



Getting Started on Big Change Projects: Applying Universal Design for Learning Principles

*Audrey L. Deterding
Northern Arizona University
Audrey.Deterding@nau.edu*

When creating course materials, it is important to be as inclusive as possible. A common way of working to ensure that materials respond to different approaches to learning is to use Universal Design for Learning (UDL), which proposes inclusive course design. It is a framework that helps to make content, activities and assignments, and instruction accessible to students at different levels, with different abilities, and who take different approaches to learning. While this sounds straightforward and relatively simple, when one dives into the UDL literature and works to implement its guidelines, the task quickly starts to feel overwhelming—at least that’s how it made me feel.

Last year, I attended a year-long faculty working group in which we focused on implementing UDL in our courses. Here’s what made this a daunting task. A course that is truly adhering to UDL guidelines makes every aspect of the course as inclusive as possible, including the syllabus, lectures, and any online components such as videos, PowerPoints, etc. It can mean creating closed captioning for videos and ensuring that all documents are created and saved in a manner that is screen reader ready.

My course already had a long list of items that needed modification, and then I learned that assignments needed to be created so that students could complete them using a variety of methods. For

example, suppose I asked my students to introduce themselves for an online class. Rather than the more traditional written paragraph format, I might want to allow students to create a Prezi, or a video, or an audio recording and upload it. If it were a graded assignment that could be completed in different ways, then rubrics needed to be created to accommodate these different approaches while maintaining grading consistency.

How does one tackle something that feels impossible?

I was overwhelmed. How does one tackle something that feels impossible? I wasn’t sure, but I plunged in anyway and decided to focus on one thing at a time. I started with my syllabus. I created it with all the usual pieces—policies, course objectives, learning outcomes, and assignments. I saved it in a format that works with screen readers. I also created an abridged version that contained my contact information and the policies most students truly care about: attendance, late work, and extra credit. The goal of this version was to provide easy access to course information so that students who may have reading difficulties could discover those aspects of the course that would most affect their grades and learning. Next, I planned to create a closed-captioned video so students could choose to hear the syllabus rather than read it.

After initial work on the syllabus, I opted to tackle online content labeling. Initially, I had color-coded assignments. For example, journal-entry labels were in blue, quizzes were in black, videos were labeled in red, and PowerPoints were in green. However, color coding doesn’t work for anyone who may be color-blind. So I then decided, in addition to the color, I would use brackets, parentheses, underlining, and the like, to give students more than one way to visually find the assignment types.

At times, my work group mates and I felt as if we were attending a self-help support group, and we probably were. But what I learned from this whole experience is that sometimes one just needs to start. I haven’t created an entire class that follows UDL guidelines, but I have made a start and can build on what I’ve done. Often when an instructional improvement project looks too big, we avoid it. Implementing UDL in a course is a big project. I believe it’s something we all need to do. And now I know it can be done one piece at a time. 🌳

In This Issue

Student Group Research Projects	2
Revisiting Teacher Authenticity	3
Student Resistance: Fact or Fiction	4
Should Students Form Their Own Groups?	5
When a Student Disagrees with the Grade	6
Figuring Out if It’s a Good Idea— Constructively	7
Improving Peer Feedback	8



President
William Haight
whaight@magnapubs.com

Publisher
David Burns
dburns@magnapubs.com

Editor
Maryellen Weimer, PhD
grg@psu.edu

Managing Editor
Tyler Koshakow
tyler.koshakow@magnapubs.com

For subscription information, contact
customer service:
800-433-0499
support@magnapubs.com
www.magnapubs.com

The Teaching Professor (ISSN 0892-2209) is published 10 times per year by Magna Publications Inc., 2718 Dryden Drive, Madison, WI 53704. Phone: 800-433-0499. Fax: 608-246-3597. Email: support@magnapubs.com. Website: magnapubs.com.

One-year subscription: \$119 (Multiple print subscriptions and group online subscriptions are available, call customer service at 800-433-0499 for information.)

Photocopying or other reproduction in whole or in part without written permission is prohibited. POSTMASTER: Send change of address to *The Teaching Professor*, 2718 Dryden Drive, Madison, WI 53704. Copyright ©2017, Magna Publications Inc.

Submissions to *The Teaching Professor* are welcome. For submission guidelines, please go to <https://www.magnapubs.com/frequently-asked-questions-help/submission-guidelines.html>

Authorization to photocopy or reuse content from *The Teaching Professor* is available for academic institutions, businesses, and individuals from the Copyright Clearance Center (CCC). To see a list of options available for you to reuse select content, visit copyright.com or call CCC at 978-750-8400 for more information.

Student Group Research Projects

It's a favorite assignment in upper-division major courses—have students collaborate on a research project. The rationale is straightforward. Students learn how to do research by doing it. Of course it depends, but in most fields, students new to research find it a daunting process that includes multiple steps: generating a research question, reviewing the literature, designing the study, collecting the data, analyzing them, writing up the results, and then presenting them. Teachers have students tackle the project in groups to make it less overwhelming and to underscore the value of collaboration on big projects.

Sociologist Renee Monson wrote that “almost without exception, instructors claim that group research projects have impressive effects on student learning in research methods courses” (p. 242). Students become engaged with the project, they learn to work together, and they accomplish more than they could if they worked on the project alone. However, Monson goes on to point out that there isn't much evidence that supports these outcomes, and for instructors, “inspired by the testimonial case studies of this pedagogy,” there isn't much guidance on the design details that make these successful learning experiences. That's why she thought it was important to explore these two research questions: “What group characteristics are associated with groups that earn higher grades on the research project?” and “Does the achievement of a student's group on the research projects predict the student's subsequent achievement on the final paper in the course?” (p. 240).

Monson used 14 sections of an intermediate-level sociology research methods course taught across 11 years, enrolling a total of 257 students, to explore the role of group characteristics and the influence of the group research project on individual learning. As for group characteristics that might

influence the outcome, she looked at group size, gender, and racial composition. She used mid-term exam scores to create three- to five-person heterogeneous groups. After completing the research project, her students prepared a final paper formatted as an individual research report, which Monson described as a “comprehensive assessment of the sum total of their learning in the course...” (p. 244).

Students become engaged with the project, they learn to work together, and they accomplish more than they could if they worked on the project alone.

“With respect to predictors of group achievement on research projects, it is not surprising that a group's overall average midterm exam grade predicts group achievement on the research project...” (p. 248). She found that group size matters and suggested that instructors avoid three-person groups, although that recommendation may be content- and course-specific. The effects of gender were less clear-cut. Racial compositions did not produce statistically significant differences in achievement.

Perhaps more significant were her findings on the effects of the group project on individual learning. Here “the results suggest that group achievement on the research project does predict individual learning as measured by grade on the final research report and proposal, even after controlling for individual characteristics that also predict individuals' final paper grade”

Revisiting Teacher Authenticity

It's a favorite refrain: "The best teaching is teaching that is a genuine, authentic representation of who you are." Yes, in the classroom we are obligated to be professional, but being professional should not prevent students from seeing their teacher as a real person.

It seems pretty simple and straightforward: let students see who you are. But this is more complicated than it looks at first glance. Start with how teacher authenticity or the lack of it is communicated by things we do and say. We select certain strategies, approaches, behaviors, and policies to use when we teach. Both what we use and what we say about these techniques help to define us as teachers. That definition may or may not accurately reflect our personal identity—what we value and care about. If what we do and say is perceived as being inauthentic, not honest, not genuine—that affects the quality of the relationship we have with the class and with individual students in that class.

Authenticity then isn't just about how we teach; it is also about how we build relationships with students. Communication is the vehicle through which those relationships are built and cultivated. If we come to class early and chat with students and if we ask how they are doing, then that tells students something about the way we want to relate to them. Add to that the uniqueness of the teacher–student relationship. It is not a friendship, or a long-term, intimate partnership. That makes how authenticity functions in our relationships also unique and challenging. We must find ways to be friendly but not friends, ways to be caring but not intimate partners.

Most often, authenticity is understood from the perspective of the self. Are you being authentic? Do you actually care for students, or are you pretending that you care? We cannot ask students (unless perhaps a student knows us very well), "Does this teacher act in ways that are consistent with his or her values?" Only

the teacher knows that for sure. But perceptions of authenticity (or the lack of it) are important. If students do not think teachers care, have time for them, or are interested in them as individuals, that changes the relationship but it also affects how students approach the course and what they learn in it.

Zac Johnson and Sara LaBelle recently studied how authenticity is perceived by students. They used a grounded theory approach, which allows meaning to arise from the data rather than being imposed. They wanted to try to "determine the behaviors and communicative messages that students perceive as indicative of teacher (in)authenticity" (p. 424).

Most often, authenticity is understood from the perspective of the self.

They gave 297 undergraduates, mostly business or business administration students, a description of teacher authenticity, asked them to think about a teacher they believed to be authentic, and then had them identify those behaviors and actions that made them feel the teacher was being authentic with the class and with them as individuals. They also provided a description of inauthenticity and had students write how they knew when it was absent in a teacher.

A content analysis of the results revealed five behavior sets students associated with authentic teachers. Each is briefly highlighted below.

- **Approachable:** Authentic teachers tell personal stories. They use humor. They talk with students before and after class. They let students know they are available during office hours and can be contacted electronically. "Overall, *approachable* teachers make it clear to students that their lives are open to them" (p. 430).

- **Passionate:** Students perceive teachers to be authentic when they are excited about their content or about teaching. They talk joyfully about what they are teaching or about teaching. They wear their love of what they do openly, without shame or embarrassment.
- **Attentive:** Authenticity is conveyed by careful listening, providing feedback, offering advice, and knowing students' names. These teachers work hard to discern whether students understand or are confused. They try to clarify what is not understood or appears confusing. Authentic teachers have standards and expectations, but they are also caring and kind.
- **Capable:** In this category, authenticity involves being adept in the role of teaching—arriving to class on time, prepared, and well organized with a syllabus that spells out what students need to know about the course. Authenticity here flows out of how the teacher handles the noncontent-related aspects of teaching.
- **Knowledgeable:** This behavior set is related to authenticity communicated by passion and by being capable, but it is more focused on the content and was frequently described by these students as the level of confidence the teacher has about the content. It is the depth of knowledge that allows teachers to expand on the content, offer other examples, and answer questions.

The student descriptions of teachers without authenticity were mostly opposite. They were perceived as unapproachable, ignored students outside of class, and showed no interest in developing relationships with students. Their classroom presentations lacked passion. They were inattentive, avoided student questions, and failed to ask for

Student Resistance: Fact or Fiction

When faculty consider adopting a new instructional approach, there's always a question about how it will be received by students. Will they engage with it and learn from it, or will they resist, as in complain, participate reluctantly, and give the course and instructor low evaluations? The fear of student resistance can prevent faculty from trying out new approaches, including any number of active learning approaches with well-documented learning benefits.

What isn't clear about student resistance is whether it's to new approaches in general or to certain kinds of instructional strategies. Up to this point, there has been scant empirical exploration of the phenomenon, which makes a recent study done in engineering particularly worth highlighting.

A large research team of mostly STEM faculty developed and validated a Student Response to Instructional Practices (StRIP) survey to “measure students’ expectations of active learning and other types of instruction. The StRIP survey also measured students’ experiences of types of instruction, instructor strategies for using in-class activities, and student response to instruction” (p. 4). They asked for student responses to four types of instruction: passive lecture where the instructor talked and students listened; active learning lecture where the instructor talked, but the instructor and students asked and answered questions; group-based activities where students worked on content with other students; and self-directed activities where students assumed responsibility for learning material on their own.

Students were asked to respond to these types of instruction in terms of their perceptions of their value, positivity (their attitude toward the instructor and course), and their evaluation of the course and instructor. They were also asked about their participation with a set of prompts that included positive and negative statements (“I tried my hardest

to do a good job;” “I rushed through the activity, giving minimal effort.”). A cohort of 179 students in four different courses at three different institutions took the survey at the beginning of the course, two weeks in, and a third time at the end of the course.

The fear of student resistance can prevent faculty from trying out new approaches, including any number of active learning approaches with well-documented learning benefits.

Student responses were analyzed with various statistical methods, which generated a number of different (and interesting) results with only the major findings highlighted here. “Perhaps most importantly, the data show no significant negative correlation between any type of instruction and any student response to instruction” (p. 14). And that included how students responded to group work! The findings do not rule out the possibility of a student resisting a particular instructional approach, but they do indicate that instructors should not expect student resistance as an automatic outcome to instructional approaches other than those students expect. Moreover, “there was no evidence found to support the common concern that instructor or course evaluations are negatively affected by adopting active learning strategies” (p. 14). Rather, these students “more often than not” saw active learning approaches as having value and participated in them fully.

Faculty with concerns about student resistance should find those results encouraging, but even more helpful were findings that what most strongly

predicted how students responded was not the type of instruction, but the strategies the instructor used to implement the particular approach. The StRIP survey asked about implementation in terms of whether the instructor clearly explained what students were supposed to do, including the purpose of the activity, how it related to learning, and its degree of difficulty (not too easy or too difficult). There was also a set of prompts pertaining to how the instructor facilitated the instruction. Was there an opportunity for students to provide feedback, was the instructor there to help, did the instructor’s demeanor encourage engagement, and was an appropriate amount of time devoted to the activity? Of this finding, the research team writes, “Clearly, instructors have a great deal of influence on how students respond to active learning” (p. 15).

This research was done only with students in one discipline, so more work is needed to confirm that students elsewhere do not in large numbers resist approaches other than lecture. But the research is valuable in its identification of concrete actions instructors can take when they implement other approaches that, in this case, were strong predictors of how students responded to the type of instruction. —MEW

Reference: Nguyen, K., Husman, J., Borrego, M., Shekhar, P., Prince, M., Demonbrun, M., Finelli, C., Henderson, C., & Waters, C. (2017). Students’ expectations, types of instruction and instructor strategies predicting student response to active learning. *International Journal of Engineering Education*, 33 (1), 2–18. 🌱

Should Students Form Their Own Groups?

It's one of the questions always asked by faculty using group work. Sometimes students tell the teacher they want to form their own groups. Teachers worry about those students who aren't well connected with others in the class. Will they be invited to join a group? Or, what about that clique in the back row who already spend too much time having fun? Or, maybe it's that very bright, motivated bunch in the front row. Yes, they will work hard together, but other students could learn so much from working with them.

In some situations, it isn't possible for teachers to form groups. Take the case of a 700-student introductory course for biology majors and those in related fields. To incorporate active learning experiences in the course, the instructor (and TAs), much to their credit, included a number of clicker questions that were first answered individually and then in collaboration with others, some of which were graded. Students in this course also completed six paper-and-pencil exercises, which they did in pairs or small groups with each student receiving credit for what the group submitted. In a class that large, teacher-formed groups for in-class activities are not an option.

Well-designed, in-class group work continues to show a variety of benefits—better academic achievement, development of higher-order cognitive skills, and more student engagement. But whom students choose to work with is bound to affect whether those benefits accrue. So one course instructor and associated colleagues decided to look at whom students collaborated with on the activities described above. For logistical purposes, they worked with those sitting nearby, but students did have some freedom to choose where they sat. At the beginning of the course, seating was completely open. After that, students were encouraged to sit in an area near their TA (who instructed their labs and was there to help during these in-class activities).

Their article describes the variety of ways they analyzed who students chose to work with. That analysis revealed these main trends (p. 22).

- Most of the time, students self-sorted by ethnicity. For example, there were 22 of the 699 students who self-identified as African American. By the end of the course, they were 10 times more likely to working together than a pair of students who shared none of the characteristics considered in the study.

The question is whether collaboration in homogenous groups is a good thing.

- Most of the time, students in this course self-sorted by gender.
- Past high achievers (determined by GPA at the time they entered the course and SAT verbal scores) worked together early on, but then that relationship disappeared.
- Students who actually did well in the course (based on their final grade) began collaborating, and, by the end of the course, they were more likely to be working together than expected by chance.
- Students with a history of struggling academically (based on their GPA when the course began) started associating, and, by the end of the course, they were much more likely to be collaborating than expected by chance.

The researchers' summary conclusion was: "Our data indicate that in a large-enrollment classroom that emphasizes intensive collaboration, students self-segregate to a small degree by academic characteristics and strongly by demographic traits" (p. 123).

What they found demonstrates the old adage that likes attract. The question is whether collaboration in homogenous groups is a good thing. If diverse experiences and perspectives are what promote better solutions to challenging problems, deeper learning, and the development of higher-order thinking skills, then heterogeneous groups may be preferable. If one of the goals of group collaboration is the opportunity to learn to work with others who are different, then homogenous groups don't accomplish that goal. On the other hand, if being with those who share the same ethnicity, gender, and possibly level of language fluency makes it feel safer and easier to communicate, and if those groups are free from bias, then homogenous groups have the advantage.

"The existing literature on professional and classroom collaborations suggest that the active-learning experience would be optimal if students worked in heterogeneous groups that were free of bias based on gender, ethnicity, or language fluency, and that required struggling students to engage and work hard" (p. 124). In this situation, students did not choose to create groups that fit this description. Should teachers form the groups when it's possible? Perhaps, provided that teachers help students understand the value of diverse groups and perhaps, provided teachers help student understand the value of diverse groups and how to work constructively within them. —MEW

Reference: Freeman, S., Theobald, R., Crowe, A. J., & Wenderoth, M. P. (2017). Like attract: Students self-sort in a classroom by gender, demography and academic characteristics. *Active Learning in Higher Education*, 18 (2), 115—126. 🌱

When a Student Disagrees with the Grade

“This is not a C paper!” “This answer deserves more points.” “Half of my work on this problem is correct, but I got less than half credit.” Grades are terribly important to most students, so when they object to a grade, they often do so with passion. For most professors, discussing contested grades is not a favorite conversation. Often, it doesn’t end well. The grade can’t be changed, and the student can’t be persuaded. However, teachable moments are still possible in these conversations. Here are some dos and don’ts for making the most of these exchanges.

- **Don’t** discuss an individual student grade in front of other students. Grades are personally private information, and so are the discussions about them. Besides, student emotions run high just after receiving a grade, especially one they didn’t expect. They’ll get more out of the conversation once there’s some space between getting the grade and having the discussion about it.
- **Do** have the conversation with the student in your office or some other place, where the two of you can talk comfortably. There are reasons to anticipate the conversation. It’s an opportunity to get to know the student better. You get to talk more about the content, possibly helping the student understand something important. You can show the student that disagreements can be discussed constructively.

- **Do** prepare for the conversation. Ask for or make a copy so you can reread the answer before talking with the student. Or, before the conversation begins, ask for silence while you look at the student’s work.

Grades are terribly important to most students, so when they object to a grade, they often do so with passion. For most professors, discussing contested grades is not a favorite conversation.

- **Do** listen. In fact, start the conversation by listening to the student. Let the student make the case for why the paper, answer, or problems merits more points or a higher grade.
- **Do** ask questions, lots of them. “Where in this answer do you discuss what the text says about this?” “Where is your thesis statement?” “How did you get from this step in solving the problem to this step?” “Can you show me something in your notes that says this?”
- **Don’t** go into the conversation assuming you won’t change the grade. Chances are you won’t, but don’t let that be a foregone conclusion.

Perhaps the grade is too low. Teachers grade a lot. They grade when they’re tired. They’ve been known to grade when they’re distracted. They do, on occasion, make mistakes.

- **Don’t** tell the student that he or she is wrong. Focus on the answer. What’s not right about the answer? What’s confusing or unclear? What’s not there that should be?
- **Don’t** try to persuade the student that the grade is correct. It may well be, but the student isn’t likely to be persuaded and your attempts at persuasion will be met with arguments (the same ones or new ones). Then you have to respond, and, as these exchanges continue, more emotion enters the conversation. State your decision, explain your reasons, smile, and change the subject.
- **Do** spend time talking about the next paper, essay question, or problem. What does the student need to better answer next time? Be specific. “Keep coming to class, do the homework, and stop by office hours if you need help or if you’d like some feedback. When you study, ask yourself potential questions and then practice answering them. You can do better.” Students will have learned something if they leave the conversation with a better understanding of what makes a solution worth full credit. And they will have learned even more if they have some ideas about preparing those answers. —MEW 🌱

GROUP RESEARCH FROM PAGE 2

(p. 249). On the other hand, the group characteristics considered in the study (size, gender, racial composition, and overall average grade on midterms) did not contribute to individual achievement on the final paper over and above the group’s achievement.

This study is noteworthy because it begins to provide evidence that supports anecdotal claims about the value of group research projects. In this case, students learned how to do research by working with other students on a research projects. In addition, it offers some insights as to the effects of group characteristics, such as size and composition. —MEW

Reference: Monson, R. (2017). Groups that work: Student achievement in group research projects and effects on individual learning. *Teaching Sociology*, 45 (3), 240–251. 🌱

Figuring Out if It's a Good Idea—Constructively

A recent issue of the journal *Issues in Accounting Education* published teaching statements written by the 2016 winners of the Cook Prize, a national prize that recognizes superior teaching in accounting. Part of the statement, written by Billie M. Cunningham, who teaches accounting at the University of Missouri, describes how she first approached making changes in her teaching compared with how she handles the change process now.

In the beginning, she used what she called a “seat of the pants” approach, “trying new activities and strategies because they intuitively seemed more logical, they were theoretically ‘supposed’ to work, or they appeared to work in other educators’ classes” (p. 5). If they didn’t work, she stopped using them. She writes that her enthusiasm for new strategies meant she often incorporated several in the same course. And although each had great potential (she reports feeling that in her gut), with more than one being used in the same course, if there were improvements, she didn’t know to which strategy she should attribute those improvements.

“In the past decade, or so, I have become more measured and analytical in my approach to change ...” (p. 5). Now she relies on “action research.” After selecting and implementing some

sort of change, she triages “different measures—exam results, course evaluations, classroom participation, clicker results—to determine if, together, the measures support the that the change is moving students toward a specific goal, whether that goal is a better classroom environment, better student engagement, or better learning and understanding on the part of my students” (p. 5).

In general, teachers do need to grow into more systematic and thoughtful ways of approaching the change process.

Action research provides her with feedback on specific details, and that enables her to make more, often small, changes, tweaking the strategy so that it works better for more students. Previously, without that information, if something failed or didn’t work very well, she’d just scrap it. She includes a great example of her first experiences using graded clicker questions during class sessions. There were some technical difficulties and complaints from students

about how they felt they were being “forced” to attend class. But she also found out from her action research data collection that students liked some aspects of the clicker quiz questions (the immediate feedback and seeing how other students fared on the question) and that they thought those features were helping them learn. She was able to make informed choices that refined and improved her use of this strategy.

In general, teachers do need to grow into more systematic and thoughtful ways of approaching the change process. Too often we hear a good idea, decide to try it, and then assess how well it worked with those gut feelings. We do not collect data. We do not look at objective measures. We come to quick and global conclusions—it worked or it did not work. If it did not work, well, it could be the strategy, could be the students, or it could be us, but no matter, we will not use it again. There are better ways—ones with more potential to grow our effectiveness as teachers and ones more likely to promote learning for students. —MEW

Reference: Editorial (2017). Summaries of the teaching domain statement of the 2015 and 2016 Cook Prize Winners. *Issues in Accounting Education*, 32 (2), 1–15. 🌱

AUTHENTICITY FROM PAGE 3

feedback. They did not appear capable, tended to read from PowerPoint slides or the text, and showed a lack of respect for students by being authoritarian and rude.

In their conclusion, Johnson and LaBelle reiterate an important point, cautioning against interpreting their

findings “to mean that to be authentic is merely to practice effective teaching behaviors. Rather, the indicators of authenticity reported by students in our sample reflected their perceptions that teachers were acting out of genuine concern, respect, and care for the students” (p. 433). Said more bluntly, authenticity is not something that can be easily faked. As in life, at some point in

relationships of any length, who is real and who is pretending becomes clear. —MEW

Reference: Johnson, Z. D. & LaBelle, S. (2017). An examination of teacher authenticity in the college classroom. *Communication Education*, 66 (4), 423–439. 🌱

Improving Peer Feedback

Students regularly talk to one another about homework and course assignments. They discuss what they think the teacher wants, offer advice about what to study, and sometimes look at one another's work and provide feedback. That feedback runs the gambit from generic commendations like, "that looks good," to advice on comma placement, to detailed feedback on the substance or solution. Usually, the latter is the exception rather than the rule, unless students have learned that they can give and receive feedback in exchanges with peers. Many teachers try to provide that experience with in-class peer-review activities. They may give students checklists, question sets, or rubrics to guide their assessments and the feedback they then provide. The feedback may be written, or it may be exchanged online or in face-to-face conversations. But do these teacher interventions improve the peer feedback? Can students learn to give one another feedback that enables them to improve their work?

Here's a study that answers those questions with a resounding yes. The course was introductory calculus, and students provided one another feedback once a week on a "challenging, in-depth homework problem" (p. 4). Students worked on the problem at home, individually. After working on it, they completed a self-reflection. In class, they shared and discussed their solutions. Students then had the opportunity to revise their work before turning it in. That process alone improved students' pass rate by 13 percent.

Of interest to researcher and instructor Daniel Reinholz were those conversations that took place between peers. What if attempts were made to improve the quality of the feedback they provided to one another? What if students were given some training? Would that change how students talked to one another about the problems?

To find out, Reinholz devised a training experience that took place

once a week immediately after students turned in their final solutions to the challenging problems. They were given three sample solutions to one part of the problem that they just completed. They were asked to rate the quality of those solutions and explain how they could be improved. Students first wrote down their thoughts before engaging in a whole-class discussion.

Can students learn to give one another feedback that enables them to improve their work?

A variety of data were collected to determine whether the conversations that students had with this training (Phase 2) were different from the conversation that took place when no training had occurred (Phase 1). Data included video observations, copies of student work and exams, audio recordings of their conversations (54 from Phase 1 and 86 from Phase 2), student surveys, and interviews with students about their experiences. These data were analyzed via a variety of methods as well, including content analysis of the conversations, qualitative analysis of a subset of the conversations, and student interviews.

Starting simply but dramatically, the length of the conversations in the training sections increased significantly from 351 words (SD = 173 words) in Phase 1 to 635 words (SD = 252 words) in Phase 2. The length nearly doubled. Using previous research, Reinholz considered three kinds of feedback: that which focused on the process, focused on the product, and was directed to the person. In Phase 2, students spent more time talking about process feedback. They used more question words—11.5 question words per conversation compared with 6.3 words per conversation without training.

They used almost twice as many communication words such as explain, find, mean, read, tell, and understand in the training phase. Students also spent proportionally more time talking about the product in Phase 2, and they offered more feedback to the person, such as giving one another ideas about problem-solving in general. Finally, when students were trained, the course pass rate improved by 23 percent.

In sum, Reinholz reports, "the improved conversations consisted of much more on-topic talk and productive feedback; after training, students provided more feedback related to processes (communication and underlying reasoning) than product (correctness or incorrectness)" (p. 1). Interestingly, the training provided in this study was not advice on how to give good feedback. Rather, quality feedback was demonstrated through discussions of problems students had just completed. So students gained more exposure to the content as they were learning how to analyze and talk about challenging problems. —MEW

Reference: Reinholz, D. (2016). Peer conferences in calculus: The impact of systematic training. *Assessment and Evaluation in Higher Education*, 42 (1), 1—17. 🌱

Next Month's Topics

A teacher asking tough questions about grading: "What am I grading when I grade?"

A hat trick alternative to quizzing

How well are your active learning activities engaging students? Here's a quick way to find out.

Optional reading guides that students opted to read