

Peer review—Can the backbone of research be the backbone of teaching?

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(Appeared in the *CETL Blog*, UC Davis, May 2014)



Photo Credit: Chris Thaiss

Caption: Students engage in peer review in Writing in Science

Ask any researcher at UC Davis if peer review is important in that scholar's discipline, and you'll get a "duh—of course!" response. But ask that researcher if he or she is teaching undergraduate students the principles and practice of peer review, and you may get a puzzled look.

However, more and more UC Davis faculty and TAs are finding that critical review by students of their fellow students' work is a valuable—even vital—part of student learning. In a panel I organized for the November 2013 "Transforming STEM Education" Conference in San Diego, UCD plant sciences professor John Yoder expressed these benefits of peer review for his 150-student course in biotechnology:

- Student reviewers learn to distinguish different qualities of work
- Student writers get additional feedback
- Students learn the processes and significance of peer review
- Faculty "outsource" some grading responsibilities

His finely-tuned system of peer review allows Yoder to assign an ambitious multi-stage team project featuring business plans for biotech innovations. (You can read

more about his course in *The Wheel*: <http://wheel.ucdavis.edu/2012/12/faculty-spotlight-john-yoder/> .)

Co-panelist Annaliese Franz, associate professor of chemistry, finds peer review an essential part of an equally ambitious project in her 250-student sections of organic chemistry for non-majors. To enable students to learn basic principles well enough to “describe and present this concept in a visual way to other students (non-chemists) in a YouTube video,” she requires students to create scripts for videos on such topics as catalysts, hydrogen bonding, and polymerization reactions. Since fellow students are the target audience for these videos, their critiques are basic to success. (You can also read more about Franz’s project in *The Wheel*: <http://wheel.ucdavis.edu/2012/12/faculty-spotlight-annaliese-franz/> .)

My own discipline, writing studies, teaches students peer review principles and techniques as an essential aspect of both (1) writing proficiency and (2) conceptual understanding of writing processes. When I teach the junior-senior course *Writing in Science*, for example, I present peer review as a core skill of the students’ work beyond their undergraduate years, whether in project teams, committees, management, or the proposal and publication processes. Each major assignment in the course has a peer-review phase, and students write about the results of peer review in the “change memos” they submit with their revised drafts.



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Two Basic Tips for Using Peer Review in Any Class

- **Be guided by student learning outcomes:** As with any other aspect of teaching, introducing peer review should be guided by the learning outcomes you want your students to achieve. For example, when learning a key concept in your discipline is a goal, try having each student explain or apply it in writing (in an in-class exercise or in an online forum). Then have students in pairs or small groups compare their explanations—and perhaps try to achieve a consensus explanation. Such an exercise, which takes very

few minutes, gets students thinking more deeply about concepts than mere memorization possibly could.

- **Always guide the process of peer review.** Always make clear to students why you want them to do a peer review procedure. What goals are you trying to achieve? Then help them to know how to give useful feedback. Remember that students have usually limited experience, if any, with peer review. For example, if you want students to give one another feedback on a draft of a writing assignment, design a rubric of qualities to look for in the draft and on which to comment. (Just as the editor of a journal gives you questions to answer when you do a manuscript review.) This rubric should always be assignment specific. I always ask my students to add to the rubric one or two concerns that they specifically want feedback on from their colleagues.
- **For more on peer review,** consult us in CETL. Also, a number of writing programs give good guidance to teachers on using peer review. For example, here's the guide from Colorado State:
<http://writing.colostate.edu/guides/teaching/peer/> .