Enhancing the Quality of Programming Courses: Effective Teaching Practices and Suggestions for Improvement

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Teaching programming courses such as Programming Fundamentals, Object-Oriented Programming, and Data Structures poses unique challenges in the diverse academic landscape. The diversity of students background often creates significant hurdles. Many students come from pre-medical streams or schooling systems that heavily rely on rote learning. This approach leaves students weakness for the logical thinking and problem-solving skills which are essential for computing programs.

Students frequently struggle with logic building and critical thinking, finding it difficult to grasp abstract concepts due to a lack of analytical problem-solving skills. A lack of confidence among students, particularly those intimidated by programming, further inhibits participation and engagement, making it challenging to enhance a productive learning environment.

To address these challenges, I follow some practices. I provide a structured 15-week teaching plan for systematic and effective learning. The curriculum begins with foundational topics and gradually progresses to more complex topics such as data structures, algorithms, and file handling. Breaking down large problems into smaller, subproblems helps students build scalable solutions while mitigating their fear of coding. I also incorporate well-defined class activities to ensure active participation and engagement. Live coding sessions and coding competitions encourage students to think on their feet, while peer programming and code reviews enhance collaboration and improve coding skills. Open-ended and complex computing problems are designed to challenge students and develop their critical thinking abilities. I also emphasize the importance of version control by requiring students to maintain GitHub repositories for their projects, encouraging professional practices in their learning.

Suggestions for Improvement

1. Increase emphasis on critical thinking and logic-building activities.
2. Integrate real-world application for programming courses projects.
3. Introduce industry-demanding programming languages and frameworks.
4. Encourage participation in coding competitions and hackathons.
5. Replace traditional exams with live coding tests and evaluate projects based on quality, efficiency, and scalability.
6. Design project-based tasks to enhance team collaboration and communication.
7. Use clear rubrics and adhere to Outcome-Based Education (OBE) principles for consistent and fair evaluation. Include artifact evaluations based on viva/demos, supported by additional resources like Teaching Assistants and Lab Engineers.
8. Invite guest lectures and mentors from the industry for practical insights.
9. Tie programming courses with competitions such as speed programming, analytical reasoning challenges, and complex problem-solving tasks.
10. Organize programming bootcamps for students and training sessions for faculty to stay updated with emerging trends. Courses taught by faculty with programming skills or industry experience can provide practical insights.