

Calibrated Peer Review™

A Writing and Critical Thinking Instructional Tool

The White Paper: A Description of CPR

Abstract

Calibrated Peer Review™ (CPR) is an Internet-based instructional tool that enables students to learn by writing about important topics in a course. Instructors may either author their own CPR assignments or choose from an assignment library. Once assignments are authored or chosen from the library, CPR empowers an instructor to give frequent writing assignments without increasing grading workload.

In a CPR assignment, students write short essays on a specific topic. Guiding questions encourage critical thinking and help students organize thoughts for the essay. After electronic submission of essays, students read and assign a score to three “calibration” essays. When students demonstrate they are competent reviewers, they read and assign a score to three anonymous peer essays, and finally, to their own essay.

Regular use of CPR assignments teaches students to articulate ideas coherently and to critically evaluate both their peers’ and their own work.

CPR Website

<http://cpr.molsci.ucla.edu>

You need an Internet connection and a browser (Netscape Navigator version 4 and later or Internet Explorer version 4 and later). Your browser should have Java enabled, be able to accept cookies, and have the cache (temporary Internet files) set to “check every time.”

Tour CPR

On the CPR homepage listed above, click on the link “Tour CPR.”

Chemistry Library

To view the library of assignments, go to <http://cpr.molsci.ucla.edu>.

Register to use CPR

On the CPR homepage, click the “TRY IT NOW” picture.

Technical Support and CPR Authoring Workshop Information

E-mail: cpr@nslc.ucla.edu

What Calibrated Peer Review™ Is

Calibrated Peer Review™ (CPR) is a program, for Internet-ready computers, that enables frequent writing assignments. Once assignments are developed and incorporated into a syllabus, CPR can reduce the time an instructor spends reading and assessing student writing. CPR offers instructors the choice of creating their own writing assignments or using a rapidly expanding assignment library. Although CPR stems from a science-based model, CPR has the exciting feature that it is discipline independent and level independent. When children first begin to write a paragraph, they can use CPR profitably, and yet the same program serves college and university students as well as graduate and professional students.

The Model for CPR

CPR was developed on a science-based model. What do scientists do? Research begins with proposals. Scientists write research proposals and review peer proposals. Scientists do research and write and peer review research manuscripts. Peer review has a prominent role in the progress of science. Anonymous peer review is thus the model on which we built Calibrated Peer Review™. In the beginning, CPR was intended to serve large lecture sections in university courses in conjunction with the fully digital, Internet-delivered Molecular Science learning units. But in actual use, CPR has worked well at many levels, in varied courses and class sizes.

What CPR Comprises

Calibrated Peer Review™ comprises an integrated set of digital tools that manage the review process, analyze student input, assess that input, and prepare reports for both instructor and student. CPR provides two other key features: an assignment-authoring tool and an assignment library. The authoring tool enables the instructor to control the components that form the learning environment. The assignment library provides a set of existing units so the instructor may give writing assignments without increasing his or her workload. Our assignment library is expanding rapidly and will ultimately contain hundreds of writing assignments covering many levels and subjects.

How CPR Works

After a student completes the writing assignment, he or she submits the document electronically. CPR responds by presenting, in random sequence, three calibration documents. One calibration document is an exemplar written by an expert; the other two calibration documents represent student documents containing misconceptions, omissions, and errors. All three calibration documents respond to the same writing assignment that the student has just completed. For each calibration document, the student answers a series of content questions and then a series of style questions. The style questions may range from very simple questions to questions that require detailed grammatical analysis. After answering the questions for each document, the student rates each document on a scale of 1-10, with 10 being "best." When the student has completed the calibration, CPR prepares and presents the student calibration report.

The report shows both the student's and the official answers, and compares the student scores to the official scores for each document. While examining the calibration report, the student can access all three calibration documents. Extensive feedback in the assessment of the calibrations clarifies students' understanding of the issues and corrects any misconceptions that they might have. In the background, CPR assesses the student's performance on the calibration. If the student's performance on calibration proved inadequate, the student receives instruction and then must repeat the calibration satisfactorily. When the student has completed the calibration satisfactorily, CPR presents, in sequence, three peer documents for review. The student answers the same content and style questions for each document and scores each document on the 1-10 scale. Next, CPR presents the student's own document for self-review. Finally, CPR prepares and presents the student report, which shows all of the reviewers' answers to the content and style questions and the scores each reviewer gave the student's document. In the background, CPR prepares the instructor report.

Creating Your Own Assignment

Only your imagination limits the assignments that you can create in Calibrated Peer Review™. Assignment possibilities include abstracts, proposals, microthemes, position papers, analyses, descriptions, ethics, and policy issues. Anything is possible. Sources for writing assignments range from a reading selection taken from Michael Crichton's Jurassic Park, to a painting scanned into a web site, to the analysis of a laboratory experiment, to business letters for CEO's. One caution: remember the copyright laws!

If you decide to create your own CPR assignment, the task will take several hours. The first assignment that you produce will take you significantly longer than your subsequent creations. First you choose the source for the assignment, and define the specific writing assignment. Then you write the exemplar for calibration. The other two calibration documents may be student documents from a previous use of this source or you can produce them from your experience on errors and omissions that students make. Next, you generate the content and style questions that extract the essential issues in the source material. You then assess your calibration documents and provide feedback so students can learn from their errors. That is all you do to prepare the assignment; CPR does everything else.

If you opt for using our CPR assignment library, you select and set up an assignment from our list, and inform your students. You have nothing else to do to prepare the assignment!

What CPR Achieves

CPR enables frequent student writing in most any discipline and level without overloading the instructor. Students learn to read for content; by the time they have read seven documents on the same theme, they have mastered the content. One can, in fact, observe that students answer the content questions much more quickly toward the end of a review than they do at the beginning. The quality time-on-task that students spend while using CPR gives them important experience in learning how to concentrate and in learning how to learn. Students also develop key skills such as abstracting, persuading (proposals), developing arguments, describing, assessing, criticizing,

analyzing, and reviewing. In well-chosen assignments, students encounter engaging ideas and ponder important issues. Most important, through writing, students develop critical thinking.

CPR Has Broad Implications for Education

By greatly enhancing the amount of writing that students do, CPR opens new avenues to learning that we educators have not explored. Imagine the difference in final results between students who learn science by writing about science as opposed to students who memorize facts and exercises in current science curricula. In the new learning environment, students can deal with real issues and real problems—not the exercises of the past. In the new learning environment, students will learn to ask the critical questions, to doubt, to probe, to form mental models. But these issues are not just science issues, they hold true for history, sociology, geography, and more; indeed, they cut across our curricula.

CPR Creators

ORVILLE L. CHAPMAN, creator of the Calibrated Peer Review™ program, is a Professor of Organic Chemistry at UCLA and a member of the National Academy. He has received many national and international awards including the Pure Chemistry Award, the Arthur C. Cope Medal, the Havinga Medal (Stichtung Havinga, the Netherlands), and the Texas Instruments Foundation Founders' Prize. In 1995, he received the ComputerWorld Smithsonian Institution Award for the best use of computers in education and academia.

MICHAEL A. FIORE designed the Calibrated Peer Review™ framework as well as the beta versions of Calibrated Peer Review™.

*Los Angeles
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