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Analysis on the Teaching Status and Improvement Strategies of Python Programming Course Teachers in Higher Vocational Colleges

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ABSTRACT: This paper comprehensively examines the teaching status of Python programming course teachers in higher vocational colleges. Through an in-depth analysis of teachers' educational backgrounds, teaching methods, teaching content, teaching environments, and resources, it uncovers the existing status and challenges. Corresponding improvement strategies are proposed to enhance the teaching quality of this course and provide valuable references for promoting students' programming learning.

KEYWORDS: Python programming; vocational college teachers; teaching status; teaching challenges; improvement strategies

I. INTRODUCTION

In the realm of higher vocational education, the Python Programming course plays an indispensable role in nurturing students' programming capabilities. As the primary drivers of instruction, teachers' teaching proficiency and status significantly influence the course's educational quality and students' learning outcomes. Hence, a meticulous exploration of the relevant circumstances surrounding these teachers is of paramount importance.

II. CURRENT SITUATION OF TEACHERS' TEACHING

2.1 Educational Background and Experience

Among the five instructors of this course, two hold master's degrees, while the remaining three possess bachelor's degrees or above. This educational attainment endows them with a certain theoretical foundation for teaching. Notably, TP1, TP2, and TP4 bring to the table over 8 years of teaching experience, with 6, 4, and 3 years of specific Python teaching experience respectively. Their extensive teaching tenures have equipped them to adeptly handle a diverse array of teaching hurdles. For instance, TP1 has amassed a wealth of teaching wisdom through years of educating college students. In contrast, the novice teacher TP5, despite lacking experience, brims with enthusiasm and actively engages in the pursuit of innovative pedagogical approaches.

2.2 Commonly Used Teaching Methods

Teachers predominantly adopt a teaching modality that amalgamates lectures with practical exercises. Practical instruction is conducted in the computer lab using tools such as PyCharm. Typically, instructors dedicate approximately 20 minutes to elucidating theoretical knowledge. Subsequently, they utilize PPT or the blackboard, supplemented by illustrative examples, to expound on concepts and demonstrate code writing. Emphasis is placed on instilling sound programming habits, and students are actively encouraged to pose questions and interact. Following this, students engage in 20 minutes of hands-on practice, during which teachers offer guidance and critique students' work. Additionally, teachers recommend seminal texts like "Python Programming: From Beginners to Practice" and online learning repositories such as Coursera and China MOOC University to augment students' knowledge base and foster their independent learning acumen.

2.3 Teaching Content

The teaching curriculum spans from fundamental to advanced levels, encompassing core concepts such as Python environment configuration, syntax, and data types. It is further augmented by real-world applications like office automation and data analysis. Some educators also integrate novel technologies, including file operations and database operations. For example, TP2 enriches the course by incorporating data analysis and crawler cases, thereby enhancing its allure. Although individual teachers may prioritize different content areas, they all strive to maintain a harmonious equilibrium between theory

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and practice, ensuring students' comprehensive mastery of programming skills.

2.4 Teaching Environment and Teaching Resources

In terms of the teaching environment, the school has furnished the basic infrastructure requisite for computer professional course instruction. Computer facilities capable of running PyCharm are available, and there are ongoing plans for further enhancements. However, teaching resources are generally deficient. Traditional textbooks, online learning platforms, and specialized books are in short supply. While textbooks attempt to marry theory with practice, they suffer from the drawback of sluggish updates. Both teachers and students have expressed dissatisfaction with the antiquated examples presented in the textbooks.

III. CHALLENGES FACING TEACHERS

3.1 Teaching Burden

Teachers are not only tasked with fulfilling routine teaching obligations but also must continuously refresh course content to keep pace with the rapidly evolving technological landscape. TP1 and TP5 have underscored the significance and complexity of iterating course content in the AI era. In large class settings, the realization of personalized instruction and in-depth assessment of students' creativity becomes an arduous feat. TP2, TP3, and TP4 have been particularly beleaguered by this issue, which has substantially augmented their teaching workload.

3.2 Pressure to Update Course Content

With the incessant evolution of Python technology and the burgeoning expansion of its industrial applications, the imperative to update course content in a timely manner has become more pressing than ever. Nevertheless, teachers encounter numerous obstacles during the update process. They must first acquaint themselves with new knowledge and then seamlessly integrate it into the existing teaching framework. TP2 has alluded to the difficulties in tracking the development trajectory of Python, while TP3 and TP5 have pointed out the challenges in maintaining an appropriate balance between the depth and breadth of theory and ensuring the currency of content.

3.3 Insufficient Teaching Resources

The paucity of software platform resources represents a significant stumbling block. TP4 and TP5 have reported that the school lacks a professional experimental platform, which has a deleterious impact on students' practical learning outcomes. The tardy update of teaching materials also acts as a fetter on the elevation of teaching quality. The obsolete examples in textbooks fail to satiate students' thirst for new knowledge, compelling teachers to expend additional effort to supplement the latest information during instruction.

IV. IMPROVEMENT STRATEGY

4.1 Actively Participate in Teaching and Research Activities

Teachers should proactively engage in seminars, teaching observations, and collective lesson preparations. During collective lesson planning sessions, they should collaboratively deliberate on the crucial points, difficulties, and instructional methodologies of the course. By taking into account the unique characteristics of students, personalized teaching blueprints can be crafted. Through teaching observations, they can assimilate exemplary teaching practices and thereby enhance their own teaching competencies.

4.2 Innovative Teaching Model

The adoption of modern teaching paradigms such as hybrid teaching, flipped classrooms, and project-based learning is highly recommended. Hybrid teaching leverages platforms like "Learning Pass" to disseminate learning resources online and facilitates in-depth discussions and practical applications offline. In a flipped classroom setup, students are empowered to engage in self-directed learning prior to class, with the classroom time dedicated to problem-solving. Project-based learning organizes instruction around real-world projects, fostering students' teamwork and problem-solving capabilities.

4.3 Introducing Advanced Technology Tools

Teachers should guide students in utilizing cloud programming environments and AI-assisted tools like Google Colab and Jupyter Notebook. This not only alleviates the difficulties associated with software installation and environment configuration for students but also enhances their learning efficiency and code quality. Concurrently, the promotion of online programming platforms and the organization of competitions can stoke students' enthusiasm for coding and augment their competitiveness.

4.4 Strengthening Industry Cooperation

Actively inviting industry experts to deliver lectures and oversee projects can expose students to authentic work scenarios. By jointly designing project tasks with experts, teachers can ensure that students acquire the latest technologies and work processes in

a practical context, thereby enhancing their professional proficiencies.

4.5 Improve the Teacher-Student Interaction and Evaluation Mechanism

The establishment of an online Q&A community can facilitate the prompt resolution of students' queries and foster communication and collaboration among them. Implementing a multi-dimensional evaluation and self-reflection mechanism, which encompasses student peer evaluations and self-assessments, can cultivate students' critical thinking and self-management abilities.

V. CONCLUSION

Python programming course teachers in higher vocational colleges are confronted with both opportunities and challenges in their teaching endeavors. By implementing the aforementioned improvement strategies, teachers can systematically enhance the quality of instruction, more effectively cultivate students' programming skills, adapt to the evolving demands of course teaching, and lay a solid foundation for students' future career development. It is incumbent upon educational institutions and teachers themselves to remain vigilant and proactive in the pursuit of educational excellence in this dynamic field. Continuous efforts in professional development, curriculum innovation, and resource augmentation are essential to ensure that students receive a high-quality education that prepares them for the challenges of the digital age. Through collaborative efforts between educators and industry partners, the Python programming course can be transformed into a vibrant and engaging learning experience that equips students with the skills and knowledge necessary to thrive in the technology-driven job market.

In summary, the journey towards optimizing Python programming teaching in higher vocational colleges is an ongoing process that demands unwavering commitment and innovation from all stakeholders. By addressing the existing challenges and capitalizing on emerging opportunities, we can look forward to a future where students are proficient in Python programming and well-prepared to contribute to the technological advancements of society.

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