

# Discussion on the Teaching Reform of Java Programming Course for Computer Science Majors in Colleges and Universities



Guofan Huang\*,<sup>1</sup>

<sup>1</sup>Guang Dong Peizheng College, China

**Abstract:** In the new era, society has put forward higher requirements for the training of talents in colleges and universities, which needs to keep pace with the development of the times in the Java programming course for college computer majors, and constantly improve and optimize the teaching strategy. From the current situation, there are some problems in the teaching of Java programming courses for computer science majors in colleges and universities, such as the teaching content is not updated in time, the teaching method is too single, etc., which needs to be addressed in the teaching reform to solve the current problems. The article explores the importance of teaching reform of Java programming courses for computer majors in colleges and universities and gives effective teaching strategies according to the current teaching situation.

**Keywords:** colleges and universities; computer majors; Java programming; teaching reform

## Introduction

Java, as a widely used programming language, is an important part of the computer professional curriculum. However, with the continuous evolution of technology, especially in the fields of cloud computing, artificial intelligence, Internet of Things, and mobile applications, the knowledge and skills involved in Java programming are constantly changing. Traditional teaching methods and course content may no longer be sufficient to meet the needs of students and society's demand for technical talents. This requires colleges and universities to follow the pace of curriculum reform continuously optimize teaching content and innovate teaching methods to promote the quality and efficiency of Java programming course teaching.

## 1. The significance of the teaching reform of Java programming courses for computer majors in colleges and universities

**Corresponding Author:** Guofan Huang  
Guang Dong Peizheng College, China  
Email: [690160691@qq.com](mailto:690160691@qq.com)

©The Author(s) 2023. Published by BONI FUTURE DIGITAL PUBLISHING CO., LIMITED. This is an open access article under the CC BY License(<https://creativecommons.org/licenses/by/4.0/>).

### 1.1 Enable students to adapt to the development trend of technology

One of the important significance of the teaching reform of Java programming courses for computer majors in colleges and universities is that it enables students to better adapt to the rapidly changing technological trends. In today's context, the field of science and technology is advancing at an extremely fast pace, and new programming tools, frameworks, and techniques are constantly emerging. It is therefore important for the education system to keep pace with this change to ensure that students are not only equipped with traditional Java programming skills but are also able to understand and apply the latest technologies. By revamping the curriculum, schools can introduce the latest programming concepts and tools to help students keep up with the cutting edge of technology. This real-time education enables students to better understand and adapt to new programming paradigms, such as cloud computing, big data analytics, artificial intelligence, and the Internet of Things, which not only helps them

to get up to speed more quickly in the workplace but also improves their attractiveness in the job market as employers are more inclined to recruit graduates with knowledge of the latest technologies. At the same time, adapting students to technological trends will also help them develop self-learning skills and a spirit of continuous learning. Because they have been exposed to changing technologies in school, they are more likely to take the initiative to pursue new knowledge and skills in their careers and remain competitive (Wei, 2023).

### **1.2 Helping to improve the teaching quality of Java design courses for computer science majors**

With the rapid development of science and technology, programming languages and technologies are constantly updated, to cultivate competitive computer professionals, the education system must constantly improve the curriculum to ensure that students can master the latest knowledge and skills. By revamping the curriculum, colleges and universities can update textbooks and course content to reflect current best practices and industry standards. This means that students will be able to learn more practical and real-world programming skills that will be valuable to their future careers. Reforms can also introduce more real-world projects and case studies so that students can apply their theoretical knowledge to real-world situations, leading to a better understanding and mastery of Java programming. In addition, the reform can also improve teaching methods, such as adopting more interactive and participatory teaching methods to promote students' active learning and problem-solving abilities, and universities can actively train teachers so that they can master the latest teaching techniques and tools and improve their educational level to better instruct students (Li, 2020). Improving the quality of teaching and learning in Java design courses for computer science majors helps to produce more competitive graduates who are better able to meet career challenges and contribute to the development and innovation of the technology industry. It also makes colleges and universities more attractive, attracting more students who are interested

in studying computer science and injecting new vitality and vigor into the whole industry.

### **1.3 Being able to better meet the social demand for computer talents**

With the push of education reform, colleges and universities can ensure that they produce more competitive and adaptable computer science graduates who are equipped with the latest Java programming skills and knowledge. This will help meet the demand for high-level technical talent not only from employers such as technology companies, Internet firms, and innovative startups, but also for computing professionals in fields such as government, healthcare, finance, and manufacturing. Reforming the curriculum also promotes interdisciplinary collaboration and produces computer technology-literate professionals who can play key roles on teams in different fields. At the same time, the reform can also help to cultivate more innovators and entrepreneurs who can utilize their Java programming skills to develop new applications and solutions that will bring about positive changes in society, which is important for meeting the growing demand for science and technology innovation as well as promoting economic growth and social progress. It can be seen that the significance of the teaching reform of the Java programming course for computer majors in colleges and universities lies in the fact that it can better satisfy the extensive demand for computer talents in society, provide employers in different fields with the required technical expertise, and promote innovation and social development, which helps to build a more competitive workforce and make positive contributions to the scientific and technological progress and prosperity of society.

## **2. The current situation of teaching Java programming courses for computer majors in colleges and universities**

Currently, the Java programming course for college computer majors is facing multiple challenges and opportunities, and the Java programming course is a core course in college computer majors, the importance of which cannot be

ignored, but from the perspective of the teaching situation of the Java programming course for college computer majors, several problems have a serious impact on the quality of the course teaching and the development of the students (MA et al, 2023). First, traditional Java courses usually focus on teaching basic syntax and concepts and lack opportunities for practical application and project practice, which leads to gaps in students' actual programming ability and makes it difficult for them to cope with real-world programming challenges. Second, course content lags behind the rapid development of technology. The Java programming language is constantly being updated and evolving, but the course content is not updated to reflect the latest features and best practices. This leaves students at risk of learning knowledge that is outdated or no longer widely used in the current technology environment. In addition, the teaching methods in Java programming courses are relatively traditional and lack innovation and interactivity. Classes are usually dominated by lectures and presentations, with limited student participation and a lack of real-world projects and problem-solving opportunities. This limits active learning and the development of practical programming skills. Assessment and evaluation methods may also be problematic. Traditional exams and quizzes may not be able to fully assess students' programming skills and practical problem-solving abilities, which makes it difficult to objectively reflect students' learning outcomes and fully reflect their potential and actual level. Finally, some colleges and universities may lack modern educational technology tools and resources, such as online learning platforms, virtual labs, and distance learning tools, which may limit students' learning opportunities and fail to bring more diverse learning experiences to students (Tan & Jiang, 2015).

### **3. Specific Measures for Teaching Reform of Java Programming Course for Computer Science Majors in Colleges and Universities**

#### **3.1 Innovative teaching content following the**

#### **development of the times**

As the field of science and technology continues to evolve, Java programming also continues to develop and improve, and the course content needs to be updated to reflect the latest trends and technologies, which is crucial to ensure that the education system remains consistent with practical applications. Reforms can be made to innovate the content by introducing new topics and technology areas, for example, the curriculum can be expanded to include emerging areas such as Cloud Computing, Artificial Intelligence, Blockchain, and the Internet of Things to meet the growing market demand. Such updates enable students to acquire a wider range of knowledge and skills that will help them find employment opportunities in different career fields. Students' practical real-world applications and real-world problem-solving skills can also be emphasized in the content reform. The curriculum can include more project work and encourage students to participate in actual software development projects, which helps to transform theoretical knowledge into practical programming skills and develops students' problem-solving and innovation skills. Students can accumulate practical experience through participation in open-source projects, competitions, and internships to improve their competitiveness in the job market. Innovative teaching content following the development of the times is an indispensable measure in the teaching reform of Java programming courses for computer majors in colleges and universities, which ensures that students are equipped with up-to-date knowledge and skills after graduation and have the ability to cope with the ever-changing technological environment, and at the same time, helps to meet the social demand for computer professional talents. This innovative approach to teaching content brings education closer to the real world and lays a solid foundation for students' professional success (Mo, 2022).

#### **3.2 Innovative teaching methods to bring students a better learning experience**

In the process of teaching reform of Java

programming course, innovative teaching methods are crucial to bring students a better learning experience, improve the attractiveness, interactivity, and practicality of the course, and stimulate students' learning interest and enthusiasm. In the teaching process, teachers can introduce innovative teaching methods, such as problem-driven learning, project-driven learning, and teamwork teaching. Through these methods, students will not only learn the theoretical knowledge of Java programming but also apply it directly to solving practical problems and developing projects, which helps to improve students' practical programming ability and problem-solving skills and enables them to better combine theory and practice. Teachers can also use interactive teaching methods, including classroom discussions, group activities, laboratory practice, etc. Such interactive teaching can enhance students' sense of participation and learning motivation, and promote better digestion and understanding of knowledge. Teachers can ask challenging questions to guide students' thinking and discussion, thus cultivating their critical thinking and problem-solving skills. In addition, classroom teachers can introduce online learning resources and tools to support students' independent learning. This includes online programming platforms, educational videos, virtual labs, etc. Students can access these resources anytime, anywhere to learn and practice programming skills independently, which helps to reinforce what they have learned in the classroom. Utilizing innovative pedagogical methods enhances students' learning experience, develops real-world programming skills, and stimulates their academic interests. This approach makes education more interactive and interesting, providing students with better learning opportunities and preparation for increasingly complex technological challenges (Yuan & Zhu, 2021).

### **3.3 Optimize evaluation methods to promote continuous improvement and optimization of teaching**

One specific measure of the teaching reform of Java programming courses for computer science

majors in higher education is to optimize the evaluation methods to promote the continuous improvement and optimization of teaching. This reform measure aims to ensure that students' learning outcomes can reflect their actual skill levels more comprehensively and objectively while ensuring that teachers provide higher-quality education. Teachers can introduce diverse assessment methods in the teaching evaluation process, including classroom assignments, project outcomes, programming practices, group discussions, code reviews, self-assessment, and peer assessment, which can comprehensively assess students' skills and abilities in different areas and thus provide a more comprehensive understanding of their academic performance (Luo, 2021). Teachers should also emphasize the assessment of practical projects and real-world problems where students can demonstrate their skills by completing projects and solving real-world programming challenges. This practical approach to assessment is closer to the needs of the workplace and can better develop students' real-world programming skills as well as improve their career competitiveness. In addition to this, teachers can also conduct regular course evaluations to collect students' feedback and suggestions to improve the course content and teaching methods based on the feedback, and this feedback loop helps to continuously optimize the teaching and ensure that the course can meet the needs and expectations of students.

### **3.4 Build an online learning platform to provide students with more learning opportunities**

In the Internet era, an important measure for the teaching reform of Java programming courses for computer science majors in colleges and universities is to build an online learning platform, that is designed to provide more flexible, convenient, and diversified learning modes by using modern technological means to meet the needs and learning styles of different students. First of all, the online learning platform can provide a wealth of learning resources, including textbooks, educational videos, programming examples, practice problems, etc.

Students can access these resources at any time according to their learning progress and need for independent learning and reviewing of course content. This opportunity for self-directed learning helps to consolidate what has been learned and allows students to move forward at their own pace. Online learning platforms also support distance learning and online interaction, allowing instructors to conduct real-time classroom lectures, Q&A sessions, and group discussions through online conferencing tools (Zhao, & Zhang, 2020). This approach allows students to participate in courses without having to leave their homes and ensures continuity of education, especially in special circumstances such as during epidemics. In addition, the online learning platform can record students' progress and grades, providing timely feedback and assessment for both teachers and students. This helps students to better manage their learning, identify weaknesses, and correct mistakes promptly.

### Summarize

The reform of teaching Java programming courses for computer majors in colleges and universities is a key initiative to meet the rapidly developing technology field and the social demand for computer professionals. The importance of the reform is reflected in several aspects, including enabling students to adapt to the development trend of technology, improving the quality of education, and meeting the social demand for computer talent. Specific measures include updating teaching content, innovating teaching methods, optimizing evaluation methods, and building an online learning platform. These measures can provide students with a better learning experience, develop practical programming skills, and improve their professional competitiveness. This reform of education has a positive impact on students, teachers, and society as a whole, and makes an important contribution to the development of computer science education and the scientific and technological progress of society.

### Conflict of Interest

The authors declare that they have no conflicts of interest to this work.

### References

- Wei, X. (2023). Research on informatization teaching reform of higher vocational computer courses under the background of "classroom revolution"--taking higher vocational "java programming fundamentals" as an example. *Science and Education Wenhui (Lower Lunar)*, 2021(30), 151–153.
- Li, D. (2020). Discussion on the reform of JAVA programming course under flipped classroom teaching mode--taking beibu gulf university computer science and technology major as an example. *Journal of Beibu Gulf University*, 35(04), 74–80.
- MA, B., Zhai, L., & Li, S. (2023). Research on teaching reform of programming courses for computer science majors in colleges and universities. *Electronic Testing*, 2019(12), 136–137.
- Tan, X., & Jiang, H. (2015). Exploring the teaching reform of computer programming courses in colleges and universities under the background of big data--Take the teaching reform of java programming as an example. *Computer Knowledge and Technology*, 11(23), 91–92.
- Mo, J. (2022). Teaching reform of java programming course. *Western Quality Education*, 08(05), 159–162.
- Yuan, Y., & Zhu, P. (2021). Teaching reform practice of java programming course based on mobile teaching platform--taking the school of information science and engineering of hebei north college as an example. *Journal of Hebei North College (Social Science Edition)*, 37(04), 92–94.
- Luo, N. (2021). Exploring the teaching reform of higher vocational " java programming" course under internet+ platform. *China New Communication*, 23(05), 165–166.
- Zhao, L., & Zhang, Y. (2020). Teaching reform and exploration of java programming course in applied undergraduate colleges. *Journal of Beihua Institute of Aerospace Industry*, 30(03), 57–59.

**How to Cite:** Huang, G., (2023). Discussion on the Teaching Reform of Java Programming Course for Computer Science Majors in Colleges and Universities. *Contemporary Education and Teaching Research*, 04(10), 529-533.  
<https://doi.org/10.61360/BoniCETR232015101007>