially and enhance their confidence in mastering computational language and logical thinking; it is also suitable for the use of scholars in professional fields to help them reduce the pressure of work and focus on professional problems themselves.

Python programming concept is a divided and governed thinking. When solving professional problems, people often encounter more complex problems. At this time, we need to simplify, solve the big problems into small problems, one by one to solve. And the Python language is to follow the similar law, so that students in the process of learning, the complex problems simplified, on the basis of the previous program components, constantly decompose and refine the problem, and solve it one by one. Through solving practical problems, it can stimulate students' interest in learning [4], as well as understanding and understanding of divide-and-conquer method, program logic structure and program flow, and cultivate rigorous and meticulous logical thinking ability.

2 Advantages of Python Application in Computer Courses

Python is an efficient and flexible high-level programming language, which has a wide range of applications in artificial intelligence, data mining, such as Keras、TensorFlow and famous web crawler scripting programs.

2.1 Programing is Simple and Easy to Understand

The syntax Python is close to the natural language, and the use of statements to shrink in to identify code segments, etc; Python provides a variety of running mechanisms, either using the PyCharm editor to run on-line, or using Jupyter Notebook online. On the other hand, Python can provide various application libraries such as NumPy, matplotlib, scikit-learn, and with the help of anaconda software can be more convenient to install, manage and update various Python libraries [5]. Python library can realize many operations in related fields, powerful and convenient to call, greatly reduces the programming time required for students to realize the basic framework part of teaching, and its operation efficiency is high. For beginners, therefore, using Python programming is easier to learn, can quickly get started, so that students focus on the problem itself modeling and solving. Python can free students from complex programming operations and focus on modeling and corresponding solution optimization.

2.2 The Open Source Nature of Python is Beneficial

At present, around Python language, the world's largest open community for single programming language has been formed. As of November 2015, this open community has provided more than 68000 function libraries, covering many technical fields of information technology. A large number of function libraries are of high quality and open source, which provides a great convenience and a good learning platform for programming in Python. This open source and open concept is the driving force for the development of computers.

2.3 The Open Source Nature of Python is Beneficial

Python has a good employment prospect. Cloud computing, big data, mobile Internet, creative games and so on provide python with good employment prospects. Table 1 listed the demand comparison of Python language, C language, VB language and Java language programmers of the top two online recruitment websites in California, the United States, and the top two recruitment websites in China in four first tier cities, including Beijing, Shanghai, Guangzhou and Shenzhen [6].

Table 1. Employment demand by programming language

Website\Language	C	VB	Java	Python
LinkedIn	4655	4865	54745	25275
Indeed	2473	1167	18792	13872
51job	15700	6000	>900000	43400
zhaopin	11358	1211	46058	9080

Although these employment demand data can not be used as the basis for courses, they can be used as a judgment dimension for teaching content. As can be seen from the number level of job requirements, Python and Java are two very important branches in the job market of programmers in the United States, among which the market demand of Python is about half of that of Java [7]. However, in China, limited by the limitations of university teaching and the information depression of industry on programming language, python programmers just need more than C and VB. What needs to be explained here is that the employment demand of Java language is almost all for the app development of Android system, which is relatively single for professional computer programmers. Python language employment demand is more extensive, including data analysts, operation and maintenance engineers, product testing and other categories.

2.4 Good Combination with Other Courses of Computer Major

As a core course for college students majoring in computer and related majors, the goal of computer network is to make students firmly grasp the hierarchical architecture of computer network and common network protocols (TCP/IP、PPP、 routing protocols, etc.). In the face of the rapid development of information network, not only can understand its basic operating principles, but also can skillfully use transformation innovation. And through Python programming, it can give new vitality and content of computer network course [8]. The textbook, for example, the top-down approach to computer networks (sixth edition of the original book), replaces the Java language in the previous version with Python language in the socket programming. On the one hand, using Python language can easily understand the core concepts of TCP and UDP protocols for students who have just learned programming; on the other hand, Python language can provide an interface to access the original socket, enabling students to create a wider range of network applications autonomously on this basis.

3 Teaching Methods of Python

3.1 Carrying out Self-study Before Class Actively

Before the beginning of this course, students have learned the basic knowledge of computer culture and have a certain cognitive foundation of computer structure, but have not yet contacted the knowledge of programming language and programming algorithm. When teaching, we should give full consideration to the students' learning foundation, and pay attention to the differences of different students' mastery of these courses [9]. At this time, if we use concentrated teaching or a single textbook to teach python programming, some students may have mastered the relevant content, while others with weak foundation may feel that the progress is a little fast. Therefore, it is necessary to adopt the teaching mode of teaching students according to their aptitude, recommend relevant teaching materials, open class videos and other materials, so that students can focus on learning relevant content according to their existing basis and schedule.

3.2 Developing Classroom Discussion Spreadly

In order to effectively obtain information feedback from students, we should actively ask questions, organize discussions, inspire students to answer questions in pre class preview, guide students to actively study and think through ingenious design of simple program examples, and reflect on the effect of pre class self-study. Finally, teachers and students summarize the important knowledge points

and precautions of Python Network programming. In the process of organization and implementation, classroom discussion should be the focus of teaching practice, carefully prepared and well organized, so that students can understand the operation mechanism of Python language in network protocol, master the steps and methods of using Python to realize network communication, and understand the relationship between network communication and the bottom link of programming.

3.3 Organizing Classroom Experiments Widely

Python Network programming teaching should strive to avoid the situation that "it seems to be able to do it all" and improve the practical ability of students. Through the design of basic experiment, advanced experiment and independent experiment project, consolidate the effect of classroom theory teaching. Taking network communication programming as an example, the basic and required subjects need to be passed one by one, while the subjects with high divergence and ability demand can be taught according to their aptitude and ability, which not only ensures that everyone has learned the knowledge, but also realizes the optimization. In particular, there is no ready-made reference to programming design, students should be encouraged to achieve through independent analysis, independent design, programming and testing work [10]. Finally, the teacher verifies the correctness and effectiveness of the students' writing procedure through the open test procedure. In the process of implementation, some contests and contests can be taken to stimulate the enthusiasm and enthusiasm of students' experiments. After completing the task, teachers should lead the students to summarize and correct the typical mistakes, and remind them to pay attention in the future study of programming.

4 Conclusion

This paper takes the application of Python language in network programming experiment as an example, analyzes the characteristics of Python language and its influence on logical thinking, as well as the advantages of Python application in computer network course, and explores how to cultivate and improve students' computing thinking ability in computer network course. Based on the idea of flipped classroom, this paper puts forward the teaching strategy of self-study before class and discussion in class and experiment on computer, so as to cultivate students' ability of independent learning and innovation. Of course, there are many computer network courses, leaving more room for Python programming language. How to combine the characteristics of other related courses to improve students' logical thinking ability and enhance the learning effect of follow-up courses is the new direction of further exploration and reform in the future teaching work.

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