Calibrated Peer Review: A Writing and Critical-Thinking Instructional Tool

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What is it?

Calibrated Peer Review[1] (CPR) is a free Web-based program that allows instructors to incorporate frequent writing assignments into their courses, regardless of class size, without increasing their grading workload. Students are trained to be competent reviewers and are then given the responsibility of providing their classmates with personalized feedback on expository writing assignments. Meanwhile, with access to all student work, instructors can monitor the class as a whole and assess the progress of each student. The CPR system manages the entire peer-review process, including assignment creation, electronic paper submission, student training in reviewing, student input analysis, and final performance report preparation.

Although the CPR system was developed under a National Science Foundation grant awarded to Orville Chapman at UCLA for curricular reform in chemistry, the CPR instructional tool suite has been designed to be discipline-independent. CPR's integrated set of network tools supports a "writing-across-the-curriculum" approach. The central tenet is that students in any discipline can learn from writing: students understand more deeply when they write about what they are learning.

The cross-disciplinary nature of this instructional tool is underscored by one of its key features—the Web-based assignment library, which stores instructor-created assignments categorized by discipline. True to the philosophy of "peers helping peers," this online repository establishes an instructor support network, giving faculty ready access to assignments created and published by their colleagues. The CPR Web tool, including the program's growing library of assignments, is hosted by UCLA and delivered without cost to participating institutions. The growing user base receives technical assistance from the CPR development team through e-mail and a listserv. Currently, more than 500 institutions are taking advantage of this free service, deploying CPR in over 1,900 courses with a combined enrollment of more than 72,000 students.

What problem does it solve?

By introducing undergraduates to a managed, anonymous peer-review process modeled on the professional practices of scholars, the CPR program reforms the undergraduate curriculum at institutions where undergraduates have limited opportunities to gain access to:

● Personalized learning support

● Frequent writing and critical-thinking exercises

● Multiple perspectives

● Opportunities for autonomy

● Insight into professional practices

Chapman and the CPR development team recognized that lower-division undergraduates rarely confront writing assignments outside their English composition courses, nor are they expected to use expository writing as a means of clarifying their conceptual understanding of discipline-specific issues. As a result, students have little exposure in their early college years to the professional practices of working scientists, engineers, and scholars, for whom peer review is the standard mode of demonstrating the merit of research proposals and results. By adopting guided peer review as its instructional design model, the CPR development team intended to promote a classroom environment where students must make decisions and offer sound advice while continuing to work out their own interpretations of complex discipline-specific content.

How did they do it?

The CPR approach to peer review is based on the way scientists and engineers assess the accuracy of observations and approach the evaluation of one another's work. First, CPR alleviates the pressure on sensitive students by adopting the scientific community's "double-blind" review process, during which both the author and the evaluator remain anonymous. Second, CPR ensures that student feedback is consistent and reliable by taking its cue from the "calibration" techniques that laboratory scientists use to obtain accurate measurements. The CPR program initially guides students through a series of calibration exercises intended to hone their critical-thinking skills and establish standard criteria for reviewing before they are allowed to read and assess the work of their peers.

In terms of online instructional design, CPR can be seen as a direct response to the perceived shortcomings of the online tutorial, with its scripted presentations, programmed responses, and limited student input. By contrast, the CPR system encourages student autonomy while offering continual feedback through guided exercises, peer evaluations, and final performance reports. CPR's guided peer review process is relatively straightforward:

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- **Step One:** The instructor crafts a writing assignment. She can use CPR's built-in authoring tools or choose a ready-made assignment from among those created and published on the CPR Web site by other faculty in her discipline.

- **Step Two:** Each student composes a written response based on the instructor's guidelines and submits his or her work electronically.

- **Step Three:** The CPR program guides each student through a tutorial on peer review for that particular assignment. This tutorial consists of calibration exercises and detailed feedback designed to help students become competent reviewers. Students must pass the calibration exercises before they can move to Step Four.

- **Step Four:** Students evaluate the work of their peers in a double-blind process to ensure privacy. However, none of the work is anonymous to the instructor.

- **Step Five:** Students turn a critical eye on their own work, applying the same standards they previously employed to evaluate their peers' work.

- **Step Six:** Finally, the CPR system provides each student with a personal performance report and generates an instructor's report as well.

What does it take?

To participate in a CPR-enabled course, a student needs only an Internet connection and a Web browser. Interested faculty can gain free access to the software by visiting the CPR Web site and registering. Once there, they are given the option of administering their own courses only or becoming the administrator for their entire institution, responsible for managing all of the institution's users and courses and the assignment library. Institutions considering broad adoption of the CPR system might want to provide their own data-backup services. In addition, institutions should consider the possibilities and the costs of integrating the stand-alone CPR assignment library and performance-evaluation tools with their own enterprise systems for course management, digital resource preservation, and authorized resource sharing.

Why is it noteworthy?

- **Applies across disciplines and institution types.** CPR students in multiple disciplines demonstrate learning gains throughout the term, regardless of whether CPR assignments are implemented at a high school, community college, comprehensive college, or research university.

- **Improves student learning.** Quantitative studies of CPR's impact on student learning at three different universities indicate that CPR learners perform approximately 10 percent better on traditional course exams than students taught through traditional lecture methods, regardless of whether the exams are essay-based, problem-based, or multiple-choice. Moreover, students improve their reviewing abilities over the course of the term. After passing the calibration exercises in the CPR tutorial, more than one-third of the students who submitted poor essays were able to recognize their mistakes and accurately evaluate their own work during the self-assessment stage.

- **Reduces faculty workload.** CPR decreases the instructional workload for faculty in terms of both developing and evaluating assignments. The assignment library, now holding 1,275 sharable assignments, provides faculty with field-tested instructional materials they can adopt for use in their own classrooms, saving considerable time required to devise engaging and broadly applicable activities on topics relevant to a particular discipline. Moreover, a special task force provides support for STEM (science, technology, engineering, and mathematics) instructors.

- **Replicates successfully.** To date, the CPR classroom experience has been replicated successfully at more than 500 institutions, which have deployed CPR in over 1,900 courses (primarily chemistry, biochemistry, the life sciences, and composition), with a combined enrollment of over 72,000 students.

To learn more

Visit the CPR Web site at **http://cpr.molsci.ucla.edu/**.

To share your innovation

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[1] Calibrated Peer Review is a trademark of the Regents of The University of California.

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