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Using Post-Test Analysis to Help Students See Correlation Between Effort and Performance

One of the student engagement techniques (SETs) described in Elizabeth F. Barkley's new book on student engagement (see a review of the book elsewhere in this issue) has students predicting and reflecting on their exam preparation and performance. It's a technique that helps students see the correlation between their efforts and their exam scores, as well as one that helps them assess the effectiveness of the study strategies they use.

Here's how the activity works. After students have finished the exam, but before submitting it, they complete a short post-test analysis questionnaire—you may need to state that you won't accept the exam unless the analysis sheet is attached. Barkley suggests having students respond to items such as:

- Predict your exam score.
- Rate your effort in studying for the exam on a scale of 1 (lowest) to 10 (highest).
- List the specific learning strategies you used to study for the exam (Did you make flash cards to help you memorize definitions? Rewrite your notes? Create outlines of assigned readings? Discuss the readings with other students?).
- Identify what you found easiest and most difficult about the exam and explain why.

After the exam has been graded and returned, students do a second analysis—you might want to not record the exam scores until students complete the second analysis, or you might want to offer some bonus points to those students who complete both analyses thoughtfully and carefully. Here are some of the suggested items for this second analysis:

- Describe your emotional response to your exam score (Surprised? Disappointed? Relieved? Pleased?).
- Compare your actual score with your predicted score and comment on how well or poorly you predicted your score.
- Identify where each question came from (in-class material, book material, online resources) and then calculate the percentage of questions missed in each of the categories. What do these percentages tell you?
- Reflect on the strategies you used for studying for this exam and the amount of time you devoted to study. Describe any changes you plan to make in your approach to studying for the next exam.
- Do you have any suggestions for how I or your classmates could help you better prepare for the next exam?
- Based on your performance on this exam, set one goal for the next exam. Make the goal specific and concrete (e.g., "I plan to get at least 75 percent of the questions from the reading materials correct.").

An activity like this is most beneficial if it's completed early in the course so that students can act on what they have learned.

Although the advantages of such an activity may be perfectly obvious to the teacher, don't assume that students will automatically see the value of this kind of analysis. Introduce the activity with a discussion of things students can do to improve their exam performance in this (and other) course(s).

If students do the activity for more than one exam, you might want to add an item that has them track their performance across the exams, asking to what they attribute their improvement (or lack thereof).

Barkley points out that this activity is easily adaptable to other kinds of assignments, such as written work or projects.

Reference: Barkley, E. F. *Student Engagement Techniques: A Handbook for College Faculty.* San Francisco: Jossey-Bass, 2009, 336-339.

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- Write with the understanding that your audience includes faculty in a wide variety of disciplines and in a number of different institutional settings; i.e., what you describe must be relevant to a significant proportion of our audience.
- Write directly to the audience, remembering that this is a newsLETTER.
- Keep the article short; generally between 2 and 3 double-spaced pages.
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Teachers Who Improved

Two researchers used end-of-course ratings data to generate a cohort of faculty whose ratings in the same course had significantly improved over a three-year period. They defined significant improvement as a 1.5-point increase on an 8-point scale. In this cohort, more than 50 percent of faculty had improved between 1.5 and 1.99 points, another 40 percent between 2.0 and 2.99 points, and the rest even more. They surveyed this group, asking the faculty members to respond to several questions, including this most important one: "Your student ratings have increased for at least three consecutive semesters during the last three years in your [Course Name] class. What factors led to this change in your teaching performance?"

The slightly more than 200 respondents most frequently attributed the increase in ratings to changes made in one or several of these five areas: 1) more active/practical learning, including efforts to make the content's relevance apparent to students; 2) better teacher/student interactions, exemplified by learning students' names and having individual conferences with them; 3) making expectations for learning outcomes clearer while still maintaining high standards; 4) being better prepared for class; and 5) revising the evaluation policies and procedures used to assess student work. The first three of these categories accounted for almost 50 percent of the faculty responses. A bit surprisingly, 5 percent of the respondents whose scores had improved didn't list anything they'd done or they indicated that they were not aware of having implemented any changes.

This cohort of faculty included full-time tenured faculty (actually this was the largest group, 56 percent), full-time non-tenured faculty (12 percent), and part-time appointees (35 percent). The researchers note that this indicates how faculty in all kinds of positions can improve. That so many in the already-tenured and part-time categories did so is especially noteworthy and encouraging.

In addition to the survey, 30 faculty from 10 of 12 colleges at the institution were interviewed "to gain a better understanding of the change process." (p. 167) Several interesting findings emerged from the interviews. For many faculty members, the most difficult part of the process was being willing to admit that they needed to change. "Humbling" was an adjective used to describe the feeling. Often there was some sort of triggering event—frequently it involved end-of-course ratings results. After teaching a course seven times, one faculty member received his lowest-ever overall course rating. He was shocked but reported that he decided to find out why. Others talked about an overall lack of excitement in the course and their own motivation to change and do better.

In the interviews, almost 80 percent of the faculty indicated that the effort required to implement the changes was minimal. It seemed that for most it was more a matter of fine-tuning their teaching. The researchers conclude, "The results of this study should be encouraging to faculty members who feel they cannot improve." (p. 171)

Reference: McGowan, W. R., and Graham, C. R. (2009). Factors contributing to improved teaching performance. *Innovative Higher Education*, 34, 161-171.

Online Seminar Call for Proposals

Magna Publications is accepting proposals for its online seminar series. For more information on how our online seminars work, visit www.magnapubs.com/calendar/index-cat-type.html.

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Assessing and Developing Metacognitive Skills

Metacognition is easily defined: "[It] refers to the ability to reflect upon, understand and control one's learning," (Schraw and Dennison, p. 460) or, even more simply, "thinking about one's thinking." Despite straightforward definitions, metacognition is a complicated construct that has been the object of research for more than 30 years.

Research supports theories that separate metacognition into two major components: knowledge of cognition and regulation of cognition. Knowledge of cognition "describes an individual's awareness of cognition at three different levels: declarative (knowing about things), procedural (knowing about how to do things), and conditional (knowing why and when to do things)." (Cooper and Sandi-Urena, p. 240) Regulation of cognition relates to how learners control their learning. Relevant regulatory activities include planning, monitoring, and evaluating.

Metacognition has been studied in students from grade school through college, and it has produced a number of interesting and important findings. Schraw and Dennison report that "recent research indicates that metacognitively aware learners are more strategic and perform better than unaware learners." (p. 460) When learners use regulatory metacognitive skills, they do better at paying attention, they use learning strategies more effectively, and they are more aware of when they are not comprehending something they are trying to learn. Surprisingly, the research has also shown that metacognitive awareness is not a function of intellectual ability. And the research has shown that metacognitive skills are not domain specific. They are remarkably consistent across different fields.

Two of the references below (Cooper and Sandi-Urena and Schraw and Dennison) report on the development of instruments that can be used to assess a learner's level of metacognitive awareness. The Schraw and Dennison instrument, the Metacognitive Awareness Inventory, includes 52 items, including "I am good at organizing information," "I summarize what I've learned after I've finished," "I am a good judge of how well I understand something," and "I change strategies when I fail to understand." The Cooper and Sandi-Urena instrument, the Metacognitive Activities Inventory (MCAI), was "designed specifically to assess students' metacognitive skillfulness during chemistry problem solving." (p. 240) It contains 27 items, including "Once a result is obtained, I check to see that it agrees with what I expected," "I spend little time on problems I am not sure I can solve," "I try to double-check everything: my understanding of the problem, calculations, units, etc.," and "I attempt to break down the problem to find the starting point." As these examples illustrate, even though the MCAI was developed for use in chemistry, its items are relevant to many kinds of problem solving. In both cases, students respond via a Likert scale that asks them to rate how characteristic the responses are of them. Each of these instruments was carefully developed, and the articles referenced include empirical results verifying both their reliability and validity.

The research makes clear that metacognitive skills can be developed and that, certainly, an instructor could use either of these instruments to help accomplish that goal. Having students complete an instrument like this helps instructors by providing data on how metacognitively aware a given group of students might be and by identifying students who might not have a well-developed set of metacognitive skills. Administering an instrument like this can be a learning experience for the student who completes it. It forces reflection—what do I do when I confront a problem?—and it describes actions a student might not know about or do regularly. Neither of these instruments is time consuming to complete, and both were developed for use by faculty in classrooms. Having students complete either of these instruments after an exam when they did not do as well they (or their teacher) wanted is an effective way to provide feedback, with the potential to improve subsequent performance.

There are other ways to develop metacognitive skills, as Schraw points out in his article. Teachers can model metacognitive skills, and the more specifically they do that, the more effective their modeling becomes. "Too often teachers discuss and model their cognition (i.e., how to perform a task) without modeling metacognition (i.e., how they think about and monitor their performance). For example, as a former math major, I have seen hundreds of mathematical proofs performed in college classrooms, but I cannot ever remember any of my instructors describing their thought processes ... as they performed the proof[s]." (p. 119)

Schraw also notes that students can effectively model metacognitive skills for other students. In fact, sometimes they can do so more effectively than teachers can, in part because 18-to-23-year-old peers have great credibility with each other. Students will listen to advice on problem solving given by other students (especially if those students are doing well in the course) much more intently than they will listen to advice (even the very same advice) offered by the teacher. Teachers can make use of student modeling by designing classroom activities where students have the opportunity to work with each other and reflect on the learning strategies they are using.

Schraw's article provides a fitting conclusion to this discussion of metacognitive skills. "Metacognition is essential to successful learning because it enables individuals to better manage their cognitive skills and to determine weaknesses that can be corrected by constructing new cognitive skills. Almost anyone who can perform a skill is capable of metacogni-

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Word Sort: An Active Learning, Critical-Thinking Strategy

Most college students struggle with the vocabulary of our disciplines. In their various electronic exchanges, they do not use a lot of multisyllabic, difficult-to-pronounce words. And virtually all college courses are vocabulary rich—unfamiliar words abound. Most students know that the new vocabulary in a course is important. They use flash cards and other methods to help them memorize the words and their meanings for their exams. Two days later, the words and their meanings are gone.

Word sort is a strategy that helps students learn and better remember new vocabulary. Students work in small groups, with each group given an envelope containing key terms on separate slips of paper. Students are instructed to discuss what they think the words mean and then organize them into different categories based on what they think the relationships among the words might be. The strategy was developed for use in science courses, where terms have more precise meanings and fit more readily into categories. Students do this initial sort before reading about the terms or hearing them defined and discussed in lecture. After exposure to the words in the text or lecture, students get back into their groups and re-sort the words, comparing their new arrangements with the ones they first constructed.

Lots of iterations of the basic strategy can be used. For example, individual students can be given the collection of terms and told to define and relate them after having done the reading as a homework assignment. Before turning their work in for some modest number of points, students might share with other students in a small group what they've done. Or the instructor might use a particularly good categorization in a final review of the material or position that chunk of content with what's to be learned next.

As might be expected, some students (in this article it was a small group) object to the approach. These are the students who think that the instructor should just tell them the definitions and their relationships. Having to figure it out for themselves means that the students are doing the work the teacher should be doing. What these students fail to understand is that the process of discussing—saying the words aloud and using them in sentences—makes the words more familiar and therefore easier to remember. Exploring how the words relate to each other means that the students are building a framework that puts the words in context, also making the words easier to remember in both the short and long terms.

If students work with the terms and their relationships before being given their definitions and relationships, they are forced to draw on their prior knowledge and experience. Students discover that they often do know something about the terms and their relationships, and teachers need to include more activities in courses that challenge students to draw on their prior knowledge. Students do not arrive in college courses as blank slates—they have taken (in this case) science courses previously. That tasks like these challenge students is a good thing. Students benefit when they are put in situations where figuring out answers is up to them.

Reference: Nixon, S. and Fishback, J. (2009). Enhancing comprehension and retention of vocabulary concepts through small-group discussion: Probing for connections among key terms. *Journal of College Science Teaching*, May/June, 18-21.

Cool Calling: A Creative Way to Start Discussions

I'm starting to clean out my article files. Nowadays, with journal content accessible, downloadable, and storable electronically, there doesn't seem to be much reason to keep file drawers full of paper copies of articles. So I'm sorting through mine. Progress is slow—I seem to be doing more reading than sorting and tossing.

One thing I am noticing: good teaching ideas are pretty much timeless. Yesterday I was rereading Bill Welty's great piece on "discussion method teaching." As you can see by the reference, it was published 20 years ago. If you are a veteran reader of this publication and have one of those steel-trap memories, you will remember that in the November 1989 issue of this newsletter I summarized key ideas from that article.

I still think the best part of that article is something I wrote about in the *TP* piece: Welty points out that the questions teachers ask in class should be prepared beforehand. He recommends outlining the material for the class session and identifying the most important concepts. Then an instructor should prepare a question outline that accompanies the content outline. "It is important at this stage that you carefully think out questions that will promote *discussion*, not answers, about the concepts you want understood." (p. 42) Too often we arrive in class well prepared on the content but unprepared with questions. We ask what comes to us as we make our way through the material. That part of Welty's article

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Teacher Anger: When Does it Violate Expected Norms of Teacher Behavior?

Do you ever reach a point where you've just had it with your students—they still aren't following directions you've repeatedly delivered, they're still talking not so quietly in the back of the room, and too many of them are still turning in work that has been dashed off at the last minute? So what do you do? March into class and more or less let them have it? Well, if you do, you certainly are not alone. In a study of teacher anger, researchers asked students to think of a specific teacher who had become angry in class and then describe that angry episode. Only five of the 301 students asked could not think of an angry-teacher event.

Specifically, these researchers were interested in seeing if they could identify some conditions under which the expression of teacher anger was seen as violating expected norms for teacher behavior. In a nutshell, they discovered that "teacher anger is not in and of itself a classroom norm violation. It is the manner in which anger is expressed that defines it as a norm violation." (p. 85)

Expressions of anger by teachers are deemed appropriate when teachers "avoid intense, aggressive anger displays and instead assertively and directly discuss the problem with the class." (p. 85) When they have those discussions, teachers are well advised to be fair and open and to consider carefully student perceptions of what has happened and why.

Said more concretely, even if you're mad as hell, you want to turn down the volume, you don't want to use a lot of emotional language, you don't want to throw things (chalk, papers), you don't want to exaggerate (not every last person in the class is lazy), you don't want to turn red and look as though a stroke may be imminent, and you don't want to be rude or condescending. You want to describe how student behavior affects you and what it causes you to do and to think. You also want to propose some alternatives—identify behaviors that are appropriate. You know yourself best, but sometimes it makes sense to let the intense wave of emotions pass before you respond. You want to control your emotions rather than let them control you.

If you do express anger in ways that violate norms, those expressions negatively influence student perceptions of you and your course. Any expression of anger is a high-stakes moment, as seen by how readily students remember them. Interesting side note: these researchers found that angry displays students considered inappropriate at the beginning of the course were more accepted by students later in the course. The researchers think that once students get to know a teacher and come to trust how she is running the course, they are more willing to accept an angry display.

If you think these research results indicate that you should suppress angry feelings—not let students know that you are upset by what they've done (or haven't done)—that conclusion is not supported by this research. What these researchers found was that "students perceived teachers who did not display anger as neither appropriate [nor] inappropriate." (p. 85) In other words, suppressing anger does not gain you higher marks with students. It gains you no marks. It's back to what the researchers observed initially: "Not all angry episodes are similarly perceived. The way teachers express their anger affects how students respond." (p. 86)

Reference: McPherson, M. B., Kearney, P., and Plax, T. G. (2003). The dark side of instruction: Teacher anger as classroom norm violations. *Journal of Applied Communication Research*, 31 (1), 76-90.

Cool Calling

FROM PAGE 4

has stayed with me, and in my experience, the caliber of discussion in my classroom was always better when I came to class with prepared questions. I also discovered that prepared questions can be kept in the content folder and recycled (sometimes revised) for use in subsequent classes.

What I missed in Welty's article (or maybe forgot) and never mentioned in the *TP* piece was a very creative suggestion for calling on students. If you're a regular reader, you know that we've done any number of for and against pieces on the strategy researchers have labeled "cold-calling." It happens when a teacher calls on a student who has not volunteered to participate. Lots of teachers use this strategy because it effectively accomplishes goals like getting more students coming to class prepared and keeping more students paying attention to what's happening in class. Lots of teachers don't use this strategy because many students find it very anxiety provoking, and calling on students does not help them develop the ability to speak up when they aren't called on. Like so many teaching practices, this one is neither definitively right nor wrong. It very much depends on how the teacher uses the strategy.

Welty describes an approach he names "cool calling," and it represents a creative compromise between cold calling and recognizing only volunteers. When class begins, Welty asks his first question (you could easily have it in a PowerPoint presentation when students arrive in class). He "calls on" someone, meaning that he asks a student to think

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Developing Problem-Solving Skills via Online Discussions

As regularly noted in this publication, developing sophisticated but essential learning skills is especially challenging in large classes. That's why we regularly report on strategies that faculty members have developed and are using in large classes. The cases in point here are three different biochemistry courses in which faculty members have been using online, asynchronous discussion groups to develop problem-solving skills.

Here's how the groups have been used in 10 sections of courses that enroll between 60 and 150 students: During the first week of the course, students are randomly placed into small discussion groups with five to 10 other students. Throughout the semester, each group will work on four to six problem-based learning (PBL) cases. Like all good PBL cases, the ones used in this research present intriguing but ill-defined problems. They cannot be solved without students finding more information. The example included in the article describes the "suspicious" death of a professor who may have been a victim of foul play or may have succumbed to an undiagnosed metabolic problem. Students work on each case for about two to three weeks. Online, in their groups, they propose hypotheses about what's happened, and they may request data from the instructor or pull information from texts. While students are working on each case, they are assigned readings that contain relevant information, and they hear material in class presentations that is also pertinent. However, the solution is not provided in the texts or in class. To prevent groups from sharing solutions with each other (across semesters or within them), faculty use similar cases but with different data and solutions.

What's most interesting and useful about the approach described in the article is the method these authors have developed for assessing student work in these groups. Performance in the case discussion counts for between 10 percent and 15 percent of the course grade. The scientific content of each student's posting is given a numerical rating from one to 10. The rubric used to make these determinations is included in the article. Typically, individual scores start out low, but as students acquire information, start asking the right questions, and get the data they need, they are able to hone their postings and the point totals start to rise. The highest contribution score achieved within the group as a whole becomes the final group grade. Individual student grades are assigned relative to the group grade, based on both participation and quality of individual contributions. The grading mechanism is explained in detail on pp. 255-256 of the article, including how much time is involved and how senior students can be trained to help with the grading.

The grading system allows faculty to track the problem-solving abilities of students throughout the course and sometimes even two courses (as two of these courses were part of a sequence). They found that this activity did improve the problem-solving abilities of many students, although they also found a group of students who consistently applied the same ineffective strategies. Those students did not improve without faculty intervention. The beauty of the approach, though, is that it allows faculty to work with those students who most need help.

Generally, students responded to this activity positively. Sixty percent found that the case studies helped them understand biochemical concepts and that the experience of working with other students was enjoyable. About 10 percent of the students responded negatively to the experience. "By far the most common negative comment was that students did not trust their peers to contribute correct biochemistry content." (p. 258) The solutions students developed to the problems showed that this fear was unfounded.

The authors see two main benefits with this approach. First, it provides students "with a forum to discuss and apply their biochemistry learning." (p. 261) Opportunities like this are not often a part of large courses. Second, the activity gives instructors the opportunity to analyze individual students' problem-solving strategies. "The data obtained in the online discussions allow a far more precise and constructive method of student assessment than is possible in the face-to-face setting." (p. 261)

This article is full of details describing the method, its development, and its implementation. The faculty members discuss what they have learned, and ongoing research projects focus on the approach. If the strategy is at all of interest, the article provides enough information that the approach could be implemented, and those who do implement it will benefit from what these faculty have learned.

Reference: Anderson, W. L., Mitchell, S. M., and Osgood, M. P. (2008). Gauging the gaps in student problem-solving skills: Assessing individual and group use of problem-solving strategies using online discussions. *Cell Biology Education*, 7, Summer, 254-262.

Metacognitive Skills

FROM PAGE 3

tion ... Promoting metacognition begins with building an awareness among learners that metacognition exists, differs from cognition, and increases academic success. The next step is to teach strategies, and more importantly, to help students construct explicit knowledge about when and where to use strategies." (p. 123)

References:

Cooper, M. M., and Sandi-Urena, S. (2009). Design and validation of an instrument to assess metacognitive skillfulness in chemistry problem solving. *Journal of Chemical Education* 86 (2), 240-245.

Schraw, G. (1998). Promoting general metacognitive awareness. *Instructional Science,* 26, 113-125.

Schraw, G. and Dennison, R. S. (1994). Assessing metacognitive awareness. *Contemporary Educational Psychology*, 19, 460-475.

Editor's note: We don't do book reviews all that often in this newsletter, so our book review policy bears repeating. We do reviews when a book is, as the section title says, "noteworthy." That means the book is one we can honestly recommend. Yes, some subjectivity is involved, but given our long history of reading pedagogical literature, we live dangerously and dare to name the best books. Feel welcome to suggest books you think merit this kind of endorsement—and we just may invite you to write the review.

Book Review: New and Noteworthy

Student Engagement Techniques: A Handbook for College Faculty

By Elizabeth F. Barkley

The book in a nutshell: "Student engagement is a process and a product that is experienced on a continuum and results from the synergistic interaction between motivation and active learning." (p. 8) That's how Barkley defines engagement. It's more than just motivation and active learning overlapping. Barkley thinks the double-helix model better captures the interplay between the two. As they interact, the intensity builds—the more active the involvement, the greater the motivation, and the greater the motivation, the more active the involvement in learning. Learning experiences at the far end of the continuum are "transformative, peak experiences that constitute the treasured milestones of an education." (p. 8)

Unlike much of the work on active learning that emphasizes techniques—those strategies a teacher can use to try to engage students in the learning process—Barkley first builds a conceptual framework for understanding student engagement. She draws heavily on research in the cognitive sciences, but she writes about it in an engaging and accessible way. As you read through these chapters, it all starts to make sense. You begin to understand active learning in deeper and more complex ways and, more important, see how it is inextricably linked to motivation.

It's not that the book ignores techniques—it contains an impressive collection of them in two different sections. The first one, called "Tips and Strategies," offers advice on a wide range of topics (50, to be exact) related to engagement. For example, Barkley recommends using icebreakers to warm up the class and as part of a larger effort to build community within the class. All of Barkley's recommendations are offered with examples. In the case of icebreakers, she describes five different kinds of social icebreakers, three kinds of course content icebreakers, and three kinds of course policies and procedures icebreakers.

The first two sections compose about half of the book. The last half is a comprehensive collection of student engagement techniques, or SETs, as Barkley calls them. Each SET comes with directions that start with a brief listing of essential characteristics. These lists enable teachers to decide quickly whether or not a particular SET is of interest. If there is interest, it can be further explored by reading the more complete description and purpose of the SET. That's followed with step-by-step directions that are illustrated with examples (concrete, specific descriptions of how the SET has been applied). Next, there's a section about how the SET can be used in an online environment, followed by a section that includes other variations and extensions of the SET. Barkley finishes up with a section of observations, advice, and a listing of key resources relevant to that particular SET.

In a nutshell, she offers a complete and detailed "recipe" for each SET. She writes that she hopes that "rather than following the instructions precisely, teachers will use the SETs as accomplished chefs use recipes. [They] use their knowledge and experience to experiment with recipes—substituting ingredients, adding new elements, tweaking the procedures, and basically using their creativity to adapt the recipe[s] to their own needs and preferences." (p. 149)

There are three other characteristics of the book that make it noteworthy. First, the whole book is amazingly well organized, including the section that contains the SETs. They are grouped into eight different chapters. To illustrate, all the SETs that promote analysis and critical thinking are in one chapter, those that develop synthesis and creative thinking are in another, those that address problem solving are in a third, and those that help students develop learning and study skills are in the final chapter. This is a 400-page book, and most college teachers simply don't have time to make their way through a book of this length. However, this book is so superbly organized that you can find what you need even if you only have a few minutes.

Second, this book is well referenced. Whether it's the research on cognitive science or the practitioner literature from which the SETS are drawn, original sources are acknowledged. The bibliography alone makes this book worth the purchase price.

Finally, teachers' voices are included throughout the book. Barkley interviewed a number of teachers known to effectively engage students. They offer advice and examples in their own words. How individual teachers have used a particular SET is regularly included. This means there are examples from many different disciplines, and it also means the SETs have been road tested—they have successfully engaged students in real courses.

The conclusion is easy: if you're going to be teaching on the moon and have only one suitcase for resources, this is the book on motivation and active learning that you'll want to pack. I know it's the one I'd be taking with me … probably as a carry-on so I have something good to read on the way.

Ordering information: The book is a 2009 publication of Jossey-Bass. It may be ordered online at *www.josseybass.com* for $40.00, plus shipping and handling.

Final note: There's an article in this issue titled "Post-Test Analysis." It describes one of the many SETs included in this book.

Discovering and Developing Teaching Skills

"Self-knowledge is the beginning of all knowledge," writes C. Roland Christensen, one of the true masters of discussion teaching. He is referring to his development as a teacher—how he arrived at the techniques that made him so effective. Most teacher accounts of growth are not as instructive and insightful as this one. Best of all, the approach he used to develop his discussion leadership skills is one that can be used to develop many teaching skills.

"Slowly, I learned to make my classroom observations more productive by focusing them. I started to try out tiny experiments. Instead of waiting for the class to assemble before making my appearance, for example, I tried arriving early to see what that might teach me about my students. The exercise proved valuable." (p. 103) It helped Christensen get to know his students—who played sports, who had three tests that week, who had some experiences relevant to the day's topic. That knowledge of individual students enabled him to stop calling on students alphabetically and start calling on those with relevant backgrounds and interests.

He notes that "much of what we teachers do in the classroom seems intuitive. My task was to examine this apparently automatic behavior, show its workings, and identify areas in which judgment might play a part." (p. 103) He found it all but impossible to reflect on classroom discussions as they unfolded, saying that it was "like trying to meditate on a speeding fire engine." (p. 103) Progress was also limited when he looked for general principles to guide his understanding. He discovered that he needed to be much more concrete and specific. "When I came to class with a simple, practical teaching experiment in mind—something like evaluating the effect of calling on students seated in different parts of the room—I got results. Sometimes I focused on the art of questioning. What happens when I ask the same question of two students in succession? ... Sometimes I concentrated on phrasing. What is the difference between using a student's name and simply gesturing?" (p. 104)

His approach makes sense, and, as he discovered, the classroom offers countless opportunities for this kind of experimentation and observation. "The classroom proved to be a perfect laboratory for my nuts-and-bolts experiments with the discussion process. As an observer, of myself and of other instructors in action, I truly began to learn." (p. 104)

Most of us, especially those likely to read a publication like this, aspire to teach well. However, even though we want to continue to improve and grow throughout the years, most of us devote precious little time to our development. We look for new techniques and regularly try new strategies and approaches, but Christensen challenges us to start someplace else—to acquaint ourselves with ourselves as teachers.

Christensen believes in "the teachability of teaching. For the past two decades my pedagogical research, statements, and teaching objectives have centered on this fundamental conviction: good teachers are made, not born." (p. 117) What he says next should be a source of inspiration for all of us: "My belief in the essential magnificence of teaching grows ever stronger. What I have learned about the abiding conundrums of discussion pedagogy makes me even more certain that teaching is a great learning experience. And for the study of teaching, what better laboratory than the classroom, where the teacher can experiment with the real 'stuff' and test, modify, and retest all the hypotheses?" (p. 110) He concludes with a telling question: "Is a lifetime in the classroom really long enough to figure out what effective teaching is all about?" (p. 111)

Reference: Christensen, C. R. (1991). "Every Student Teaches and Every Teacher Learns," in Christensen, C. R., Garvin, D. A., and Sweet, A., eds., *Educating for Judgment: The Artistry of Discussion Leadership.* Boston: Harvard Business School Press.

Cool Calling

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about an answer, and asks a second student to back up the first one. Then he proceeds with all the normal opening class duties—making announcements, responding to questions, reviewing upcoming assignments—giving the student who has been called on a good five minutes to think about and prepare an answer. Depending on time, you could also ask the backup student to share his or her answer, and then solicit responses to both answers from the rest of the class.

Just in case you might be curious about where Welty stands on the cold calling or volunteering issue, he writes: "I prefer to stay with volunteers … I would want to think that those students who participated wanted to do so because they had something to contribute at the time of the participation, not because I wanted them to participate." (p. 46)

Reference: Welty, W. M. (1989). Discussion method teaching: How to make it work. *Change*, July/August, 41-49.