

VPL: Enhancing CS Education & Streamlining Your Workflow

A Workshop for High School Computer Science Teachers

Roy Canseco | June 2, 2025



The illustration features a central figure of a woman with dark hair, wearing a blue top, standing behind a podium and pointing at a large screen. The screen displays a presentation slide with text and diagrams. To her right is a stack of colorful books and papers, with a magnifying glass resting on them. To her left is a small stack of papers. The background is a light beige color. There are three yellow rectangular boxes with text and small icons: 'Introduction to VPL' (with a code editor icon), 'VPL in Action' (with a stack of papers icon), and 'Implementation and Support' (with a person icon).



The Modern CS Classroom Challenge

Today's Computer Science classrooms face increased grading volumes, delayed feedback, and challenges from AI-generated code like ChatGPT. Additionally, plagiarism remains a significant concern, making efficient assessment more critical than ever.

According to a study funded by Google, under the direction of ACM, and in partnership with Microsoft:

"Computer science educators often struggle with limited access to up-to-date materials, software, and hardware"

-University of Chicago Study



1. Century et al. 2013. Building an Operating System report.
2. <https://outlier.uchicago.edu/computerscience/OS4CS/challenges/>. Accessed 2024
3. Building an Operating System report. <https://outlier.uchicago.edu/computerscience/OS4CS/challenges/>. Accessed 2024

Introducing the Virtual Programming Lab (VPL)

VPL is a Moodle plugin that provides an integrated coding environment for students, complete with auto-grading features and support for multiple programming languages. This tool simplifies workflow for teachers and fosters student engagement in coding tasks.



The Value Proposition: Why VPL is a Game-Changer

VPL enhances teacher efficiency and insight while providing students with instant feedback and a deeper understanding of programming concepts. It supports iterative learning and reduces frustration by streamlining assessment processes, making it essential in today's educational landscape.



VPL in Action

This section contains five small, square-shaped cards, each representing a different aspect of VPL's application:

- VPL Showcase: A Practical Look**: Shows a classroom with students at their desks.
- VPL Student Experience**: Shows a student interacting with a computer screen.
- VPL Teacher Overview**: Shows a teacher standing in front of a classroom of students.
- Addressing AI Challenges**: Shows a student working on a computer with a focus on AI-related tasks.
- Fostering Integrity in Learning**: Shows a student working on a computer with a focus on ethical or integrity-related learning.



VPL Showcase: A Practical Look

VPL provides a seamless interface for students to submit their code, access real-time feedback, and review public test cases. Teachers also benefit from an intuitive grading overview, facilitating easier assessment and insight into student performance.



VPL Student Experience

Students experience an interactive coding environment where they can execute code directly and receive instant feedback. This iterative learning process builds confidence and promotes deeper understanding of programming concepts.



VPL Teacher Overview

Teachers can easily set up assignments with hidden test cases to ensure fairness in grading and timing. The grading interface consolidates all submissions, allowing for efficient management of assessment tasks.



Addressing AI Challenges

VPL's robust testing mechanisms counter the limitations of basic AI-generated code by identifying uniqueness and similarity within student submissions. This approach encourages critical thinking while mitigating plagiarism issues effectively.

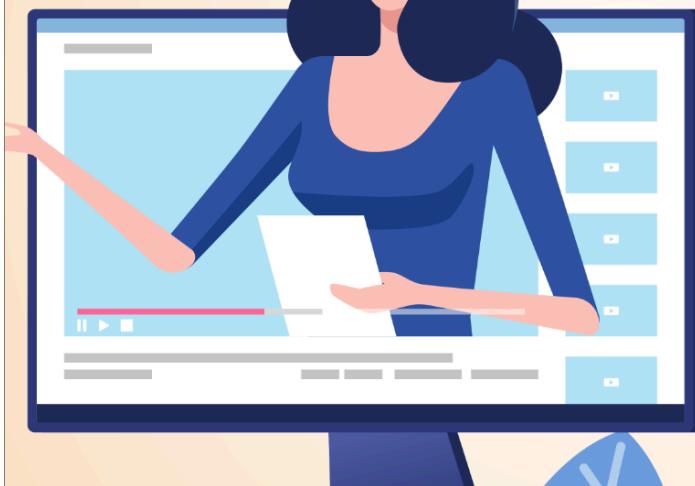


Fostering Integrity in Learning

Employing VPL strengthens academic integrity by tracking submission logs and ensuring originality in student work. This not only deters plagiarism but also inspires problem-solving and independent thought.



Implementation and Support



Integrating VPL into Your Moodle Course



Q&A and Discussion



Resources & Support



Securing Your Jail Server with Let's Encrypt

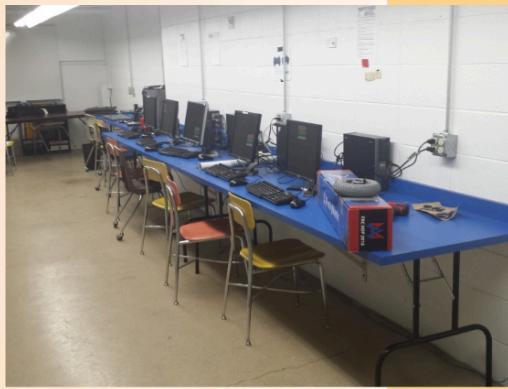
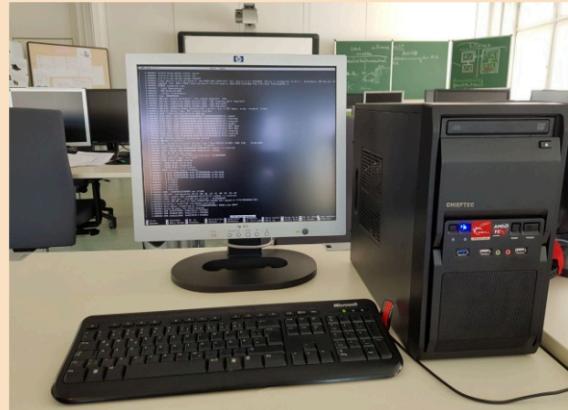


Call to Action & Encouragement



Integrating VPL into Your Moodle Course

Integrating VPL into your Moodle course involves installing the VPL plugin, configuring key settings, and creating VPL assignments. Important steps include specifying assignment descriptions, execution files, and test cases to streamline student interactions and enhance the learning experience.



Setting Up Your VPL-Jail-System Compute Server

A dedicated compute server enhances security and controls resources needed for VPL. Key steps include provisioning a Linode server with Ubuntu LTS, running initial setups like SSH, and installing the VPL-Jail-System through git commands, ensuring a robust execution environment for student submissions.

Securing Your Jail Server with Let's Encrypt

Implementing SSL/TLS with Let's Encrypt secures VPL server communications. This process involves installing Certbot, configuring your server for HTTPS, and ensuring Moodle connections are secured, which enhances trust and integrity in automated coding submissions.



Q&A and Discussion



Resources & Support

Key resources include official VPL documentation, Moodle forums for community insights, and Linode guides for server management. These materials provide essential support for troubleshooting and optimizing VPL integration in educational settings.



Call to Action & Encouragement

Starting with VPL serves as a holistic approach to enhancing programming education.

Together we can leverage our collective expertise and face CS education challenges!