

Teaching at Stanford

The Center
for Teaching
and Learning,
Stanford
University



An Introductory Handbook

for Faculty, Academic Staff, and Teaching Assistants

We believe it is not only possible but vital that we give teaching as much emphasis and support as we give research. As a Stanford faculty member, academic staff member, or teaching assistant, you are already recognized for your scholarship in your field. We ask that you be a leader in your teaching as well.

John L. Hennessy
President





Dear Colleagues,

Since its founding a little more than a century ago, Stanford University has become one of the world's outstanding educational institutions. As your colleague and the president of Stanford, I am confident that you will continue that tradition of excellence. In pursuit of that goal, I encourage you to explore and expand the relationship between your teaching and your research.

At Stanford, we place a high value on collaborative learning—not only among faculty, academic staff, and teaching assistants, but also between faculty and students. You will find that your students and colleagues will challenge you to think in new ways, offer new insights, and expand your perspective. Given the close interaction between faculty and students, I hope that your dual passions—for teaching and for research—nurture each other.

Stanford is committed to being a great research and teaching university. We believe it is not only possible but vital that we give teaching as much emphasis and support as we give research. As a Stanford faculty member, academic staff member, or teaching assistant, you are already recognized for your scholarship in your field. We ask that you be a leader in your teaching as well. This handbook will provide you with support and with answers to your questions. I hope that you approach your teaching with the same passion that you approach your research. Not only will our students benefit, but I firmly believe that it will result in further intellectual exploration and growth for you as well.

In *Stanford University: The First Twenty-Five Years*, the university's first registrar, Orrin Leslie Elliott, quotes David Starr Jordan: "The value of a teacher decreases with the increase of the square of the distance from the student." Although technological advances have given us additional resources to work with, it is still good advice today. I look forward to seeing what we can accomplish together.

A handwritten signature in black ink, reading "John L. Hennessy". The signature is fluid and cursive, with a large initial "J" and "H".

John L. Hennessy, President

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Welcome to Teaching at Stanford!

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The Center for Teaching and Learning is delighted to offer you this newly revised handbook and to further support you in your teaching-related endeavors. Whether you are brand-new to teaching or have many years of experience, we hope this handbook will give you a sense of how teaching at Stanford is especially rewarding and challenging, regardless of your discipline. Necessarily—because scientists, humanists, social scientists, and engineers will be reading this—the advice we offer is general. We urge you to address the specific challenges of teaching in your field by talking to your colleagues, reading about teaching in your subject, reflecting on your own experiences, and watching carefully those who already know how to teach your discipline well. We expect that you will find enough here, however, to get you started with confidence.

We at CTL maintain that, contrary to popular belief, teachers are made, not born. While teaching is certainly an art, it also is a set of skills that can be learned, just as writing or public speaking are abilities that can be developed. This means that accomplished teachers can always improve, and every new teacher has the chance to be great. At the least, this means that by reading about the theories and approaches we discuss in this handbook, you can learn how to do a very good job in the classroom—good enough to give you satisfaction and to give your students an effective learning experience.

In time, you will go beyond this handbook to develop your own teaching style, one that may even challenge some of the advice given here. You will learn how to make the unusual and the spontaneous work for you and your students and you will be able to respond to students instinctively with pedagogical insight and variety. This is the purpose of any introductory handbook—to let you use the experience and advice of others to help you find your own unique approach. In the spirit of collaboration, please accept our best wishes for a productive and fulfilling teaching experience at Stanford!



Michele Marinovich, Ph.D., Associate Vice Provost for Undergraduate Education and Director, Center for Teaching and Learning

A Framework for Effective Teaching at Stanford

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Teaching Goals

Recall a favorite teacher from your past. Perhaps it is someone who helped you learn something about yourself, influenced the direction of your career, or changed the way you view the world. Perhaps it is someone whose classes consistently created moments of humor, insight, and wonder, or someone who presented a refreshing intellectual challenge at a time when you needed it.

We begin this handbook with a discussion of the highest teaching goals, to remind you that great teaching is more than a handful of teaching tricks strung together with modest aims and sufficient expertise in your field. Every aspect of your teaching will be shaped by the role you want to play in the mentorship and development of your students. Every nuts-and-bolts teaching strategy this handbook suggests, even the most practical advice about lecturing or writing exams, serves the goal of helping you become the kind of teacher who has inspired you. As we mentioned on page 2, great teachers are made, not born. These are not mysterious talents you have to be granted at birth, but skills that you can learn. Those who make it look easy have probably worked the hardest.

Consider now the following teaching goals, and decide for yourself which are most relevant to the material you teach and the role you want to play in your students' intellectual and personal development. Keep these goals in mind as you continue through the practical advice that makes up the bulk of this handbook.

Inspire Students

Nothing pushes students to do their best work like a professor who takes pride not in his or her own accomplishments, but in helping others realize their potential.

—Jason Dent, Philosophy, '05

Your effort and enthusiasm as a teacher directly influence students' commitment to your course and interest in your field. Great teachers inspire students by demonstrating belief in their students' abilities and by providing the support students need to meet challenging academic demands.

Facilitate Mastery of a Field

In choosing my area of concentration I decided to combine two of my interests, sports and medicine, and study sports medicine. Initially I was just mildly curious about the field. However, after taking a class on exercise and physiology by Dr. Anne Friedlander and talking with her outside of class, my interest became more than just academic. She opened my eyes to the practicality and numerous applications of sports medicine. In a few weeks I will begin a sports medicine internship with a grassroots organization that encourages older individuals to maintain health through an active lifestyle. Thanks to Dr. Friedlander I am learning more about sports medicine and enjoying opportunities to apply that knowledge in everyday life.

—Angela Markham, Human Biology (Sports Medicine), '05

Your classroom is a training ground not only for future study in your field but also for many aspects of life. Great teachers help students master the fundamentals of their subject matter, which will pay off both for advanced study in their field and for students' everyday understanding of the world.

Mentor Young Intellectuals

I attribute a great deal of my intellectual growth at Stanford to my advisor's mentorship and guidance. I came to her last year as someone who was completely intimidated by economics. But from the first day of my research assistantship she pushed me to challenge myself academically and personally. For the first time, I began to understand what it meant to set high goals for myself without fear.

—Felicia Estrada, Public Policy, '04

Long after individual facts and phrases are forgotten, your students will carry with them the intellectual skills you help them develop, from critical to creative thinking. Great teachers prepare students for lifelong learning.

Help Students Find Their Voice

Although I had been very outspoken during high school, initially it was very hard to find my “voice” at Stanford. I think my breakthrough came during an African history class. The professor showed that he valued our class participation both in the grading of the course and by encouraging every student to speak at least once during the quarter. He received our comments in such a nonjudgmental way that after a couple weeks I felt much more confident speaking up in all my classes.

—Andrea Snavelly, International Relations, '04

Once you've helped students find something they want to say, you need to help them find a way to say it. Great teachers give students the skills to communicate effectively and the confidence to express what they think.

Help Students Articulate and Follow Their Values

It's all too easy for students to think the learning process is limited to lectures, readings, or problem sets. It takes a great professor or TA to take course material outside the context of the classroom and remind us that we study in order to better the world. I remain impressed with instructors who take time to do this in traditional classes, not just those labeled as “service-learning courses.”

—Felicia Estrada, Public Policy, '04

One of the main goals of higher education is to help students figure out who they are and how they can be of service to their community. Great teachers help students understand the social responsibilities of their field and the social impact of their choices.

Combining Teaching and Research

As an academic you may at times feel the attractions of teaching and research as opposing forces. With limited time it's not easy to do both to one's satisfaction. Promotion processes, as well as your own desire to advance your field, usually require that you devote considerable time to research, publication, and presentation. Even dedicated teachers can feel pressured not to spend too much time and energy on their teaching. Yet teaching is one of your primary obligations as a scholar, and it is



In the best universities, education and research, teaching and research, are but two sides of the same coin—the search to know. This search to know takes place in the classroom, as well as in the library and in the laboratory.

Gerhard Casper, Peter and Helen Bing Professor in Undergraduate Education and President Emeritus

important not to focus so intently on your research that your students suffer. How can you strike the right balance?

Before you reconcile yourself to the idea that excellence in teaching and research are mutually exclusive, consider the similarities between the two endeavors. Presenting at conferences and fielding questions from the audience requires the same skills as lecturing; designing an outstanding course outline and syllabus uses many of the same skills as putting together a literature review or grant proposal. Both teaching and research help you develop insight into your field, refine your communication skills, and draw on your ability to select and organize content in a meaningful way. Because they require similar skills, you will find that improvement and advancement in one feeds back into improvement and advancement in the other.

Still, new instructors' first concern is often one of simple time management. The following suggestions may be helpful as you first establish the balance between teaching and research:

- Consider doubling your teaching load during one quarter so that you have at least one quarter free for time-intensive projects, such as major grant proposals.

- Invite your colleagues to give guest lectures on their areas of expertise (and volunteer to do the same for them—it will give you a chance to practice speaking about your research to a nonexpert audience).
- Build a teaching library of videos, class activities, and presentations that you can draw on when you become unexpectedly overwhelmed by other demands.

Your research program can also enrich your classes. Stephen Bostock of Keele University (http://www.keele.ac.uk/depts/cs/Stephen_Bostock/docs/Strengthening%20teaching-research%20links%20at%20Keele.htm) has identified four effective ways for instructors to bring the process as well as the products of research into the classroom:

- Use current research perspectives, paradigms, and debates in the classroom to show that knowledge is contested and growing, rather than accepted fact.
- Include recent research results as part of curriculum content.
- Introduce both generic and subject-specific research skills and scholarly activities into course assignments, including literature review, experiment design, peer review, book review, conference paper presentation, and grant application.
- Invite students into your research community in small ways, by requiring them to join scholarly email lists or discussion boards, use online conference proceedings as resources for class assignments, or attend departmental talks.

In addition, you can view your classroom as a pool of potential research assistants and honor students (who often contribute greatly to a research program). Undergraduate RAs bring enthusiasm, time, and a fresh perspective to your work. There are some drawbacks, such as the training and start-up time, but the rewards are great. Many RAs who are inspired by a specific course will stay with a faculty member or graduate student for much of their time at Stanford. Consider coordinating a course on current faculty research in your department, with faculty rotating as speakers. This may count toward your teaching requirements while helping to match interested students and faculty.

Finally, there is always the possibility that questions that come up in class will inspire new directions for your research. For example, Professor Philip Zimbardo's Stanford Prison Experiment, which may be the most well-known research study in Stanford's history, was

inspired by an exercise in his psychology class. Other Stanford professors report similar classroom inspirations. Psychology professor Ewart Thomas says this phenomenon is particularly likely to occur in those classes where “we are operating at the borders of what is known and what is not known.”

The Ultimate Goal: Active Learning

If you needed to learn how to do something, would you rather listen to someone describe the process or be invited to join in a demonstration of the process? If you had to form an opinion about something, would you rather listen to someone explain his reasoning or be invited to analyze his reasoning along with him? If you knew you had to remember a large amount of new information, would you rather rush through the material without the opportunity to reflect on it or be given time to review, connect, and apply the information as you went along?

Whether you're facing a lecture hall filled with 300 students or a seminar table with 15 students, one of your primary goals for the class should be to actively engage students with the material. The research is clear: Students learn more when they are asked to *actively participate* in the process of learning, whether it's through discussion, practice, review, or application (Grunert, 1997). This is in stark contrast to the idea of the student as a passive recipient of knowledge, absorbing information presented by the instructor. For this reason, active learning is an important theme in this handbook. Active learning strategies should be incorporated into every component of your course

ACTIVE-LEARNING RESOURCES

Active learning is an excellent way to meet all three kinds of learning goals (informational, idea-based, and skills-based). Active learning activities and assignments allow you to integrate your learning goals so that students understand the meaning and application of what they are learning. CTL can provide you with more information about how to design active learning activities, assignments, and exams. Visit the CTL website (<http://ctl.stanford.edu>) for an extensive selection of handouts and online articles on active learning, as well as information about upcoming workshops on how to integrate active learning into your course.

design. These range from short partner discussions during lecture to problem- or case-based research projects to small-group critical analysis exercises during seminars.

Because it can take time and creativity to develop active-learning exercises, we provide many examples in every section of the handbook, particularly in the section titled “Teaching Strategies.” Some of these strategies are appropriate for any subject matter, whereas others provide field-specific examples of innovative approaches. Here, we review the rationale for an active-learning approach, as well as some sample strategies to get you started.

Active learning promotes independent, critical, and creative thinking. Students must engage with material in order to practice and develop thinking skills. You can facilitate this by asking students to analyze, synthesize, or apply material, both in the classroom and in class assignments.

- For instance, in case-based problem-solving exercises, students must analyze the information they are given, generate or compare possible conclusions and solutions, and decide on a final strategy or interpretation. You can use case studies in a lecture and have students work out their solutions independently or in small groups. You can also use case studies as the basis for major projects or exams.
- Another active learning technique that develops thinking skills is debate: you can present competing viewpoints in lecture and assign students to defend one of the viewpoints in a short (five-minute) written exercise or classroom debate. To further develop students’ thinking skills, you might ask students to defend and critique a single view, to “switch” views after they have defended one, or to find a broader perspective that can accommodate key ideas from both views.

Active learning promotes collaboration. Collaborative group work can be an extremely useful addition to a large class.

- For example, small-group discussions help students understand and retain material while also serving the broader goals of developing their communication skills and increasing their awareness of their classmates as learning resources.
- Another active learning strategy is peer instruction exercises. For instance, you can pose a question during lecture and give students one minute to think about and write down their answers. Then have students turn to a classmate sitting next to them and try to convince

their neighbor of the solution. Give them a moment to write down their revised answers. Tally their answers by having the students raise their hands in response to different options. When the tally is in, use the results as a teaching opportunity; explain the correct answer and demonstrate why the other options are misleading (Mazur, 1997). Research from cognitive psychology has shown that one of the best ways to improve understanding is to teach material to a peer; you can build this into your classes through presentations, study groups, and quick, breakout “teaching” sessions, such as the one described above.

Active learning increases student investment, motivation, and performance. When you invite students to actively participate in the learning environment, they take more responsibility for their performance in the course. When they have an opportunity to make decisions about what they learn and how they use that knowledge, students see a course as more valuable and more directly related to their goals.

- For example, you might allow students to choose the topic of a short discussion or ask students to generate ideas about how a concept could be applied to a problem that interests them. Involving students in classroom activities also requires them to assess their understanding and skill; rather than allowing them to rest comfortably with a surface knowledge, it forces them to develop a deeper understanding.

CTL has an extensive collection of books, articles, and handouts on active learning strategies for your use, including a number of online handouts and articles (<http://ctl.stanford.edu>). CTL also offers workshops throughout the year on how to use active learning effectively in different class settings. We encourage you to set active learning as your ultimate teaching goal *and* strategy; it can transform the learning environment into an exciting, dynamic place that both you and the students look forward to.

CHARACTERISTICS OF EFFECTIVE TEACHERS

The following characteristics appear again and again in studies of effective teachers. We have classified these qualities according to a scheme worked out by M. Hildebrand in a 1971 study in which opinions on effective teaching from both faculty and students were analyzed (M. Hildebrand, R.C. Wilson, and E.R. Dienst, *Evaluating University Teaching*. UC–Berkeley, Center for Research and Development in Higher Education, 1971).

Organization and Clarity

- explains clearly
- is well prepared
- makes difficult topics easy to understand
- uses examples, details, analogies, metaphors, and variety in modes of explanation to make material not only understandable but memorable
- makes the objectives of the course and each class clear
- establishes a context for material

Analytic/Synthetic Approach

- has a thorough command of the field
- contrasts the implications of various theories
- gives the student a sense of the field, its past, present, and future directions, the origins of ideas and concepts
- presents facts and concepts from related fields
- discusses viewpoints other than his/her own

Dynamism and Enthusiasm

- is an energetic, dynamic person
- seems to enjoy teaching
- conveys a love of the field
- has an aura of self-confidence

Instructor-Group Interaction

- can stimulate, direct, and pace interaction with the class
- encourages independent thought and accepts criticism
- uses wit and humor effectively
- is a good public speaker
- knows whether or not the class is following the material and is sensitive to students' motivation
- is concerned about the quality of his/her teaching

Instructor-Individual Student Interaction

- is perceived as fair, especially in his/her methods of evaluation
- is seen by students as approachable and a valuable source of advice even on matters not directly related to the course

Teaching at Stanford

Course Preparation

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Course Design

Whether designing a new course or preparing to adopt a standardized curriculum, you will find it helpful to begin your course preparation by clearly defining what you expect your students to have learned by the end of your course or section. You can then put together course materials, or select new ways of presenting course materials, that serve the learning outcomes you have chosen.

Consider the topic and level of your course, and ask yourself:

- What is the most important information students should learn and remember from this course (facts and other kinds of core knowledge)?
- What are the most important ideas that students should understand after taking this course (theories, approaches, perspectives, and other broad themes in your field)?
- What are the most important skills that students should develop in this course (laboratory skills, problem-solving skills, creative skills, writing skills, etc.)?

(Some faculty also ask what attitudes they want students to develop as a result of their course, such as love of the field; a critical, questioning stance toward texts; or an appreciation of cultural differences.)

Be as specific as possible. For example, an instructor of modern Chinese history might identify the timeline of key historical events and periods as important

information, competing theories about the causes of the Chinese Revolution as important ideas, and the ability to compare modern Chinese history to other significant historical trends as an important skill. An instructor of product design might identify fundamentals of descriptive geometry as important information, the relationship between form and function as an important idea, and the use of a design software program as an important skill. Different courses may emphasize one type of learning outcome more than others; you may have an enormous amount of facts to cover in an introductory course or you may find yourself teaching a highly skills-specific course for advanced students. However, most courses will have a combination of all three kinds of outcomes.

If you get lost in a sea of possible learning outcomes and find yourself overwhelmed, consider dividing the outcomes into those that are essential (students must reach these goals in order to continue successfully in their program) and those that are desirable. To decide



The more you make Stanford students accountable for complex tasks, the more they rise to the occasion. The majority of our students enjoy the course more and value it much more highly if they feel that their intellects have really been challenged, that they've been stretched and have performed at a level they themselves didn't know they were capable of.

Anne Fernald, Josephine Knotts Knowles Professor of Human Biology

which outcomes are essential, you can talk to upper-division students and to faculty members whose courses follow yours in a major. If the curriculum is already established, use previous syllabi or talk to previous instructors to find out what has historically been considered essential in the course.

Desirable outcomes, on the other hand, reflect your idealistic side: What are your dream learning outcomes for a student taking this course? Do you care more about breadth of knowledge, imagining your students fielding a broad variety of questions on your field (as an instructor of an introductory course might)? Or do you care more about depth of knowledge, imagining your students deep in the trenches of a specific research problem or creative project (as an instructor of a seminar might)? What kinds of intellectual and practical challenges would your students ideally be able to face head-on and conquer? For a professor of any science, a desirable learning outcome might be the ability to design, run, and analyze an innovative study; for a professor of business, it might be the ability to put together a business plan that a potential investor would get excited about.

You will, of course, need to take into account such practical considerations as what you can realistically fit into a quarter, what your department expects from your course, whether or not it is part of a sequence, how prepared and committed your students are, what resources are available for the classroom and students, and your own strengths and experience as a teacher. For these reasons, it may take several rounds of teaching and revising a course before you feel confident about your ability to achieve all of your desirable goals. Give yourself room to grow. Emphasize the essential learning outcomes first, with an eye to facilitating desired learning whenever possible.

Translating Goals into Course Content

Once you have identified the most important learning outcomes for your course, you are ready to assemble the means that will best support your goals. In doing so, you will want to focus on three questions:

- What materials (textbooks, articles, lecture content) do students need access to in order to achieve your learning outcomes? Choose your reading and resource list based on the quality of the information, ideas, and training provided, and use classroom time to fill in the gaps between your goals and the content of those readings/resources.
- What assignments (papers, problem sets, projects) and experiences (discussions, labs, field trips, collaborative

activities) will give students the opportunity to reinforce the information and ideas of the course, as well as practice key skills?

- What should students be able to do to demonstrate that they have met these key learning goals? The answer(s) to this question will be the basis for your grading structure, as well as the format and content of graded exams, homework, and projects. For example, if one of your essential learning outcomes is improved analytical thinking, make sure that your exams and assignments require it.

The next step is to select the specific readings, lecture and discussion content, class activities, practice assignments, and graded assignments that will make up your course. You can weed through the course materials already prepared by previous instructors of similar courses, with an eye for those materials that best meet your goals. If you are lucky (and brave!) enough to be embarking on a new course, you have the freedom and challenge of building your course materials from scratch. The next section provides some practical advice on meeting this particular challenge.

Course Outline

The next step is to develop your course outline. Your previous work, defining your teaching goals and the most important learning outcomes for your course, will serve as a guide as you make specific decisions about course materials and content.

Choose the Readings A major decision will be whether or not to adopt a general text. If you are like most teachers, it is unlikely that any one book will meet all your needs. However, most students prefer some textbook that integrates the course for them, as long as it is reasonably well-written. One solution is to make the students responsible for mastering the text, and then use your lectures to present alternative points of view or to fill in the textbook's gaps. Since students are often confused by contradiction between textbook and lecture, be sure to explain to them what you will be doing, why it is useful, and how they can best integrate lecture and textbook when studying. If you don't choose a general textbook, it's even more important to consider how your readings relate to each other and your lectures. Again, make sure your students understand how to integrate multiple readings and lecture content. From the student's perspective, it is also considerate to minimize the expense of using several books or the inconvenience of placing a large amount of material on reserve. Such seemingly triv-

ial factors can influence whether or not a student takes your course.

Beyond the required books, readings can include articles that further illustrate applications or offer alternative points of view. Your own handouts are another valuable resource. They can be especially helpful to supplement or summarize your lectures, as long as you keep the number of pages to a minimum. Students will also make use of recommended readings if you provide structure for that use. When you give a list of additional readings, indicate which books students can consult for help in doing projects or solving problems, which works you suggest they refer to when writing a paper, and which resources can benefit students who lack certain

One of the difficulties of conceptualizing a course is avoiding the tyranny of coverage: forcing students to know everything I know in some modified form. The good news is that you know a lot about the subject; the bad news is that it's more difficult because you are likely to overwhelm students. Your need to impart everything you know may not match what they need to know.

**Russ Fernald, Benjamin Scott
Crocker Professor of Human
Biology**

background knowledge or who wish to pursue a favorite subject further.

Create an Order for Your Course Topics

You probably have a good sense of the major topics that you need to cover. However, to be thorough, you can check the major textbooks in your field, the concerns of the leading journals, and the syllabi of your colleagues teaching similar courses or courses that

precede or follow yours in a sequence. How to best order these topics? A system may immediately suggest itself—such as proceeding chronologically or using the order of the textbook you adopt. You may also consider a meaningful order of course topics that builds from the abstract to the specific, or that alternates between theory and application, or that groups course topics by the kinds of approaches, skills, or methods they require.

Whatever order you choose, be sure that student learning builds on itself. For example, you would not expect students to synthesize alternative viewpoints until they were first able to compare viewpoints and you would not expect them to compare viewpoints until they had first learned how to analyze an argument. Nor would you expect students to design experiments that test complex hypotheses before they had first developed basic inquiry skills on more simple problems. For this reason, the order of your topics should complement and support the development of the key ideas and skills that students are working to master.

Design Class Activities How exactly do you want to spend class time? Will you lecture throughout, or devote considerable time to other activities? Although lecturing might seem to be the natural mode, it can encourage passivity in students. You may want to build in other activities that require interaction with the class. Does it make sense to include short discussion periods in every class, or to schedule occasional days of discussion only? Are there guest lecturers or field experiences that could provide special insight into a topic? Will role-playing help students understand certain topics? Is there a film that does a particularly good job of covering a topic? (Note that film use is popular with students only when the film is excellent and is not perceived as merely a time-saving tool for a busy instructor.) Also consider delegating a certain amount of content coverage to peer instruction, in which students—through careful group research and presentations—teach their classmates. Studies have shown that students achieve the highest level of information retention and comprehension when they have taught the material themselves. Explain to students the value of such active engagement with the course content; you may also want to devote some class time and office hours to guiding students in their explorations and preparing them for peer instruction, so that they do not perceive peer instruction as an avoidance of your own teaching duties.

Plan the Course Calendar Finally, of course, you will want to study the academic calendar and actually decide on a week-by-week sequencing of topics, readings, assignments, and exams. Check carefully for school holidays or other events (like “Big Game”) that might affect student attendance or ability to complete assignments. Consider leaving some flexibility in your outline for student feedback (e.g., on course topics, reading load, and coursework difficulty), as well as unforeseen complications (e.g., having to reschedule an exam if the majority of your students have another exam that day).

Get Feedback Once you have your course outline, check it over carefully. Even better, have a colleague look it over and react. Is it meaty—is there enough material to challenge the students intellectually and sustain their interest? Is it flexible—if students make suggestions, do you have room to incorporate them? Is it coherent—is there a recognizable connection between the lectures, readings, and assignments? Do the major themes of the course stand out? Is there a sense of intellectual movement—will students emerge with not only more information, but also new skills and capabilities?

Syllabus

Once your course outline is finished, you can prepare a version of it for your students. Your syllabus is both an invitation to students interested in your course and a contract between you and the student. For these reasons, your syllabus should contain, at a minimum:

- a course description, including your objectives for the course;
- course prerequisites;
- a list of assignments and due dates;
- a description of exams (exam format and topics covered) and their dates;
- statements on your grading, attendance, and other policies, including the University Honor Code (see page 74) and information about the Student Disability Resource Center (see page 51–52);
- office hours and location, your telephone number and/or your email address, and the address for the course website, if you have developed one. Similar information should be provided for any TAs assisting in the course. The more you make the TAs full members of your teaching team, the more likely they will make significant contributions to the class, the students, and you.

In addition, you can attract or retain interested students by listing more specific details of the course, including the titles or topics of each lecture. Consider framing each lecture in terms of questions that the lecture will answer, for example: “What does it take to win a Nobel Prize these days?” (a lecture on the modern history of science) or “Why does tap water taste different at Stanford than in the Bronx?” (a lecture on water quality). Also consider leaving one or two days untitled, to invite students to choose a supplemental lecture topic or to allow for catch-up if necessary. Some instructors go further and include short summaries of the major themes or debates for each unit in the course.

If you are interested in going beyond the minimum requirements for your syllabus, consider the “learning-centered” model for syllabus design. A learning-centered syllabus not only outlines the instructor’s goals and objectives for the course, but also guides students to take responsibility for their own learning (Grunert, 1997). For example, a learning-centered syllabus invites students to:

- Identify their own goals for the course: What are they hoping to learn? How does this course fit into their academic plan of study, their professional goals, or their personal goals?

- Contribute to decisions about course content and activities. You might do this by offering a choice of reading materials for some topics, a vote on supplemental lecture topics, or options for final project topics.
- Take responsibility for their own learning. You can facilitate this by providing students with information about university resources (e.g., tutoring services) as well as general study tips, a list of supplemental resources for the course, and suggestions for excelling in your particular course.

In these ways, the learning-centered syllabus becomes a guide for students, rather than just a summary of course details.

Consider Your Audience

Who are your students? What are their motivations for taking your course? What background knowledge and skills can you expect them to have? The success of your course will be determined not only by how well it meets your department’s goals, or even your personal teaching goals, but by how well you manage to match your course content to the goals and backgrounds of your students. Many things influence who shows up in your classroom the first day and how they feel about being there. Some simple factors include the timing of the course (early morning versus late afternoon, fall versus spring), the subject matter and level of the course, and whether it is required or elective. To get a general sense of your likely audience, talk to students majoring in your field and instructors who have recently taught a course like yours. Also, try remembering yourself at your students’ stage in life: what your priorities were, what interests and life constraints conflicted with your academic priorities, and what you needed from an instructor. (Remember, though, that since you chose an academic career, you were not a “typical” undergraduate. Don’t rely too much on your own undergraduate experiences when judging the needs of today’s students.) By considering many factors, you can begin to imagine the needs and possible attitudes of your students.

Of these factors, the most fundamental consideration is the academic stage of your students. Are you ushering students into a field or putting the finishing touches on their professional training? Can you trust that the students in your class have at least a basic interest in the course material, or are you still trying to convince a group of ambivalent but curious students of the merits of your field? Most obviously, graduate and undergradu-

ate students differ in motivation, background, and habits. Graduate students are animated by their career goals. As a group, they (usually) share a background of prerequisites for the field and are familiar with its vocabulary. They are used to working independently and contributing to the course. Advanced majors in your field may resemble graduate students in these attributes.

A roomful of undergraduates, on the other hand, provides some interesting challenges. Some students are investigating various careers; your course may influence whether someone decides to become a chemist, a linguist, or an anthropologist. In introductory and lecture courses, it is especially important to communicate the excitement of your subject and its relevance to students' goals and the world at large. This is particularly true if students tend to view your course mainly as a stepping stone to other courses (for example, as a pre-med student might view a chemistry course). In this case, put particular effort into interesting examples and applications, and create an environment where students feel both empowered and responsible for their learning.

Students' backgrounds may vary widely in early-stage courses; if this is true for you, you will need to teach the language of your field, its methods, and approaches



I think that there are two goals in teaching an introductory science course. One is to provide the grammar. That is, there is a certain amount of intellectual background and there are certain skills that people need to develop in order to move on in the subject and to learn more complicated material. The second point is to provide some sense of the big picture of the beauty and the majesty of the intellectual discipline, to provide some sense of the big picture of what it's all about.

Robert Waymouth, Robert Eckles Swain Professor in Chemistry

as you go along. It may become important to become acquainted with tutoring resources at Stanford that can help individual students fill in any gaps in background knowledge and training (see “Teaching Support” later in this section for specific suggestions). With a group of students that varies widely in motivation and background, you may also want to collect work or schedule tests more frequently, to gauge the progress of their learning.

These predictions and generalizations may not apply to the unique set of students who walk into your classroom each quarter. Students can always surprise you! Many professors distribute a questionnaire during the first class of the quarter to find out more about their students' backgrounds and interests. It is important, in any case, to continue assessing your audience's needs throughout the term—you will be rewarded for your efforts with increased student motivation, interest, and performance.

Administrative Details

Administrative details must be tended to several months before a class at Stanford begins. Some of these details are handled by department staff, some by professors or instructors in charge of a course, and some by teaching assistants. Fortunately, the department staff generally keeps you informed of the deadlines, as long as they know your teaching plans. Here is a summary of details to be aware of:

Book Orders and Course Readers

Bookstore forms are available through your department staff. Completed forms are due well in advance of the quarter in which you plan to teach—generally the middle of the previous quarter, but the first week in May for the following autumn. Try to submit course readers early; your students will receive a substantial discount, and it will allow the bookstore plenty of time to obtain permissions. Check that the books and readers have arrived before the first class meeting, so that you can make alternative arrangements or assignments if necessary.

The Time Schedule and Stanford Bulletin

Plan your teaching schedule well in advance, keeping in mind what other commitments you will have during each quarter. Listings for the *Stanford Bulletin* have a late spring deadline for classes that will be taught the next academic year. Information for the *Time Schedule* is due to your department administrator about a quarter and a

half before the quarter during which you will be teaching. This is also the time to make decisions regarding days and times to offer your class, as well as the type of classroom you'll need and grading options you'll offer students. For more information, check with your department staff, the *Bulletin* website (<http://bulletin.stanford.edu/>), or the Registrar's Office website (<http://registrar.stanford.edu/>).

Classrooms

Room assignments—which are done through a university-wide system, not by your specific department—are generally made when the *Time Schedule* is drawn up. However, you can have a great deal of control over the kind of room you get by letting your departmental administrator know what classroom features you need. Consider whether you will need extra blackboard space, a SmartPanel for multimedia presentations, or room for in-class demonstrations. Over the last few years, the Registrar's Office has greatly upgraded its method of assigning rooms and will try to accommodate faculty and TA preferences as much as possible. Visit your assigned room as soon as possible, both to see if it meets your needs and to get a sense of where you'll be teaching. Consider whether the layout of the room is compatible with your needs; for example, whether furniture can be arranged to facilitate discussion, or whether there is sufficient laboratory work space so that students do not have to use pieces of equipment as bookshelves or storage during experiments. If you will need a different room, ask your departmental administrator to contact Room Scheduling, which is in Room 132 of the Old Union and can be reached at reg-courses@stanford.edu or 725-1892. After the quarter starts, room changes will be much more difficult.

Reserve Material

Books, photocopies, audiovisual materials, lecture notes, and old exams can be put on reserve at Green Library and at some of the branch libraries for loan periods varying from two hours to three days. Green will place one copy on reserve per 25 students in your class. To put materials on reserve for a class, fill out the required form, with full citations for the requested materials, and provide your contact information. It is also possible to submit your reserve list electronically; check the information on the Green Library website at http://www-sul.stanford.edu/services/course_reserves/index.html. These forms should be submitted at least six weeks before the

beginning of the quarter, especially if recently published books need to be ordered. Other materials may be put on reserve at much shorter notice. Branch libraries' reserve procedures may vary. Please check directly with the staff of the branch library involved.

Submitting Grades

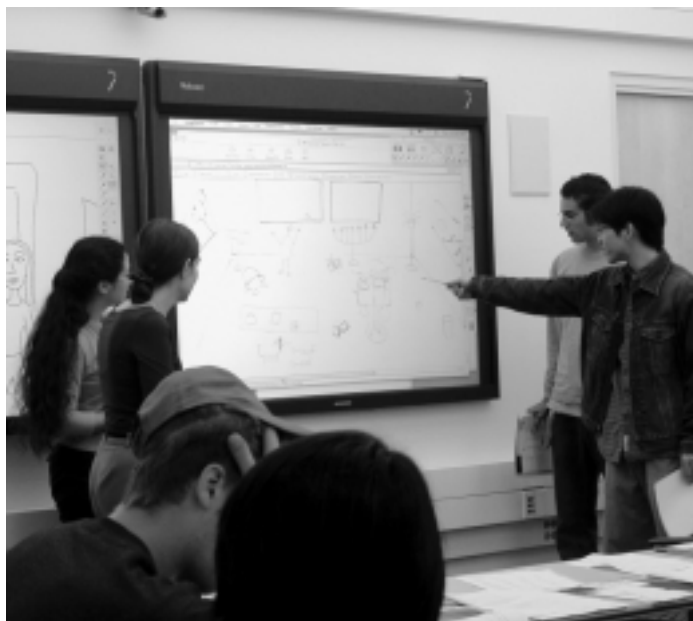
Grades must be entered online by the course professor, using the Axxess system (an online registration and general class information resource for students), though the professor can assign his or her grading proxy to other members of the teaching team. Faculty can also use the Axxess website (<http://axess.stanford.edu>) to view class rosters, get information about advisees, and search the *Time Schedule*. Grades are usually due at 11:59 p.m. on the Tuesday after finals week, except in spring quarter, when the grades for graduating seniors are due at noon on the Thursday immediately following the last day of finals. A brochure containing instructions for connecting to and using the Axxess website is sent to all faculty members via ID mail. The text of the brochure is also available on the Registrar's Office website (<http://registrar.stanford.edu/>). Your department administrator is a good source of help before you get started.

Equipment

You will also need to plan ahead if you use any audiovisual or computer equipment in your teaching. Although all classrooms are supposed to have overhead projectors, few other amenities are universal. Nor does Stanford have a central office for making equipment arrangements. The best way to secure what you need for your class is to let your department administrator know a quarter in advance exactly what kind of classroom and features you will require; when the administrator submits other kinds of course information to the Registrar's Office, he or she will then specify what kind of equipment you need. The Registrar's Office will do its best to assign an appropriate room. The university has a number of technologically enhanced rooms that can handle laptop presentations, CDs, DVDs, VHS, and other peripheral devices. To see a listing of these, check the Registrar's website at <http://www.stanford.edu/dept/registrar/RSO/techlist.html>. If you will only need the equipment on a one-time or infrequent basis, check first to see if your department can fulfill your needs. If not, the Registrar's Office will pay the cost of rented equipment up to two times per quarter for a class (but not for sections); your order must be received one week in advance. See your

departmental administrator for details.

If you teach laboratory courses or need to do demonstrations in class, equipment is even more of an issue. If your course will require the purchase of new equipment, plan well ahead to locate funds. You will also need to check out the existing equipment in advance to make sure everything is in working order. Even if everything seems in order when the quarter begins, you or your TAs should run through the planned experiment or demonstration at least a week in advance to take care of any last-minute problems. While this advice may seem obvious, experience tells us that pre-testing equipment and dry-running “obviously straightforward” labs are among the first things to be dropped as instructors become busy. Consider this detail an important commitment to your students’ learning, rather than a hassle. Prepare adequate documentation on how to use the equipment for students and TAs. Finally, you will also have to anticipate such related concerns as safety procedures, training for the students, and access arrangements. Much of this will depend on the circumstances in your own department, but the following checklist may be helpful.



Using new technologies for the first time can be challenging. CTL provides assistance on how to use and integrate technology effectively into your course.

EQUIPMENT CHECKLIST

Appropriateness

- Is the equipment appropriate to the goals you have set for the course?

Considerations when using existing equipment

- Is there enough for the number of students and type of experiments in your class?
- Is there sufficient workspace around the equipment?
- Is it working well?
- Is it recent enough for your course’s purposes?
- Will other classes be using it?

Considerations when using new equipment

- Will the new equipment enhance students’ understanding or practice enough to justify the expense?
- Are there grants or other sources of funds to cover its purchase?
- Can it be set up and in reliable working order in time for the course?
- Is all the necessary secondary equipment also on hand?

Training/accessibility arrangements

- Will students already be familiar with the equipment or will extensive training be required?
- If training is necessary, will students have sufficient access to the equipment to practice on it as well as to do their experiments?
- Is documentation adequate?
- Will consultants, TAs, or you be on hand to guide students during training?
- Is equipment or accessibility sufficient so that each student will have enough hands-on time?

Maintenance

- Are supplies on hand for “quick fixes”; e.g., fuses, extra probes?
- Are arrangements clear for the reporting and repair of broken equipment?
- Are students adequately informed of safety and clean-up procedures?
- If equipment breaks down at crucial times, are there other resources for students?
- Are adequate files being kept on equipment specifications, vendors, repair arrangements, etc.?

Teaching Support

It's easy to see the planning of a course as an independent endeavor. However, there are many resources available to support your teaching at Stanford, including teaching assistants, administrative support, and tutoring services. Plan from the beginning to integrate these resources into all stages of your course preparation and teaching.

Working with Teaching Assistants

TAs are often an underutilized resource when it comes to course planning. Even experienced faculty frequently won't start meeting with their TAs until after the course has begun. Instead, consider meeting with them a few weeks before the quarter starts (if your department makes TA assignments early enough to make this possible). Make explicit your goals for the course and what you will expect from them. Ask each TA to think about how he or she can most effectively contribute to the course. You may discover that your TAs have excellent ideas for supplementary materials, suggestions for assignment instructions and grading guidelines, and insights on how to explain difficult material.

You will also be giving your TAs an opportunity to learn more about the art of teaching, one of the benefits they deserve from the many hours they will be putting into your course. Ask your TAs if there are specific teaching skills (e.g., giving a guest lecture or designing a new class activity) they would like the opportunity to practice, in addition to the more administrative TA duties. Encouraging TAs to take initiative also requires that you provide them with essential support. In many cases, after all, they will be young, inexperienced, and perhaps not even particularly well versed in the specific area they've been assigned to teach. They may have only the vaguest idea of what it takes to prepare a review, the introduction to a lab, or a lecture. If your department does not provide TAs with an orientation, you can hold your own mini-orientation. The Center for Teaching and Learning (723-1326) is available to help you; you can also ask the more experienced TAs in your department to provide advice. If the TAs' responsibilities include experiment set-up, managing the course website and email lists, or setting up for lecture, provide them with adequate instruction in these duties. New TAs may also be unaware of the department's curriculum, its grading policies, or its administrative procedures; provide them with whatever information is most relevant to your course.

TAs typically have a number of other academic commitments, including a full course load and substantial research projects, and they may or may not be getting paid for their TA work. For this reason, try to make their TA experience as rewarding as possible, and distribute teaching and grading responsibilities fairly among your TAs. Check with your colleagues and ask TAs what the norms are in your department before you design assignments that demand extra TA time: a course with short weekly papers will require much more work from a TA than one that has only a midterm and a final.

Meet with your TAs on a weekly basis to talk about how things are going and to discuss any problems or questions. Make arrangements to visit their classes, and offer gentle but honest feedback afterward. The notes from these visits may be handy later if your TAs ask for letters of recommendation on their teaching. Let your TAs know of the services, such as videotaping or classroom observation, that are available to them from the Center for Teaching and Learning. To keep it a reciprocal relationship, ask the TAs for their comments on how you're doing in the classroom. TAs may also have a good sense of student satisfaction and concerns because of their frequent interaction with them. For these reasons, TAs can be an outstanding teaching resource beyond their obvious support duties.

Department Staff

Get to know your department's staff. They can be an invaluable aid—not only with book orders, equipment requests, and scheduling problems, but as a source of information and assistance on all sorts of daily academic hassles. At the same time, remember that the staff members' experience and expertise deserve your respect. Staff often choose to work at Stanford precisely because they enjoy faculty and student contact. You will make your own and their work more satisfying if you appreciate the importance of their assistance not just to your specific needs, but also to the higher purposes of academics. As one administrative assistant said, "Something more important than money, awards, etc., is for the person who is dishing out the work to say, 'Thank you—great job!' The people who take just a minute, even though they have a busy schedule, to say thanks, I will work all the harder for them next time and squeeze their requests in even if I am swamped myself."

Academic Services

Stanford offers a wide range of academic services for students. Make sure your students are aware of them; they can provide tremendous support to students who require help above and beyond what you or your teaching assistants can provide. Connecting students to these services can save you time and increase your teaching satisfaction by maximizing the number of students who are successful in your course.

Learning Skills Assessment and Coaching

(<http://ctl.stanford.edu/LearningSkills/index.html>)

CTL provides academic skills coaching for students who are experiencing academic difficulties. Each student's difficulties are individually assessed. If the problem stems from learning skills deficits, the learning skills specialist helps the student develop the skills to address these problems, including strategies for time management, reading, note taking, test preparation, and test taking. If the assessment points to a learning disability, initial screenings are provided, and, if warranted, referrals are made to the Office of Accessible Education. If an emotional or psychological problem seems to be at the core of the academic difficulty, referrals are made to CAPS. Contact: Adina Glickman, adinag@stanford.edu, 723-8676.

Student Peer Support

Calling on your students to take responsibility for their own and others' learning can substantially improve student performance and support your teaching goals.

Peer Study Groups

You can recommend or require that your students form study groups. Group study has numerous advantages. It increases the amount of attention each individual student receives and peers often best understand each other's problems with the material. Group discussion also increases the number of perspectives on the material that each student experiences. Moreover, work in small groups is active, rather than passive, learning. Teaching someone else is one of the best ways to test and reinforce one's own learning. Moreover, group learning, because of its sociable context, tends to be self-reinforcing. Many professors advise students to discuss assignments or papers together before they write them up individually. Students can also prepare and share written summaries, dividing the topics among the people in one group or among the different groups. Each group might also give a presentation to the full class on a certain topic.

TUTORING RESOURCES

CTL Peer Tutoring Program

(<http://ctl.stanford.edu/Tutoring/index.html>)

The CTL provides peer tutors in Chemistry, Physics, Math, Biology, Economics, and some foreign languages. Contact: Adina Glickman, adinag@stanford.edu, 723-8676.

- **Residential Tutoring** Residential tutors hold a minimum of six office hours a week in their dorms, and most are available outside of office hours.
- **Drop-in Tutoring** Peer tutors are available during office hours, usually between 6 p.m. and midnight Tuesday through Sunday, at various locations around campus.

Athletic Department Tutors

The Athletic Academic Resource Center (AARC) (http://www.stanford.edu/dept/undergrad/advising_athletes.htm) hires and supervises graduate and postgraduate students to tutor athletes. Contact: Vaughn Bryant, vbyrant@stanford.edu, 723-5806.

The Stanford University Math Organization

(<http://math.stanford.edu/tutors.htm>) SUMO hires undergraduate and graduate students who offer tutoring to undergraduate math students.

Tau Beta Pi (Engineering)

(<http://www.stanford.edu/group/tbp/tutoring.html>) Tau Beta Pi organizes volunteer peer tutors who offer tutoring to undergraduates taking engineering courses.

The Writing Center Writing Tutors

(<http://swc.stanford.edu/writingTutor.htm>)

Writing tutors who are trained and supervised by the Writing Center can assist students in general writing skills or specific writing assignments. Some are also residential writing tutors, providing assistance in students' dorms.

Oral Communication Tutors

(<http://ctl.stanford.edu/Oralcomm/tutoring.html>)

Oral Communication tutors are trained and supervised by CTL. Contact: Doree Allen at 725-4149, or Tom Freeland at 736-2337.

Peer Tutoring

Another effective method of helping students, especially in large classes, is appointing student tutors from the class. The late Professor William Reynolds of mechanical engineering used to give a test on background material at the end of the first lecture and use the results to select several tutors. He would then assign the tutors to spend two hours each week advising fellow students on how to solve homework problems and checking their results. In addition, Reynolds gave the student tutors a few special lectures to broaden their knowledge of the material. The tutors were excused from turning in their homework, but they took exams and were graded according to the same standards as the rest of the class. Reynolds's approach proved successful because it both saved the teacher time and gave the students a substantial amount of attention. If you don't want to make tutoring arrangements within your class, there are a host of existing tutoring resources that you can recommend to your students. CTL, as noted, coordinates several tutoring programs; call CTL for information at 723-8676 or check our website at <http://ctl.stanford.edu/Tutoring/index.html>.



In addition to the extensive tutoring services available on campus, finding student tutors in your own class may be a great way of helping students in need.

Preparing for the First Class

A common fear, especially for new teachers, is that the first class will be a disaster. If you've never taught before, perhaps you worry that you will forget your lecture, your demonstrations will fail, you will be unable to answer your students' questions, or you will have to wake students up at the end of class. Even experienced teach-

ers feel a mixture of excitement and anxiety about the first class of the quarter; no two classes are the same, and each first day presents its own surprises and challenges. Whether you are teaching for the very first time or are a seasoned veteran of the classroom, prepare carefully for the initial class. With sufficient preparation, the first class will take on the quality of an adventure you've been looking forward to. Your preparation and attitude is contagious: students will pick up on your excitement, be more likely to commit to your class, and invest greater energy in the class. As one student said, "When you know that the professor cares about the class, then you're going to go out and [prepare] that much better than you ever would have before." In this section, we discuss strategies for both the new and experienced teacher.

Your First Teaching Experience

There are many things you can do before the first class of the quarter to prepare for your first teaching experience. If possible, observe at least one class like the one you will be teaching. Talk with the instructor about problems or successes he or she has had with the course. Ask experienced faculty or graduate students in your department for information and tips. Visit your classroom in advance and familiarize yourself with the lighting, equipment, and layout; it's amazing how fast one's technology IQ can drop when trying to figure out new equipment in front of a room of students.

To prepare for your first class, choose a strong opening. There are several conventional ways to open a course. First, you can explain what you hope to accomplish in the course and why you find the subject matter important. You might begin by simply raising some of the more fascinating questions or problems that your field addresses to spark students' curiosity. You can then describe in more detail how your course might help students address those questions or solve those problems. Go over the topics of the course and let students know how your course connects with others in the discipline. You will probably also hand out your syllabus and go over it with the class. In discussing the syllabus and course organization, you should explain how the lectures and sections or labs—if the latter are part of the course—fit together. Bring more syllabi (and any other handouts) than you think you'll need; many more students may "shop" your class than will be enrolled in it on Axess. Be ready to answer questions on grading and exams and to recommend alternatives if the students tell you the readings aren't available yet.

You can also tell your students something about yourself that first day. If the class is small, you can have class members introduce themselves. If the class will require a lot of student interaction in discussions or projects, you might divide the students into pairs and give each pair five minutes to interview each other (be sure to indicate when the time is half over). The pairs then introduce each other to the rest of the group. This method has the advantage of not putting people on the spot to talk about themselves and yet making sure everyone already knows at least one other member of the group. Also consider giving your students a minute to swap email addresses or phone numbers with at least one other person in the class—this provides a safety net for the student who misses a class or needs help with an assignment; it also minimizes the number of trivial questions you'll receive about course details.

Learn your students' names as soon as possible, even in a large class; students will invest more in a class when the professor knows them. If the class is small enough, considering taking digital photos to review later. Former Dean of Engineering James Gibbons took Polaroid photographs at the end of his first class and had

The teacher, as has been recognized at least since Plato's Meno, is not primarily someone who knows instructing someone who does not know. He is rather someone who attempts to re-create the subject in the student's mind, and his strategy in doing this is first of all to get the student to recognize what he already potentially knows, which includes breaking up the powers of repression in his mind that keep him from knowing what he knows. That is why it is the teacher, rather than the student, who asks most of the questions.

Northrop Frye, *The Great Code*

the students sign them. He then used odd moments, on planes or at meals, to shuffle through the cards until the names and faces were all familiar. If the class is large, you might consider using a seating chart for the first week or two. This way, not only will you learn students' names, but they will also learn one another's. In the Business School, students all put their names on a placard that they set out

in each class. As a result, professors and students get to know each other quickly. Some teachers pass out 3 x 5 cards and ask the students to write down their names, addresses, and a couple of sentences about why they are taking this course. You might also ask students what their favorite class at Stanford has been and what it was about that class that they most enjoyed. This will give you a sense of what your students expect and appreciate.

Although many teachers devote the first day merely to such preliminaries, we recommend that you make a running start—that is, that you also begin discussing material or presenting information. This signals to the students that you are serious about making their time with you worthwhile and that you expect progress to be made in every session together. Since students are also “shopping around” for the best courses at the beginning of a term, you will give them a fairer sense of your course by actually digging into the subject matter and letting them sample your approach. Many new teachers prepare too much material for their first class, but if you don't yet have a feel for how much time a topic requires, your confidence will be better served by having too much rather than too little to do. For flexibility, you can divide your topics into basic and optional material. Make a list of all of the basic topics you need to address and indicate the time at which you need to move on to each topic. Leave some time for questions from the students, but don't depend on the students to fill up the time.

In general, remember this: you know more than you think, and your excitement about your field will carry you far in your students' minds. Your students want to cooperate, and they want to learn. As one student put it, “The main thing that made this professor really good was that he was so inspired and so excited about his subject.... That was a class I really had to work hard in, and the only thing that kept me working hard was that I felt he was working really hard for me too.”

The First Class of the Quarter

Even experienced teachers benefit from thorough preparation for the first class of the quarter. Decide whether you will be covering only preliminaries or whether you will make a running start by covering important material. Be prepared to give students some sense of the “big picture” of the course—its content, methods, themes, and goals, as described above—since this is what will attract many students to the course. Also remember that many of the students' questions at the first meeting will deal with such concrete matters as section times and locations, the availability and price of the textbook or course reader, grading policies, and the dates of papers and examinations. Therefore, prepare both to intrigue your students with the topics of your course and to be clear about the commitment the course will require of them. Demonstrate your commitment to the students by making a serious effort to learn their names and their reasons for taking the course, and by letting them know

when and why they should visit your office hours.

Professor Umran Inan of the Electrical Engineering Department offers two additional suggestions for the first class of the quarter. First, he recommends that you begin by connecting your new material with something the students are familiar with—their prior experience in another class or elsewhere. This will lessen their anxiety about embarking on new material and increase their interest in a subject whose significance may not yet be clear to them. Second, he suggests that you point out assumptions the students bring from their previous experiences and then “violate” one of those assumptions. For example, in a course on electromagnetism, he might “start by saying that in engineering we work with lumped linear and time invariant systems.” He then asks students to define these terms, because “everyone knows what these are, but not very clearly, it turns out.” Finally, after getting the students involved in clarifying their assumptions aloud, he pulls the rug out from under them: he shows that when studying electromagnetism, one doesn’t work with lumped systems at all but rather with distributed circuits. Immediately, he’s piqued the students’ curiosity and drawn them into the subjects he wants to cover.

Techniques like these, and others you may discover in talking with your colleagues and students, should help the quarter begin successfully. Remember, however, that even if the first session does not go as well as you had hoped, your future with the class is far from doomed. Stanford students are amazingly forgiving as long as they can see that you are making a serious effort. You will also find them willing to make suggestions on how you could change things for the better, if you decide this is necessary. You can ask them for their ideas directly, or use one of several evaluation techniques that the Center for Teaching and Learning makes available. See page 60 for more suggestions on evaluating and improving your teaching.

SEVEN WAYS TO HANDLE NERVOUSNESS

Practice

Practice doesn’t make perfect, but doing a presentation out loud several times before the real thing will make you feel more confident, especially if you practice under conditions as close to the actual situation as possible. Do at least one dry run in front of an audience, even if the audience is just a friend.

Concentrate on the Ideas

Concentrate on the ideas you want to get across, not on your own nervousness. Even shy people speak up when it’s something they care about. Think about your audience’s needs, not your own.

Make a Strong Start

You’ll be most nervous at the beginning of the talk, so start with an introduction that will be easy to remember and that will relax you as well as the audience.

Visualize

Rehearse for your first presentation by actually visualizing how it will go. Imagine what you’d like to say, how you’d like to say it, and a positive response from the audience. Many athletes use a similar approach by imagining an entire dive or jump, in detail, before they actually do it.

Use Audiovisual Aids or Multimedia

Particularly if you have lots of technical information to cover, it can be reassuring to have much of it already written on transparencies or PowerPoint slides. Even just an outline on the board can reassure you that you won’t forget what you want to say. Be sure to look at your audience as much as possible, however, and not at your outline or PowerPoint slides.

Assume a Confident Attitude

To a large extent, you can control your own reaction to sweaty palms or a beating heart. Tell yourself you’re “psyched,” not nervous. Remember that to an audience, nervousness can seem like dynamism or energy. Your attitude will probably determine what the audience thinks.

Breathe

Right before your presentation, take a few moments to regulate and deepen your breathing. When it comes to public speaking, your breath is your main support. The moment you start to feel a case of nerves building up, take a deep breath. You will start to feel better immediately and your voice will convey your relaxation and confidence.

Teaching at Stanford

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Great teaching occurs both in traditional classroom settings and outside the classroom. In this section, we offer some practical advice specific to a variety of teaching contexts, from lectures to laboratories to office hours. This advice is just a sample of teaching strategies that will apply to instructors in any field; for more detailed advice, or for strategies developed by instructors in your field, consult the many resources available at the Center for Teaching and Learning library or website (<http://ctl.stanford.edu>).

Lecturing

For centuries, the lecture has been one of the principal features of life in the university. At Stanford, most lectures run for at least fifty minutes, but the attention span of a typical student seems to be considerably less than that. Traditional lecturing can be an effective way of communicating information and demonstrating processes; however, it's always a challenge to maintain the active interest of an often sleep-deprived audience for such a long period. Even if it's been some time since you were an undergraduate sitting through a large lecture, simply consider what it takes to sustain your interest at an academic talk—then imagine being tested on the talk afterwards! While the lecture material may seem inher-

ently fascinating to the lecturer, even highly motivated listeners lose concentration periodically and must find ways to reengage themselves with the lecture.

The best lectures, like any good talk, invite students to think imaginatively and conceptually about a significant theme or problem. They do more than “cover the material” (which could be a code phrase for “put students to sleep”). Professor David Kennedy of History reminds us that a good lecture always offers a point of view and an *entry* into a field of study. It is not, however, the ideal platform for a complex scholarly argument or a massive transfer of data. The goal is to illuminate a topic, not to baffle students with its nuances or to overload them with information. You should also try for a relaxed, conversational tone; allow yourself to think out loud, and engage with the material as you present it. It's usually a mistake to rely extensively on a verbatim text, which can result in the kind of mind-numbing performance often parodied in television and movies. Professor Kennedy adds, “to the extent you can present the message in a narrative form, you are taking advantage of a natural feature of cognitive receptivity.” So the successful lecturer is, above all else, a good storyteller. If you think back to the most memorable lectures or academic talks you have heard, you will probably agree.

Preparation

Thorough preparation of a lecture will increase your confidence, improve your delivery style, and enhance the effectiveness of your presentation. When preparation time is limited, focus on the following:

- Craft an introduction that will set a clear and engaging agenda.
- Create an outline of your main points, examples, or demonstration.
- Prepare and practice a short conclusion that will tie the strands of the lecture together and place the lecture in the wider context of the course.
- If you plan to use technology aids, prepare backups in case of technological difficulties.
- Be sure that any materials you need for lecture are organized and working properly, and rehearse any demonstrations.

Basic Presentation Skills

You don't need to be a charismatic showman to deliver a strong lecture; begin by refining your basic presentation skills.

- Avoid reading your lectures verbatim; if you must refer to your notes frequently, combine this with lots of eye contact.
- When making eye contact, actually look at specific individuals while you make a point; don't just continually scan the room. Avoid the "drive-by" strategy of eye contact—throwing glances randomly around the room, hoping that some eye contact "sticks". Individuals seem most comfortable with about five seconds of sustained eye contact.
- When you lecture, speak clearly and not too rapidly. If students are busy taking notes, go even slower.
- Face the students as much as possible, rather than facing the blackboard, projection screen, or laptop.
- If you lose your train of thought, pause to think rather than chattering aimlessly. Students often welcome



If you have been successful in a lecture, you have done three things. First of all, you have imparted some useful information. Secondly, you have guided your auditors into some future (we hope) long-term engagement with a subject that's dear to your heart. And thirdly, you've left some food for thought on the table. You haven't presented such a completely closed circle of knowledge and data that there is no purchase on it other than simply to digest it. That I think is essentially the measure of a successful lecture.

David Kennedy, Donald J. McLachan Professor of History

pauses as a chance to catch up on their notes or reflect on previous material.

- Try out a new lecture room ahead of time by talking to a friend in the back row to make sure you can be heard clearly. Recognize that in a full room, people "absorb" sound, which means you may need to speak even louder (or use a microphone).
- Try taping your lecture on a tape recorder and listen to yourself. Better yet, have yourself videotaped by the Center for Teaching and Learning so that you can both see and hear yourself.

For more help developing your presentation skills, the Oral Communication Program (page 63) provides workshops, classes, and one-on-one consultations.

Structure and Pace

How you structure a lecture can make all the difference in whether students retain the material or understand it in the first place. Whereas you may have thought about your material for a long while, your students are hearing it for the first time. They only get one chance to make sense of it, and their attention is divided between thinking about what you say and deciding what to write down. Therefore, it is crucial that you do not try to say too much and that you indicate—by emphasis, repetition, and summaries—the major points and how they connect. You could probably state your main points in just ten or fifteen minutes, but students need time to understand and reflect on each point. A good lecturer spends the majority of his or her time on examples, analogies, restatements, and questions. Use the following guidelines to improve the structure and pace of your lectures:

- Your lecture topic should require no more than three to five major points for its adequate development. If you have more than five main points, you have more than one lecture.
- *Tell them what you're going to tell them, tell them, and then tell them what you've told them.* Proficient lecturers often begin by briefly outlining the points they will cover or raising questions that the lecture will answer. They then develop the points through examples and discussion. Finally, they conclude by reviewing the main ideas.
- Repetition, while deadly in print, is essential in an oral context. Repeat your points with interesting variations in examples and demonstrations.

- Most students can concentrate intently for only five to ten minutes at a time. You can't take commercial breaks, but you can present the central concepts in brief, concentrated doses during these five to ten minute periods, and then offer a mini-summary to keep students caught up.
- Follow each mini-summary with a clearly signaled transition to the next section. You can structure discussion, Q and A's, or even pauses, around these major blocks. Research has shown that two-minute silent pauses spaced between lecture points improves student learning.
- Consider spacing demonstrations, student participation activities, and multimedia clips throughout your lecture, to wake up students' attention. The ten-minute rule works well for spacing interactive elements.
- Pay attention to your audience! Puzzled looks are a good indicator that you need to restate an idea more simply, provide an example, or ask for questions. Furious scribbling is a sign to slow down and summarize recent points.
- Remember that a lecture, like great theater, is lost after the moment. Students need time to think, since they can't replay or reread parts of your lecture. Pause after complicated ideas, strive for simplicity in speech, and expand on one new idea at a time until it becomes familiar.

Cohesiveness

If you've thought a great deal about your material, you can probably articulate the key themes of your course, as well as how they develop from the beginning of the course to the end. Your students want this same clarity: they want the direction of the course to be apparent as they proceed, and they want to understand how each lecture relates to the whole. To help students see the underlying structure of the course, focus on creating cohesiveness between your individual lectures. The following suggestions can help you increase the cohesiveness of your course:

- Begin a lecture by making a connection to the previous session's topic.
- Coordinate lectures with the textbook. Make sure students understand the connections between lecture and readings (even if the content does not match perfectly). Your lectures can enliven textbook material with demonstrations, multimedia, anecdotes, and discussion; expand the range of the subject matter or focus on one important topic; reinforce textbook perspectives or provide a different perspective.
- Coordinate lectures with assignments by making sure students receive the information they need to complete assignments and making sure students understand how lecture content relates to written assignments, problem sets, or labs. Homework problems should give the students the opportunity to apply information they have just received.
- Conclude a lecture by anticipating questions that will be answered or topics that will be addressed in the next lecture.
- Cohesiveness among the parts of the lecture is equally important. When you compose a lecture, begin by identifying the theme or topic of the lecture and why the students should learn about it. This focuses, and provides an overall structure for, the lecture. Or, try writing down the things you have to cover. Go over them until a unifying theme or organizational framework suggests itself.

Dr. Robert Wilson, formerly an educational researcher at UC–Berkeley, passed along another approach from a physics professor on his campus. This professor left time at the end of each of his lectures for what he called a one-minute exam, though it was in fact ungraded. Students used the sixty seconds to respond to two questions—what was the most important point or theme of the day's lecture and what was the most important question left unanswered. In this economical way, the professor got feedback on how well his lectures were hanging together for the students and what points he might need to cover again or still needed to cover.

Putting Your Material in Context

As one student put it, it's important that "class doesn't exist in a vacuum." Students want professors to relate the material to other courses, to ideas in other fields, and to real-world examples and problems.

Students want to know how they might eventually apply the ideas they're studying. To you, the material may have intrinsic appeal, but don't count on students sharing your appreciation for its innate value. Particularly in introductory classes, you need to show the point of understanding a law of physics or the cultural origins of Pop art. Consider:

- Can what you're teaching explain a phenomenon that students may have wondered about?
- Has what you're teaching been used to solve a modern or historic problem?
- Could what you're teaching be used to solve a previously unsolvable problem?

- Does what you're teaching contradict ideas that students may have about how the world works?
- Can students use what you're teaching to interpret their everyday experiences, or cultural phenomena?
- Is there a famous example of what you're teaching, which students may now think about in a new way?
- Is there an interesting anecdote that describes how an idea was discovered, presented, or challenged?

As well as putting theory in the context of its applications and history, you can also spark students' interest by showing the relationship of your course material to other disciplines. One student likes professors to "bring in examples from different fields, because then you understand that you're not only learning x , but you have the background to work on something else if you wish later on." For example, Emeritus Professor Robert Helliwell shares with his students two different applications of a principle, one from biomedical engineering, the other from planetary astronomy. "The techniques and theory

When you start teaching and you're dealing with undergraduates, and you look out there and you see that confused look, the chances are that the context isn't there. Because if the context is there, [students] can follow all kinds of...arguments, if they see roughly where you're going.

James F. Gibbons, Professor (research) of Electrical Engineering and former Dean of the School of Engineering

behind the measurement of the rings of Saturn," he says, "are precisely the same as those used in medical electronics to measure blood flow in veins without going inside." Not only will such examples motivate your students, but they will encourage your students to find the connections between the content of all of their courses. And, as one student points out, the ability to generalize principles from one field to another is in itself an invaluable skill. It can also lead to the kind of scholarly or scientific insight that great advances depend on.

Variety of Presentation

A lecture format can accommodate a wide range of presentation styles and classroom activities. Besides questions from the audience, you may want to enrich your lecture with:

- Mini-problems that students work on independently or in pairs.
- Short discussions, either as a full class or by having students turn to face the students sitting near them.

- Short activities that require student volunteers for demonstrations, role plays, challenges, or debates.
- Case studies or experimental designs that require students to make a prediction before you reveal the outcome.
- Multimedia, including music, video clips, or computer simulations.
- Dramatic readings (in a science class, for example, you can follow an explanation of a theory with a dramatic reading of a story from the scientist's memoir about the theory's discovery or the research that disproved a competing theory).

A few exciting examples, problems, or demonstrations can be particularly helpful for times when students' energy or concentration is low. One student remembers a professor who brought up stimulating examples when he noticed that students were looking out the window. In addition to keeping students interested in the material, these techniques also give students a chance to use what they have learned and give the lecturer feedback on what students think and understand.

Handling Questions

You should go out of your way to encourage questions, although instructors have different preferences for how they take them. Some instructors believe that students learn more effectively if they can interrupt the lecturer with questions, whereas others find interruptions distracting. Let your students know if they can interrupt with questions or should save them for the end of the period. In either case, avoid going overtime, so there is a reasonable chance for students to formulate and ask questions. Students have other classes (and sometimes lunch) to go to, and attention is usually minimal toward the very end of class. Here are some tips for encouraging, and responding to, questions:

- When asking if there are any questions, don't simply ask "Any questions?" with your back turned to the audience. Phrase it as a genuine invitation, such as "What parts of this are still a little unclear or confusing for you?" or "What do I need to explain again?" or "What are you wondering about that I haven't yet addressed?" or simply "I'd like to hear your comments and questions now."
- Make sure you understand the student's question before launching into a long explanation. Restate the question and let the student clarify, if necessary.

- In a large class, repeat a student’s question so that all the students know what question you’re answering.
- Consider reserving two-to-three-minute blocks for questions at transition points in your lecture. Let students have the full time to think, even if nobody asks a question. This reinforces your commitment to answering questions and will encourage students to review the material recently covered.
- If you don’t know the answer to a question, don’t bluff. You can let the student know that the question goes well beyond what you can address in lecture, volunteer to find the answer and report back, or ask the student to investigate and report back to the class. Or, consider trying to work out an answer with the students, if the question seems solvable.
- If a student seems embarrassed about asking a basic question, say that you’re glad the student brought up something that probably a lot of people are confused about.



When I did begin to allow more time in the middle of lectures for interaction and questions from students, I discovered ...that I got the chance ...to either think out loud on my feet or to bring in material that I had really wanted to but for some reason hadn't. I learned what [the students] knew and didn't know. I learned how much I was overextending and how much I was going over stuff too much.

Estelle Freedman, Edgar E. Robinson Professor in U.S. History

Personalizing Lectures

The best lecturers, even when they speak to 300 people, give the sense that they are talking to a few friends. Their personality comes through, revealing aspects of themselves that their friends and colleagues enjoy—such as humor and their passion for their field. The lecturers give the feeling that they are participating in a pleasurable interaction with people they respect. They are engaged with the audience, not just the material. Here are some suggestions for creating the kind of informal and engaging atmosphere that puts students at ease, keeps them interested, and makes them more willing to participate:

- Plan your lectures so that they include examples and material that you find interesting, as well as those that you think may especially appeal to college students (many instructors make effective use of popular cultural references or recent campus events).
- Talk directly to the students and take cues from the audience as you lecture. Watch their body language and other indirect responses. Do they appear attentive, amused, puzzled, distracted, or bored? Are they taking notes, asking questions, or yawning?
- Respond to their responses—if they laugh, or wince, or look confused, you can comment on their response or whatever elicited the response. This often wins laughs and shows that you care about their reactions to the material.
- Be willing to shift gears if students don’t respond to, or don’t understand, the material you prepared. Improvise based on the needs of the situation. For example, you may need to focus on the basics or ramp up the level of challenge in your lecture.
- It’s appropriate to occasionally bring in your own relevant interests and experience. Students are curious about their instructors, and if you can share a topical personal story, students may become more interested in the material and invested in the class.
- If the students react particularly positively or negatively to a part of your lecture, take time after the lecture to note what evoked the strong responses.

To keep students engaged, focus on these broad practices: teach what you love, or find something you love about what you teach; let your lecturing style reflect your personality, rather than trying to replicate another successful lecturer; stay connected to what is *actually* happening in the classroom, rather than what you hoped or expected would happen; and above all, as one student put it, “don’t give up on your students.”

Audiovisual Aids

Many lecturers routinely use one or more audiovisual aids to organize, enliven, diversify, or strengthen their presentation of information and ideas. To make a choice of which, if any, you might use, consider which aids will help you achieve the clearest, most active presentation for your subject matter. Also consider how audiovisual aids can influence how much time students spend actively thinking about the material (versus passive listening/watching or uncritical, rushed note-taking). Below are some of the benefits of the most frequently used lecture aids, as well as tips for their use.

Blackboard Using the blackboard allows you to interact dynamically with the audience and to create a visual record of your lecture. You can use the body language the blackboard necessitates—walking, pointing—to show enthusiasm for the subject and to point out connections between ideas. Writing on the board is also a good way to demonstrate processes, such as derivations. Moreover, carefully worked-out use of the board can help students visualize, as well as hear, the shape of your lecture. For example, you can put up major divisions of the talk in outline form before class begins, leaving room to fill in important sub-points, facts, and formulas as you lecture.

- When writing on the board during a lecture, avoid long periods of talking with your back to the students. Not only may your voice not carry, but loss of eye contact dampens the students' interest.
- Do not stand in front of what you have just written!
- Do not erase anything, especially new material, before you have to.
- At the end of a class, go to the back of the room and see if you can reconstruct the important points of your lecture from what you have written.

Overhead Projector Overhead projectors have become popular for the presentation of detailed or technical material. With them, you can put long equations, graphs, diagrams, and detailed computations on transparencies ahead of time, freeing you during class to concentrate on the clear explanation of material rather than on its accurate representation. Students often find that the material is better organized and easier to follow as a result. Overheads have their pitfalls as well, however. There are several points to keep in mind:

- Transparencies can be hard to read unless they're carefully prepared. Check your overheads on the machine

before you first use them in class; stand toward the back of the room to see if you can read them easily.

- Transparencies can easily become an excuse for overloading students with information. Prepare and follow a careful lecture outline, organizing the material around your key points. Make sure that each overhead has only a few important (and related) ideas or facts on it.
- If you simply read what's on the overhead, student attention will wander. They will start to read the overheads on their own and forget to listen to you. Leave room for surprises, additional commentary, changes, and things students have to add, fill in, or watch for.
- Pay attention to whether you look at the transparencies, the screen, or the students. Too often, a speaker using audiovisual aids concentrates on the aids and not the audience. Set up the projector so that you are facing the students and can glance comfortably back and forth between them and the material on the overheads.

Multimedia and Computers Presentation software packages (such as PowerPoint) offer a flexible and sophisticated way to make overhead projections and slide shows. They also involve greater risk, since so many things can go wrong with the equipment. If you are using digital presentations, make some real transparencies, or at least a lecture outline, as a backup. In designing your presentations, many of the tips for overheads also apply. In addition, consider the following suggestions:

- Steer clear of gratuitous design elements (moving text, sound effects every time you change slides, etc.). Save your bells and whistles for meaningful elements, such as digital video or audio clips, interesting images, or well-designed graphs.
- Use title slides or spacer slides (images or a blank screen) between sections of your lecture, to remind you to spend some time talking directly to the students or taking questions. Reading off the screen nonstop is a surefire way to lose your connection with students.
- Upload important or information-dense slides to the course website.

For further information on the pluses and minuses of using technology in the classroom, see "Technology in Teaching" at the end of this section. For an interesting critique of PowerPoint in particular, see Edward Tufte, *The Cognitive Style of PowerPoint*, 2003.

Handouts Students appreciate clear and well-chosen handouts. One student commented that good handouts show that the professor “cares about the students and wants to help them understand things.” There are many reasons to use handouts in class. Here are just a few examples you may wish to incorporate into your teaching:

- You can hand out summaries of your lectures to the class. These may be copies of your overheads, PowerPoint slides, or even your own (clearly written) lecture outlines. This allows students to spend more time thinking than frantically copying down what you say. However, it is a good idea to leave wide margins and other white space so the students can add to the handouts.
- If you give out copies of your lecture slides or notes, go out of your way to make sure students are actively engaging with the material. Use the note-taking time you have saved to build in student participation and other active learning exercises. Otherwise, it is all too easy for students to passively watch you lecture.
- Handouts can be particularly effective for presenting complex data, detailed material, examples, and diagrams. Focus on material you think there is a good chance students will need to review, especially if they need to apply it in an assignment. The use of handouts guarantees that students will have accurate study aids for material that might be difficult to absorb fully in one lecture.
- Some professors pass out lecture notes to the class after the lecture. This allows you to add material to parts that students had questions about.

Other Good Lecturing Ideas

- When Professor Kathryn Moler of Applied Physics plans a lecture, she first identifies the main concepts that she wants the students to understand. Usually she has four to five concepts per class. She starts by explaining a concept in the traditional lecture format, using graphics and equations as well as words. After a five-to-ten-minute mini-lecture, she then poses a brief problem that the students can't answer unless they understand the basic concept. As part of the process, she asks her students in pairs to convince each other of their own answers. She often doesn't move on until almost all of the students get the main concept. She finds that asking the students to explain or defend their answers to their neighbor engages the mind of each student and solidifies their understanding. It also gives her the immediate feedback that she needs to pace the class.
- Professor Susan McConnell of Biological Sciences



Professor Vijay Pande, of Chemistry and Structural Biology, finds that preparing for lectures clarifies his understanding and refines his communication skills, both of which feed back constructively into his research.

makes an extra effort to encourage student participation in her large lecture classes. For example, when she senses that student interest is flagging, she asks students to turn to their neighbors and take a minute to discuss the concepts she's just gone over. She might ask them, for example, to come up with five mechanisms for neurons to communicate with axons. She finds that the active participation and immediate content review enhances student learning.

- Professor Richard Zare of Chemistry uses lectures to inspire and motivate students, not just to convey information. One of his strategies is to incorporate vivid, simple demonstrations into his lectures to arouse students' curiosity and challenge their expectations. For example, when he combines water and cornstarch in certain proportions, he produces a substance that dramatically challenges student notions of what is liquid and what is solid.

Now a lecture is not, in my opinion, intended to be an unaccented accumulation of factual data that you fire at the heads of the young. Properly speaking, it's a personal statement of how a lecturer feels about a period or a problem or an individual.

**Gordon A. Craig, J.E. Wallace Sterling
Professor of Humanities, Emeritus**

- Emeritus Professor Gordon Craig of History stresses the importance of having your own point of view in a lecture. Even a talk on “The Wool Trade in 13th Century England” can captivate students, but only if you’ve found a theme or perspective on it that has excited your own imagination. Share the reasons for the importance of your topic, as well as your own passion for the material, at the beginning of your lecture.
- When designing his lectures, Professor Terry Winograd of Computer Science and Linguistics uses his knowledge of how students learn. He urges, for example, that you first present complex ideas in a simplified form, stripped of qualifications and conditions. Once students understand the general idea, they are prepared to make sense of all the details and qualifiers.
- Professor Estelle Freedman of History has found that students are much more intellectually involved in her lectures when she makes the lectures somewhat informal and loosely organized. Her aim now is for a combined lecture/discussion format that gives more responsibility to students to raise and answer questions.
- Professor David Kennedy of History suggests that the end of a lecture should be punchy, memorable, and concrete. Since he also suggests that you should take an “accordion” approach to writing the lecture—that is, prepare beforehand to be able to expand or condense material as you go through your talk—you should have the time to reach your conclusion.
- Vice Provost for Undergraduate Education John Bravman stresses the importance of preparation for a successful lecture. He estimates that when he was first developing his lectures he put six to ten hours into each one. He also targets each lecture to the specific students in each class. For example, if he concludes that most students are in a class only to fulfill a requirement, he goes out of his way to arouse their interest and enthusiasm.

CHECKLIST FOR EFFECTIVE LECTURING

Be Prepared

- Outline clear objectives for your lecture—both what students should know after the lecture and why it is important.
- Develop a lecture outline and any audiovisuals.
- If you are nervous about the lecture, write out your introduction and rehearse it.

Keep Your Focus

- Limit the main points in a lecture to five or fewer.
- Create effective visuals, analogies, demonstrations, and examples to reinforce the main points.
- Share your outline with students.
- Emphasize your objectives and key points in the beginning, as you get to them, and as a summary at the end.

Engage Your Audience

- Focus attention early on using a quote, a dramatic visual, an anecdote, or other material relevant to the topic.
- Integrate visuals, multimedia, discussion, active learning strategies, small-group techniques, and peer instruction.
- Link new material to students’ prior knowledge, such as common experiences or previous coursework.
- Show enthusiasm for the topic and information. Remember, you are modeling your discipline.
- Give students time to think and genuine opportunities to respond.
- Plan for diverse learners. Use verbal, visual, and kinesthetic approaches such as hands-on exercises and simulations.

Get Feedback

- Observe students’ non-verbal communication: notetaking, response to questions, eye contact, seating patterns, and response to humor. Are they “with” you?
- Use the “minute paper” or other assessment techniques. Ask students to respond in one or two sentences to the following questions: What stood out as most important in today’s lecture? What are you confused about? Do this every few lectures—it will take you about 15 minutes to review the responses and you’ll learn an enormous amount about your students.
- Give quizzes periodically on lecture objectives, not obscure material. Are they getting it?
- Conduct midterm teaching evaluations or simply ask the students for suggestions and comments at the midpoint of the quarter.

- Professor Umran Inan of Electrical Engineering has several techniques for keeping students involved in his lectures. He'll solve the same problem two different ways, for example, not only because this shows the students different problem-solving strategies, but because they stay interested in whether he'll get the same answer each time. He stresses, as well, the importance of reminding students of the assumptions they make when solving problems. He sometimes polls students on which assumptions they think are the correct ones, adding the excitement of competition to the class.
- At the start of class meetings, Emeritus Professor David Halliburton of English and Modern Thought and Literature asked students to summarize the main points covered in recent lectures. He then made explicit connections between that summary and the new lecture. This strategy can help students understand the relationship between new material and previous material, while reinforcing what they have learned.

Discussion Leading

When jazz musician Pat Metheny gave the keynote address at the 2001 International Association of Jazz Educators Conference, he said, "One of the great beauties of jazz is its almost unlimited capacity to allow human beings to find out things about themselves and the culture that they live in, through the process of reconciling their own personal experiences with the experiences of others." Like jazz, with its reliance on improvisation and cooperation, an academic discussion is a collaborative enterprise that invites students to integrate their experiences and ideas about the world with the new insights and perspectives provided by the course material and other students. Similar to a great jazz jam session, a good discussion depends on the virtuosity of all the participants, not just one excellent musician! As a discussion leader, you are dependent on the group: its level of preparation, its enthusiasm, its willingness to participate. However, as the instructor, you often prepare the direction, structure, and motivation for the discussion; for this reason, leading a consistently lively discussion section is probably one of the most difficult challenges for a teacher.

Setting the Agenda

The most important thing to do at the beginning of the quarter, as well as in each class session, is to establish your objectives for the discussion.

- Do you want students to apply newly learned skills, mull over new subject matter, learn to analyze arguments critically, practice synthesizing conflicting views, or relate material to their own lives? These goals are not mutually exclusive, but they require different types of direction.
- Share your planning decisions with your students. Let them know what your focus is, and why it is important; also invite students to contribute suggestions for discussion topics and formats.
- Decide whether to be highly directive—that is, to ask most of the questions yourself and intervene to prevent digressions—or to be relatively nondirective and let the students' interests and questions determine what is covered.
- Whichever style you choose, be consistent. If students are responsible for setting the agenda or acknowledging the next speaker, do not suddenly take over the section if it doesn't go in the direction you would like. Similarly, if you normally decide what is said next, don't be surprised if students don't follow up on one another's comments.
- Make sure the assigned material is discussed in section; if the students don't come prepared with questions and responses, do not let the discussion wander. Bringing in specific quotes, problems, or other samples of the assigned material can ensure that even underprepared students will have something to talk about.
- Distributing study questions in advance demonstrates your own interest and helps focus their preparation. Consider asking students to email you their thoughts to one question. This will also give you insight into the students' thoughts while you plan the discussion.

Asking Questions

Experienced instructors learn to prepare a mix of questions—those that are easily answered, slightly challenging, or highly complex—that they can draw on as the discussion develops.

- Begin with material students are familiar with or feel comfortable with. This might be a question that can be answered with information from general experience or from basic data in the subject area.
- Once students are warmed up, ask questions requiring students to explain relationships among the units of information and to form general concepts.
- Let the discussion peak by asking questions that require students to apply concepts and principles they have developed to new data and different situations.

For example, suppose you are discussing Plato's *Republic*. You might begin by asking questions such as: What are the basic components of Plato's ideal state? What are the characteristics of a good ruler? Why does Plato ban poetry from his republic? After establishing that students understand the material, you can begin to explore relationships with questions like: How does the allegory of the cave fit into the rest of the work? What are the criticisms of Athenian society that Plato is making? Finally, you can ask the students to apply the material to themselves and their own lives: Is Plato's republic an attractive place to live? How would Plato criticize a contemporary American university?

Choosing what questions to ask is only half the battle, however. How you ask them, whom you ask them of, and when you ask them can also influence their effectiveness with the group. Pay particular attention to the following aspects of group dynamics:

- Decide whether to ask questions of a particular individual or the whole group. Sometimes calling on an individual may help to get a slow class going, but it can release the other students from the responsibility of formulating answers for themselves. It also puts students on the spot, which can decrease goodwill and intellectual risk-taking. Directing questions to the entire class may mean waiting longer for an answer.
- Leave sufficient wait time after asking a question before answering it yourself, repeating it, rephrasing it, or adding further information. Wait at least ten to fifteen seconds before making any change in your question. (You might want to practice asking a question and waiting ten to fifteen seconds in silence by yourself, just to see what it feels like.) Leaving sufficient time between asking and rephrasing gives students time to think, and it shows that you are more concerned with their learning than with being reinforced by quick responses.
- Avoid rapid reward for responding. Rapid reward means calling immediately on the first person who indicates an answer or approving immediately of a correct response that a student has given. This prevents other students from evaluating the response for themselves and interrupts their thinking process.
- Avoid programmed answers. Programmed answers turn discussion sections into guessing games as students try to give the section leader what he or she wants rather than thinking critically about the material. Below are some questions with answers programmed in. By asking only the original question and leaving off the "hint" questions that follow, you can avoid this pitfall.

—What reasons did you have for using that procedure? Was it in the lab book? Did you see it in a demonstration?

—What are your thoughts on Thoreau's *Walden*? Is he putting nature up against civilization or the individual up against society?

—What are some of the basic rules about misting plants? Do you mist the ones with the fuzzy leaves?

- Encourage students to sit at the table or in only one row of a circle, so that they can all see each other as well as you. Some students like to hide behind others; try to bring them out. Look around the whole group after asking a question, making eye contact with each student; ask students sitting in all parts of the room or places around the table for their responses during a section.
- After a response has been given, ask another person to comment on it rather than commenting on it yourself. This indicates that you want the whole group to be involved and want your role to be minimal.



One of the things I try to do with discussion courses is to encourage what I call 'controlled spontaneity.' And by that I mean that if something bubbles out of the discussion, even if it's not directly related to the main agenda, you have the ability to go with that idea, to send off sparks if they fly....

Harry Elam, Olive H. Palmer Professor in Humanities

- Positively reinforce students for responding, whether the answer was correct or incorrect. This helps create a safe environment for students to speak out and try new ideas. Reinforcing correct responses can be done with verbal comment or facial expression; reinterpreting incorrect responses is more difficult. If you asked an informational question, e.g., "In what year did World

War I begin?” you must simply acknowledge the answer as incorrect without disparaging the person who offered it.

- Ask students to elaborate answers rather than immediately correcting them yourself. If you ask an analytic question, e.g., “What themes do you think dominate in Thoreau’s *Walden*?” and the response is “The importance of society for human fulfillment,” you can ask the student to elaborate on what he or she means by “society” or redirect the response by asking a follow-up question such as “Do you think Thoreau views some people as more valuable than others?”

Increasing Class Participation

By asking good questions in an appropriate way, you will have gone a long way toward fulfilling your responsibilities as discussion leader. Your other main goal is to increase student participation and improve the quality of participation. Here are a few suggestions:

- Have students nominate topics for discussion at the beginning of a section. These can be problems, confusions, interesting points, or basic ideas in the text. List the nominations and let the group pick those they want to cover.
- If you assign discussion questions before each section, students can sign up to be responsible for leading the discussion on one or more questions.
- If the material for the section lends itself to open-ended questions in which a variety of ideas can aid understanding, have a brainstorming session. During the first part of the session, list every idea that students come up with in response to the question you have set. During the second part of the session, evaluate, compare, and synthesize the ideas, as you approach a solution.
- As an icebreaker, ask a question for which there is no single correct answer and go around the table with it. (Example: What is the first adjective that comes to mind when you think of the protagonist of this story? Or: On a scale of 1 to 10, rate the effectiveness of Allied military leadership in 1916.) With this strategy, you can begin the discussion with 100 percent participation, and you can subvert the usual hierarchy by inviting two or three of the more passive students to explicate their answers.
- If the discussion group is large, divide it into smaller units, each one dealing with the same or separate problems in the reading. Float from group to group, giving guidance and answering questions when needed. When the period is nearly over, leave about twenty minutes to

reassemble the class and have the small groups report to each other.

- Use material “in hand” to stimulate discussion. You can pass out poll results, historical documents, pictures, etc. Material in hand is easier to discuss than readings done and perhaps forgotten.
- Begin the class by giving students five to ten minutes to write on a topic relevant to the discussion. This will give them time to gather their thoughts, particularly with complex material. It will also reinforce the utility of writing for sorting out one’s thoughts.
- Consider asking one student each week to take notes on the major points covered in section. He/she is then responsible for bringing enough copies for everyone to the next class. You and the students should take a few minutes to go over these and make any necessary refinements. Such a technique can overcome the sense that nothing happens in a discussion.
- Pose an either/or question, e.g., “Is the frontier or the industrial revolution more important for an understanding of American character?” Have the class divide physically into those who favor each side and those who are undecided. Have the pro and con sides debate the issue, with the undecided free to contribute at any time. Instruct students to move to the other group if they change their view during the debate. This kind of debate can encourage intellectual flexibility and help students clarify value positions and levels of argument. If you are uncomfortable having students move around, use the blackboard to set out the two sides of the controversy and to keep track of points relevant to each argument.
- Give students a chance to develop ideas. Rephrase questions and “near misses” and throw them back to students. Use the Socratic method as long as it is producing insight. However, if you can’t pull out a usable answer from students, don’t go on a fishing expedition; answer the question yourself.
- A graphic display helps students keep track of an argument and think schematically. For example, put a certain outcome or viewpoint on the board and ask the students to work backwards through the most plausible causal chains or logical defense. Let students explore multiple pathways.

Once a few questions have focused the discussion, students may begin discussing among themselves and you may become moderator, mediator, and summarizer. Some groups can keep the discussion going with little

difficulty; others will need guidance and more frequent redirection on your part. You will get a feel for each particular group.

Creating a Good Climate for Discussion

You can also significantly increase the quantity and quality of participation simply by creating an encouraging environment for discussion.

- Know and use the students' names. In addition, make sure that the students know one another's names.
- Arrange the room to maximize student-to-student eye contact; e.g., chairs around a table or in a circle. You might vary where you sit from time to time, to break students' habit of staring at the front of the room.
- Arrive at section a little early and stay briefly afterwards to talk informally with students and answer questions.
- When students ask questions, try to help them find the answers for themselves.
- If arguments develop, try to resolve the disputes by appeal to objective evidence rather than authority of position. If the dispute is over values, help students clarify their values and respect each others', even if resolution is not possible. Disputes can often form the basis for interesting writing assignments.
- Be as relaxed and unselfconscious as possible. Many students enjoy discussion groups when they sense the leader's spontaneity and excitement about learning. This does not mean that a discussion section should not be well thought out in advance; simply leave room for flexibility as the class progresses.

CHECKLIST FOR EFFECTIVE DISCUSSION LEADING

Be Prepared

- Carefully consider your objectives for a discussion. What do you hope to accomplish? What topic(s) would you like discussed? What might be considered a tangent? Do students know enough about the topics to discuss them?
- Use discussion to help students link concepts to their own lives; to encourage students to evaluate material critically; and to address topics that are open-ended, have no clear resolution, and/or can be effectively addressed through multiple approaches.
- Provide students opportunities to "warm up" through brief (one to five minute) in-class writing exercises on the topic, three-to-five-person mini-discussions, or a homework exercise prior to the session that focuses students on the topic(s) to be covered.

Facilitate, Don't Dominate

- Provide clear guidelines for participation. Discuss them beforehand, stick to them, and enforce them during the discussion.
- Maintain an atmosphere of safety and respect.
- Use open-ended questions and ask students for clarification, examples, definitions.
- Summarize student responses without taking a stand one way or another.
- Invite students to address one another and not always "go through" you.
- Pause to give students time to reflect on your summaries or others' comments.
- Stimulate and challenge, don't intimidate or threaten. Don't dwell on one student for too long. Deal openly with conflicts, don't ignore them. Listen to your students, and learn from them.
- Control the "talkers" and call on the "non-talkers." But, if a "non-talker" isn't ready to contribute, don't persist.
- Consider taking notes of main points on a chalkboard or overhead, but, if you do, write everyone's ideas down.
- Toward the end of the discussion, review the main ideas, the thread of the discussion, and conclusions.

Evaluate

- Notice how many students participated in the discussion.
- Notice who did and who did not participate (look for gender and racial biases).
- Check the tone of the discussion—was it stimulating and respectful?
- Ask students about their reactions to the discussion session.

If you show respect for students in both your demeanor and language, and encourage the group to engage in a common learning enterprise, you can make the students in the group feel comfortable and ready to share ideas. Students often reflect toward each other the attitude that a teacher shows toward them. Therefore, the establishment of “favorites” in a discussion section should be avoided, as should any harsh criticism or teasing. Your primary responsibility is to help all the students in the group learn.

Laboratory Teaching

The laboratory is a place where abstract concepts become concrete and theory is both tested and applied. In each lab, students will hopefully reach a deeper understanding of the course material by putting it to work. For this reason, the lab can be an exciting place for the instructor and the students, as students commit to the processes of investigation, analysis, and reflection. However, designing and supervising effective lab sections requires thoughtfulness and strategy. The processes of investigation don’t always run smoothly, and students need guidance to make sense of their results.

Course Planning

Planning a laboratory course involves making several kinds of important decisions:

- What projects/experiments will you assign?
- How can you best integrate the teaching of theory with the related labs?
- How will you balance and organize cooperative and independent study in the lab?
- What equipment will you need?

As a first step in making all of these decisions, consider both the content and the inquiry skills that you want students to master. While your content goals clearly indicate what to cover, your inquiry goals direct how your students will interact with this material and which skills they will take from your course.

Choice of Projects

Base your choice of projects on the stated goals of the course’s lab component. In general, appropriate goals are to help students understand theory by observing and verifying concepts, to have them go through research and design processes, to help them improve their powers of reasoning by manipulating cause-and-effect relation-

ships, and to acquaint them with essential equipment. Note, also, that several of the above goals involve higher-order thinking skills that cannot be attained without the direct, creative involvement of the student. If, as content-matter experts, we routinely structure the learning to “make sense,” or to ensure a certain result, we short-circuit the processes that inquiring learners might follow and the skills they would develop in the process. Clearly, a balance must be struck. Projects driven fully by student inquiry require time, careful planning, and close, interactive support. The payoff for such effort is the increased level of student engagement and the development of analytical and problem-solving skills.

Integration with Theory

When planning the course schedule, it is essential to coordinate the teaching of concepts with their laboratory applications. Theory should be closely linked to relevant practice; time lags and intervening material can dilute the intended effects of the lab work. As you attempt to “blur” the line between lecture and lab, think broadly about the real constraints and accept as few artificial disjoints as possible. What bridges can you build between the two? Are there aspects of your lab course that can be brought into the lecture room and vice versa? Coordinate lectures, assigned readings, and supplemental references, which you can make available in the laboratory, on reserve, or on the course website.

Group Work

Many laboratory projects are conducive to group learning, which can take place both inside the lab and outside of class, during post-lab discussions or small-group study sessions. Early in the course, you may want to divide your students into lab and/or study groups of two to four partners. The number of partners per group will depend on the class size and the quantity of available equipment. Because different experiments require different numbers of apparatus, some weeks you may have to consolidate two of these small groups or otherwise reorganize things, but keep in mind that four is a good upper limit if you want each student to actively participate. Besides offering students the benefits of learning from each other, group

Small groups appear to be even more important for the sciences than for courses in any other field. Whether or not students work together in small study groups outside of class is the single best predictor of how many classes in science they will take. Those who do work in small groups take more science courses.

Richard J. Light, Harvard professor and author of *Making the Most of College: Students Speak their Minds*

work readies students for conditions in the outside world, where most scientific or technical projects involve teams of people. It is especially useful to ask the students to divide complex projects into parts and to coordinate individual tasks. If needed, a lab assistant can help with the coordination. With this approach, students can take responsibility for one part of the project while maintaining an appreciation for the design and concepts of the whole project.

Appropriate Equipment

Select the most appropriate equipment for each experiment and make sure that it is in working order, with clear instructions for its use available to students. The equipment should be neither so complex nor so rudimentary as to undermine the point of the procedure. A fancy, expensive box may distract the students' attention from the concepts the experiment aims to demonstrate. On the other hand, antiquated, inadequate instruments can encourage the practice of “dry labbing” the results. The more suitable the apparatus and measurements are to the concepts they teach, the more effective and educational the laboratory experience will be.

Planning and Reviewing Each Experiment

To ensure that lab exercises run smoothly, the professor and lab assistants or TAs should rehearse the procedure before the lab sections and review the results afterwards. Faculty can avoid problems by preparing lab assignments at least a week in advance and trying out each experiment or having a TA try it out before giving students the assignment sheet. Make sure that the requirements are feasible and clearly stated and that the specific numbers chosen produce the desired results. The trial run will ensure that the students are not hindered by ambiguous directions or computational difficulties. Your lab scheduling should include time for the instructor and/or TA to review the results of each laboratory exercise with the class. This step is essential to help the students check their individual conclusions and understand the results in relation to the theories of the course. Class discussion will also enable you to identify any problems with the lab procedures, so that you can correct them for the next session.

Nuts and Bolts

In most cases, you will be leaving the direction and supervision of the actual lab sections to a TA or lab assistant. If you are teaching the lab yourself, consult the section “Labs” on page 69.

Other Teaching Approaches

We have covered only the most common teaching formats: lectures, discussions, and laboratories. At some point in your career, you may want to consider other instructional approaches that push the boundaries of traditional teaching methods. Creative approaches can be designed to meet your specific teaching goals; below, we give just a few examples of unusual, but also unusually effective, methods that can be introduced into a single class session or used to shape an entire course.

Professor John B. Taylor of Economics frequently injects a touch of drama and humor into his popular “Principles of Economics” course. On occasion, you can even see him arguing with the ghost of Adam Smith (Professor Taylor himself with a lower tone of voice and a Scottish accent, taped prior to the lecture) about the merits of economies of scale. He covers as much material as he would in a traditional lecture style, but in a more memorable way that draws students into economics. Any touch of drama you can bring into a traditional class format will capture your students' interest by surprising them, and sustain their attention by entertaining them (even if it's not Academy-Award-winning material!).

Simulation Games

Simulation games—in which students solve problems in situations modeled on the real world—are growing in popularity; almost every academic field now has them freely or commercially available. Simulation has been used at Stanford to enhance Professor Scott Sagan's Political Science course on arms control and security issues. Students are divided into teams and assigned a role based on actual figures in the negotiations. True to their role, they write and exchange position papers, then conduct rounds of talks based on a schedule of plenary sessions. Faculty and TAs act as consultants but otherwise keep their interventions to a minimum. Class time is also used for reflective discussion of the simulation, since research indicates that games are effective only when combined with thorough debriefing. Course evaluations from the students involved are highly positive. Although students put much more time into the course than they anticipate will be necessary, they feel that actually doing the negotiations gives them an unusual mastery of this aspect of international relations. Simulation games can also be used to supplement a more traditional course. For example, the Introductory Economics Center created a variant of simulation games in which students participate in synchronous online games from their own computers.

Other courses may take students directly into the real world, to explore course topics hands-on. In one such innovative psychology course, called “Exploring Human Nature,” Professor Philip Zimbardo’s students participate in three “experiential projects,” such as observing firsthand the social persuasion strategies of a local organization. An important feature of such courses is the rigorous preparation students receive to handle and interpret their experiences in the real world.

Office Hours

Both professors and teaching assistants can accomplish some of their most rewarding teaching in the office. Office hours are valuable both for highly motivated students and for those with difficulties, for those who are shy as well as those who are eager to talk. Students often say that they want to work harder for teachers with whom they have gotten acquainted; getting to know your students can also increase your own motivation for teaching the course. Moreover, contact and candid discussion with even just a few students can provide a great deal of insight into how the course is going.

Instructors generally are expected to keep at least two or three office hours a week during a teaching quarter. TAs will probably need to schedule more time at certain points in the quarter and should check with the professor about how the time can best be used. Laboratory assistants in particular can expect to spend about ten hours a week helping students during regular hours and arranged appointments, and will probably want to hold some of their office hours in the lab to answer procedural questions. Plan your office hours well in advance, to avoid scheduling conflicts. Try to choose a combination of times when your students are likely to be free and add “and by appointment” to the listing of hours; otherwise, a person who wants to come in but can’t make your regular hours may not tell you. Finally, be consistent about keeping the hours you schedule.

However consistent you are, you may find your office hours slipping by without a single student stopping by. How can you encourage students to take advantage of the opportunity to talk with you informally? The friendlier you are in class, and the more accessible after a lecture—a good time for making appointments—the more likely students are to come around. Invite your students to drop by, and repeat the invitation several times during the quarter. Suggest the kinds of things they might want to discuss, such as questions about projects,

assignments, graduate school, research opportunities, or careers in your field. It’s also a good idea to put a map on the syllabus if your office is not in the same building as your classroom; it may seem a bit silly, but it will signal to students that you really do want them to stop by.

Some instructors go further and actually require students to come to office hours at least once in the quarter. Although this can be time-consuming for you and is only practical if your class is fairly small, instructors who do it are enthusiastic about the results. They report that it provides them with a much better understanding of their class, and that they get to know otherwise quiet or shy students much sooner. They also find that students are more likely to repeat a visit or to ask questions after class, because the instructor has become less intimidating to them.

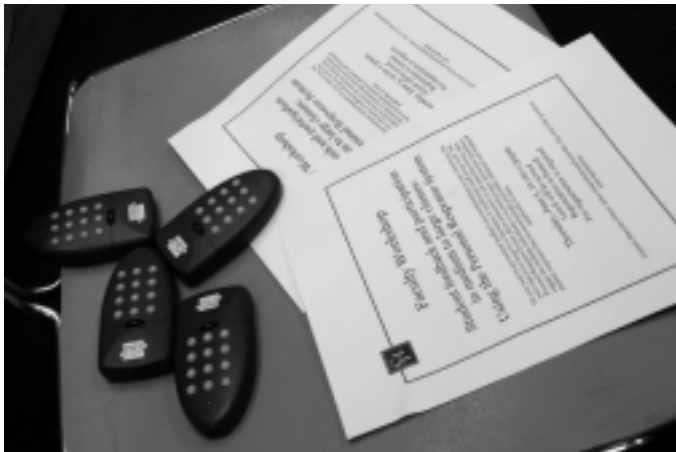
You can expect more business when students are putting projects together, studying for exams, or writing papers. TAs should be willing to adjust their office hours according to the changing needs of the students. It can be particularly hard for TAs to limit office hours in a challenging course; a class full of anxious students can make unreasonable requests on a TA’s time. In this case, you may want to require office-hour sign-ups and limit meetings to fifteen minutes each. Also plan to be available after class to arrange appointments and to answer simple questions that otherwise might absorb office hour time.

Electronic Tools for Communication

Surveys have shown that Stanford instructors who include electronic communication as part of their teaching have greater student participation and receive more student feedback. The most popular forms of communicating with students outside the classroom are email (sent individually or to the entire class as part of an electronic mailing list) and online discussion forums. Implementing one or more of these electronic tools lends an air of accessibility to the professor and the TAs. Although students may still choose to visit during office hours, the fact that they are able to make contact electronically, at their convenience, improves the students’ impression of their instructors’ availability. The use of electronic mailing lists and web discussion forums has also paved the way to freer and lengthier discussions among students, who have more time outside the classroom to reflect on their responses. Even students who are characteristically shy in class may come alive online. One

of the features of online discussion forum software is that it can automatically append students' pictures to their discussion postings; this multimedia aspect of the forum helps to forge a virtual classroom community, which helps diminish the anonymity students frequently feel when they are enrolled in a class of hundreds. Mailing lists, discussion forums, and course web pages are easy to set up at Stanford; you can request these tools directly at <http://courses.stanford.edu>, and you may also want to consult *About Computing at Stanford: A Guide for Faculty and Students*, available online at <http://computing.stanford.edu/>.

The flip side of electronic communication, of course, is the burden it can create for instructors: students may expect immediate responses to their questions, and the decreased barrier to communication often means that an instructor is inundated with last-minute emails about exams or assignments. It is always good to set clear guidelines at the beginning of the quarter about the role of electronic communication in your course, not only what you expect from your students in terms of electronic participation but also what they should expect from you in terms of turnaround time or moderation of discussions.



Technology can be used to improve communication *inside* the classroom too. The personal response system shown in the photo allows students to participate actively even in classes with hundreds of students.

Technology in Teaching

For many faculty and TAs, the computer has dramatically changed the way they conduct scholarship. Searching computerized databases, using statistical packages to analyze data, conducting research on the web, and communicating with colleagues across campus or across the country through email—all of these have become

essential components of scholarly life. These skills have likewise become a major part of students' lives, and their academic training requires an introduction to scholarly uses of technology. Technology has also entered the classroom: faculty and TAs are increasingly using tools from multimedia presentations to computer simulations to enhance their teaching. Instructors are no longer just experimenting with different ways of using technology; they are focusing on how technology can allow instructors and students to reach educational goals more effectively and efficiently.

Pedagogical Goals

What technology should you include in your teaching, and how should it be incorporated into the rest of the course structure? As with most teaching decisions you make, you should begin by considering your goals for the course. If those goals are already being met well, investing time and energy in computer-related development may not be wise. There may also be simpler ways of achieving your pedagogical aims using more conventional teaching strategies. Just because your students are comfortable using computers does *not* mean they necessarily want their time in and out of the classroom tied to a computer. You may find that technologically-savvy students are more excited by hands-on work, stimulating discussion, small-group interactions, or field experiences.

In fact, much of the courseware (software and hardware designed to assist you in your courses) that has been developed at Stanford and elsewhere is used primarily for work outside the classroom. For example, online discussion boards and course websites that contain interactive demonstrations, exercises, and background material can complement classroom instruction. Supplemental multimedia resources (websites, CD-ROMs, DVDs, etc.) make it easier for students to seek information and construct knowledge in ways that best suit their interests, abilities, and background. Course websites, discussion boards, and computer simulations can encourage interactions among students that go beyond the classroom and even beyond the end of the course.

Such technology can be effectively used in all fields, from the sciences to the arts. Some examples from Stanford:

- Anthropological Sciences Professor John Rick developed a “virtual field site” of Chavín de Huántar in Peru using extensive data and measurements collected over several summers with teams of Stanford students. The project, available at http://www.stanford.edu/~johnrick/chavin_wrap/chavin/index.html, allows students to

view the archaeological site and its labyrinthine passageways through virtual reality panoramas.

- Professor Russ Altman of Genetics and Medicine had his students in a project-based Bioinformatics class take advantage of the new classroom technologies available in Wallenberg Hall to compare alternative models of visualizing proteins. While Professor Altman used a Webster board to display one model, a student “sent” another model onto an adjacent screen. Webster boards—“smart” digital white boards that show web pages, class notes, or the instructor’s drawings and writing—allow teacher and student to collaborate and share their work with the entire class as it evolves.
- Vered Shemtov of the Language Center used both the technology and the physical spaces of Wallenberg Hall to address varying levels of understanding in an introductory Hebrew course. Shemtov employed multiple Webster boards to allow her students to break into groups and work as teams. While an advanced cohort wrote on lightweight white boards and saved their work to the class website via classroom web cameras, beginning students used breakout spaces to access the project reading materials Shemtov had posted online.
- Consulting Professor Ed Carryer of Mechanical Engineering uses a tablet laptop in his Smart Product Design course to make the lecture component of the course more interactive for students. While Carryer displays a partial outline of a schematic circuit diagram, students break into groups and decide how the circuit should be completed. As the groups report back, Carryer sketches their solutions onto his slides in real time and the whole class discusses the results. The lectures are recorded as video presentations and made available to students to replay the problem-solving experience.

Technology *in* the classroom can also serve several important purposes. Multimedia or Internet technologies may allow you to present more information more effectively. Multimedia presentations may allow students to see and hear events that otherwise would only have been described in a lecture or textbook. For example, digital video clips of historical events can easily be embedded in a PowerPoint presentation (and later uploaded to a course website). Multimedia presentations can also document and demonstrate concepts that couldn’t easily or safely be demonstrated in a lecture hall or classroom, whether an experiment, a natural disaster, or a visit to another country. Some particularly innovative uses of technology in the classroom can advance

other pedagogical goals, such as increasing participation and assessing student understanding. For example, students in Professor Kathryn Moler’s Physics class can answer questions using individual infrared transmitters. The simultaneous signals are received and processed by a computer, and the instructor can use the results to give feedback to her students and tailor the lecture according to the answers received. Using class time or sections to teach students how to use a new technology may also be worthwhile, especially in introductory courses that require field-specific computer programs (for example, statistical programs for the sciences or design programs for engineers and artists).

Whether it is designed for inside or outside the classroom, good courseware is developed with active learning in mind, often with an emphasis on making students aware of the process of learning. Marcia Linn, a professor of Cognition and Education and former director of UC–Berkeley’s Instructional Technology Program, suggests that thoughtful multimedia courseware, like thoughtful teaching, can achieve three important goals. It can:

- encourage students to think like experts, by requiring them to solve problems and critique others’ solutions to problems;
- make thinking visible, so that the process of learning, not just the result, is emphasized;
- scaffold knowledge, building on what students already know, so they can understand and form general principles from new information.

By designing courseware that encourages students to make predictions and test them in experiments, for example, you help students build a knowledge base in your discipline. Linn cites an interactive program in physics that requires students to solve problems that in the past might have been the basis for laboratory experiments: “We’ve seen a transformation of the laboratory in physics. It used to be that people mostly went in and did calculations and ran apparatus. Now there’s an alternation between labs that are done using interactive physics courseware and those that are done using apparatus. I think that the faculty have come to believe that this is a very useful way to teach physics ideas and that students are more engaged in the process of making predictions and constructing views of the phenomena when they have this kind of environment than when they work only in the lab.”

Teaching at Stanford

Evaluating Students

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Gradings can be a major challenge for teachers. Grades inevitably reflect personal philosophy and human psychology, as well as our well-intentioned efforts to measure intellectual progress and performance with standardized, objective criteria. New teachers may be harsh at the beginning to prove that they are not pushovers. Others, afraid of discouraging or alienating students, are lenient. Even those who have managed to strike a balance between stringency and leniency may find grading to be their least favorite academic task. Grades cause a lot of distress for undergraduates; this concern often seems to inhibit enthusiasm for learning for its own sake (“Do we have to know this for the exam?”) and may result in unpleasant grade challenges and negotiations. Whatever your personal philosophy about grades, their importance to your students means that you must make a constant effort to be fair and reasonable. To reduce the amount of time and energy you and your students spend worrying about, or negotiating, grades, it is vital that you provide clear grading guidelines and enforce them fairly.

When we assign a grade to a student, what are we evaluating? Teachers vary in what they consider “fair game” for grading, but most often a grade represents a combined assessment of each student’s learning achievement (testing what the student knows or knows how to do), general performance (the quality of work that the student produces for the course), and effort (how hard the student worked in the course). Exams are the most common way to evaluate student learning achievement. When designing exams and graded homework, it is

important to consider what learning outcomes you are measuring; if your main course learning goal was simply for the student to learn facts, definitions, and concepts, a well-written and clear multiple-choice exam may suffice. If you emphasized application in class and ungraded assignments, and then present students with a fact-based multiple choice exam, you will both disappoint the students and not fairly assess their learning. For performance-based evaluation (papers, presentations, projects, or classroom contributions), be sure that you have given students clear instructions, grading guidelines, and if possible examples of previous students’ outstanding work. This way, students’ performance is more likely to represent their actual skill level and commitment, rather than a misunderstanding of the assignment. If your grading system also evaluates a student’s effort, it is important to be clear at the beginning of your course what steps students need to take to demonstrate serious effort in the course (be it visiting your office hours, meeting with TAs to review assignments, revising papers and projects, attending all class meetings, or speaking up in class). Many instructors who believe that grading “effort” is unfair or imprecise nevertheless end up unconsciously rewarding students who participate fully or visit office hours. Therefore, it is better to set clear standards than to ignore the influence such student behavior can have on grading decisions.



Setting clear guidelines in advance is essential for achieving conflict-free grading.

STRATEGIES FOR FAIR AND CONFLICT-FREE GRADING

Create a Grading Plan

Make a plan for evaluating the students and stick to it. Evaluation procedures should be decided on when the course is in the planning stages. If you are working with teaching assistants or colleagues, meet with them and decide what kinds of evaluation methods are to be used. Then decide how the students' work should be graded and what proportion of the final mark each assignment, quiz, etc., will comprise. This is also the time to set out a policy for missed or failed midterms and late assignments. For example, consider giving students two days of grace (or whatever length of time seems appropriate for your class) that they can use any way they'd like in assignment due dates. Without penalty, if they need to, they can then turn in one assignment two days late or two assignments one day late each. This gives students some flexibility from the start, but it allows you to insist that there will be no other exceptions.

Communicate Your Plan to Students

Once all of these things have been set out explicitly, take the earliest opportunity to make your students aware of these policies. Tell the class what you expect from them and how you plan to measure their progress in achieving the goals of the course. Explain how the evaluations, marking procedures, and policies will help both to achieve these goals and allow you to evaluate the students' progress fairly. Good planning and clear explanations will prevent student confusion—and possibly anger—later on.

Keep Records

Keep accurate records of your evaluation of each student throughout the quarter. Such records will make it easier for you to justify and/or reevaluate a student's final grade if necessary. Keep track of all elements that will be included in the final grade, including attendance, participation, and out-of-class meetings, as well as grades for any exams and assignments. You should also keep your records for several years since students may come back later to question a grade, finish an incomplete, or ask you to write a recommendation.

Consider the Distribution of Grades

It's a good idea to make a graph of the distribution of grades on each quiz or assignment. Software grading

packages can help you not only plot your grade distributions but manage your recordkeeping. If, for instance, you are giving a numerical grade from 0 to 50 on an assignment, you can plot a graph of how many students received a grade between 1 and 10, 11 and 20, all the way to 50. This graph will tell you at a glance how the students are doing. It will also allow you to see the most frequent scores and the middle of the scoring range. These statistics are informative for students who are concerned about how they are doing with respect to the rest of the class. Distributions will make it easier for you to see how good your evaluation method was. Uneven or badly skewed distributions suggest a poor testing method. If you plot similar distributions for a number of assignments or quizzes, you will be able to see how consistent your marking has been and also if there is (one hopes) a trend toward improvement in the students' performances. An individual student's grades can also be plotted this way, making it easier to assign a final letter grade. Save copies of the exam distributions for your future reference and for the use of future teachers in the course.

Responding to Grade Challenges

Occasionally students will dispute a test score or a final grade. In that case, it's important to give the student a courteous hearing. You may have added incorrectly, overlooked work, or not been able to decipher the writing on a test. If, on the contrary, the grade should still hold, most students appreciate an explanation of how the grade accords with the policies you set forth. The clearer your records, the easier it will be to reexamine and justify your grades. You'll find it easier to handle grade challenges if you do not attempt to regrade exams or projects with the concerned student looking over your shoulder. Have students explain carefully whatever problem they see in the grade, then ask them to leave the graded work with you. Not only does this give you time to look it over on your own and recheck your records, but it also gives the often-times upset student a chance to calm down. TAs also need to be careful not to get caught between professors and students on regrading questions. TAs should find out beforehand if the professor expects to decide grading disputes or if the TA is supposed to settle the matter with the student.

Testing

Testing not only lets you and your students know how much they have learned, it also provides a chance for more learning to take place, by reinforcing course material or by requiring students to use or think about what they have learned in a new way. Tests should be designed with primary course objectives in mind and should cover material from all components of a course (sections, lectures, textbooks, etc.). If you are taking over a course, go over the old tests carefully to see what was covered and how.

Students should be told in advance, preferably at the beginning of the quarter, what kinds of exams will be given in a course. Since some students may have access to old exams, it is probably fairer to give all students sample copies of at least one previous exam. The nature of the exam will directly influence how students prepare, study and learn. For this reason, the format and frequency of your testing will directly influence what and how much students learn. If students have reason to believe that you will mainly stress recall of information, for example, then they are much less likely to devote time to the mastery of concepts and the synthesis of material (and they may also be more likely to cram at the last minute, which makes it less likely they will remember the material very long after the exam). On the other hand, if your tests will demand a deep knowledge of the ideas discussed, students are likely to respond accordingly. Frequent testing can enhance learning as well as provide information on student progress. In this case, returning exams promptly and going over the exams with students will maximize the benefits of frequent testing and feedback.

Choosing an Exam Format

Your choice of exam format should be based on the learning outcomes you want to test. Below are some possible exam formats that can be combined to create a well-balanced approach to testing, along with some basic guidelines for using each format.

- Essay tests give students a chance to organize, evaluate, and think, and therefore often have the best educational value for many subject matters. They are, however, the hardest to grade. Make sure you, or your graders, have the time and stamina to grade essay exams well. You should discuss the criteria for their evaluation with the students and with any fellow graders before the test is given.

- Math and science exams generally consist of problems to be solved. Numerical or logical problems primarily test the ability to apply material; introducing familiar versus new problem types (which require extending what students have practiced to new applications) can vary the challenge of the exam.
- Multiple-choice exams are the most difficult to construct well, but can be used to measure both information recognition and concept application. If you use this format, consider writing questions throughout the quarter, while the lectures and material are fresh in your mind.
- Completion questions test for recall of key terms and concepts. If you use completion questions, be willing to accept reasonable alternative answers that you had not considered prior to giving the exam.
- Matching questions are useful for testing recognition of the relationships between pairs of words or between words and definitions. Supply enough answer choices so that students cannot guess simply by the process of elimination.
- Short-answer questions help test information recall and analytic skills. They achieve similar goals as multiple-choice questions, but require students to recall, not just recognize, correct answers. If you use a short-answer format, make questions specific enough that students can confidently answer the question in the allotted space.

In recent years, take-home essay exams have grown in popularity. Although they may seem an ideal format, by providing students with a calmer environment and more time to think through answers, they have drawbacks. You can minimize the drawbacks with some basic precautions. You can put word limits on each essay, for example, so that students with other tests do not have to compete unfairly against students with no other demands on their time. However, following the procedures of the Honor Code, there should not be a specified time limit less than the full period between the distribution of the exam and the due date. There should also be explicit instructions about whether or not students can talk to each other about their answers and whether they have unlimited access to materials (course materials only? library resources? talking to people outside the class?). An alternative strategy is to give out the exam in advance and allow consultation among students, but have them write the test in class without notes.

Writing Good Exams

Certain standards apply to all exam formats. Good exams are written in clear, straightforward language, so that all students can understand what you are asking for. Good exams do not require skills, knowledge, or vocabulary

One of my basic principles about exams is that they should test—and encourage—a wide range of types of knowledge and thinking, from factual information to the views of experts, analysis of the subject matter, and more personal interpretation and opinion.

Paul V. Turner, Paul L. and Phyllis Wattis Professor of Art

that are not central to the course. Good exams are an appropriate length for the exam period. Directions are clearly stated on the exam (and reviewed in class before students begin the exam). The point value of each part of the exam is given so that students can prioritize their time.

For exams that use a problem- or case-based format, construct most problems so that they resemble the ones given in exercises during the quarter. You can make the problems more interesting by describing a “real” application for the concept or technique or by combining two concepts in a single problem. Problems should be of graduated difficulty. The first problem, at least, should be one that builds confidence, so that nervous students do not become ruinously flustered at the outset. Avoid “double jeopardy” (when the solution to one problem depends on successfully solving a previous one). Finally, avoid long, detailed computations. Concentrate on ideas, not endurance.

After writing the rough draft of your exam, classify the questions according to what skills they require of the students: information recall, translation, interpretation, application of principles, analysis of concepts, synthesis of ideas, or evaluation. Make sure that your questions adequately cover the kinds of skills you want to assess. Particularly for multiple-choice exams, small changes to questions can demand a higher level of thought and more closely match the learning goals of the course. For example, instead of asking a student to recognize the correct word for a given definition, you might ask the student to choose the concept/term that best matches a novel example that you provide. This requires the student not only to know the definitions of the terms but also to interpret events using those definitions. Also check that your exam fairly represents the material of the testing period. It’s easy to fall prey to “primacy” and “recency” effects, where we overemphasize material from the beginning and end of a given testing period and underemphasize what was covered in the middle.

Once the questions are written, consider the more practical concerns of arranging the exam on the page. Aim for a stylistically simple, clean, and uncrowded layout. If you leave space for short answers or essays, realize that the amount of space you leave is often interpreted by students as the length of the answer you want.

After constructing any kind of exam, ask an experienced colleague or your TAs to look it over. Someone else can often point out ambiguities and typos that you do not see. Poorly written questions and typos are discouraging to students, who trust that you have put careful thought and attention into how they are being evaluated.

Always take the exam first yourself. For most exam formats, you should be able to finish the exam in no more than a quarter of the time the students will have.



The nature of your exams impacts the depth with which your students attempt to learn.

Grading Exams

Problem Sets, Short-Answer Questions, and Multiple Choice Although these evaluation methods usually take longer to make up than others, they are also the easiest to grade. Multiple-choice exams can usually be graded by one or two people in about an hour if you use a scanner and software to grade and analyze the exams. With other formats, it is often a good idea to divide the exam questions among graders. This is more likely to provide grading consistency and make it possible for a grader to spot patterns of deviation for a single question or problem.

EXAM CHECKLIST

Are students prepared for the exam?

Make old exams available to students, if possible. Make clear before any test what material you consider important. Make sure students have practice with the kinds of questions/problems on the exam.

Does the exam reflect your goals for the course?

Compare material in the test to the major topics listed in your syllabus, lecture outlines, and the textbook, to make sure you've been consistent.

Is the exam of reasonable length?

Take the exam yourself. You should generally be able to finish in one-fourth the time it will take the students. Keep time-consuming number-crunching to a minimum.

Are the directions and the format clear and well organized?

Ask a colleague or TA to read over the instructions to help you spot any ambiguities or misleading statements. Make sure the print is clear and that if there's space left for problems/essays, it is of suitable length.

Is it clear how much credit each question is worth?

Make sure that the value of each question is clear, so students can decide how much time to spend on each part of the exam.

Is it free of double jeopardy?

Do students need an answer from one part of the exam in order to understand or solve another?

Does it begin with questions or problems that will build, rather than undermine, student confidence?

Have compassion for students' test anxiety and start an exam with questions that are reasonably easy for a prepared student.

Are the questions/problems interesting?

Try to include interesting applications or combinations of material that show the value of the material students are being tested on. Make sure to challenge, but not to confuse, your students.

For multiple-choice exams, Scantron grading software provides a number of test analysis options, including item-by-item analysis of question responses. If students are doing worse than chance on a particular question, it is likely that the question was poorly worded. In this case you should either give credit for more than one answer or toss the question out (by giving everyone credit). For all exam formats, you may think that you have written the perfect question with only one correct answer, but always be prepared for alternative answers. Consider allowing students to submit regrade petitions justifying their solutions.

Essay Exams Usually the challenge is how to wade through all those essays while remaining both consistent and sane. When there are a number of instructors assigned to a course, this is easier, because you can divide the workload. If each instructor has a section and all of you have covered the same basic material, then you may prefer to mark the entire exams of just the students in your section. (The problem here, of course, is that objectivity may be harder to achieve since you may be partial toward your own students. Grading question by question, rather than student by student, may improve grading consistency.) This will allow you to give credit for material that you presented in section and it will give you feedback on whether the ideas you have emphasized have actually registered. At the same time, you should be guided by a grading standard that has been mutually agreed upon by all instructors. If each instructor has dealt with specialized topics in lecture and section, then it is probably better to split the exam questions up so that each teacher covers the area he or she taught. Dividing the exam questions in this way ensures that each question will be marked consistently across all students, even if one grader turns out to be more stringent or lenient than other graders. However, reading 200 answers to the same question one after the other has its drawbacks; it can affect your mental health and your grading range. This is less likely to occur if you pace yourself, grade questions that you are interested in, and switch questions every once in a while if you are grading more than one question. After grading has begun, consider having all graders share a sample of their A, B, and C essays to compare and sort out any inconsistencies developing among graders.

Grading essay exams involves a lot of subjective judgment, and your judgment may be influenced by things like fatigue, boredom, or rushing to finish. In particular, you are more likely to be stringent with the first

few essays you read than with the rest and you are less likely to be careful about comments when you are tired. To avoid such problems, read a few essays before you actually start grading to get an idea of the range of quality. Stop grading when you get too tired or bored. When you start again, read over the last couple of essays you graded to make sure you were fair.

After the Exam When the exams have been marked, get together with the other graders to discuss and resolve any problems you have encountered. Then add up the total scores, check your addition (this saves a lot of trouble later), and plot the distribution. Discuss the grade distribution and what you think it says about student learning and test construction.

For maximum learning from an exam—and out of respect for the students—tests should be returned to students as soon as possible. Unless you intend to discuss them in class, hand tests back at the end of a period in order to avoid students being preoccupied while you try to cover something else. Provide a grade distribution to students to help them make sense of their numeric or letter grade. Do not post students' grades publicly. They are legally entitled to confidentiality in this matter.

Consider having an official “regrade” policy in which students have a limited time (say, one week) to review their exam, request a regrade, and justify their request with a full written explanation. This policy has the benefits of encouraging students to review their exams in a timely manner, discouraging arbitrary grade complaints, and requiring students to examine their responses carefully.

An examination is not just a grading device, but a useful tool for learning. The challenge is to craft examination questions that require students to use their knowledge, not in the linear sequence in which they may have learned it, but in applied, non-linear ways.... The most important thing that I want them to know is how to establish a conceptual framework in a vast body of information and how to decide what's important and what's trivial.

Robert Waymouth, Robert Eckles Swain Professor in Chemistry

Papers, Projects, and Presentations

Papers, projects, and presentations are excellent opportunities for students to demonstrate their learning and investment in a course. Students typically welcome such assignments when they come with clear guidelines as well as room for some flexibility in topics and creativity in content.

Creating Interesting and Effective Assignments

Because papers, projects, and presentations allow students to spend a significant amount of time preparing the end product, these kinds of assignments can focus on the highest-level goals for the course. For example, assignments may require analysis and synthesis of competing perspectives, application of theory to real-world problems, or creative extensions of course material. When you choose a topic or format for this kind of assignment, make sure that it challenges students to meet these kinds of high-level goals. Otherwise, exams and homework are usually a simpler assessment tool. Several approaches can make a basic assignment more interesting. Consider adding the following angles to your assignment:

- Have students target their paper, project, or presentation for a specific audience, other than the instructor. Target audiences might include a review board or funding agency (for research papers), a judge or jury (for logical arguments or analyses), the general public (for informational reports), or a historical figure. The format of the assignment can be tailored to the audience, for example a proposal to a review board or a letter to a historical figure.
- Require students to use experiential resources alongside traditional library resources. For example, students can conduct an interview or engage in observer-participation at a relevant site or event.
- Invite an expert to discuss students' work at the end of the quarter. For example, you might invite a colleague in academics, industry, or service to oversee a presentation of student projects and select the most innovative project, or discuss in class how the process students went through to produce the project relates to professional or real-world activities.
- Allow for some aspect of collaboration or peer feedback. For example, students can respond to drafts of another student's work. Or, you can assign students to different aspects of a single topic and reserve some class time for discussion among students working on the same topic.

When writing your assignment instructions, recognize that introductory students (especially freshmen) appreciate specific assignment topics and instructions, whereas advanced students often prefer more freedom. If you decide to allow for a wide range of topics and formats, make sure that your instructions are still specific enough to ensure that students produce high-quality work. For example, you might allow students to choose their own topic, but provide specific instructions on how to produce a good literature review, grant proposal, or informational website (whatever the format is); or, you might let students choose the format, but still give specific requirements about the number and quality of resources they need to use. For all students and assignments, it is helpful to:

- give clear grading guidelines;
- make samples of previous students' work available;
- break the assignment into stages (i.e., outline, draft, revision, final project) to prevent procrastination or misunderstanding.

Grading Papers

There is nothing more arbitrary to a student than a paper passed back with a grade but few comments. When grading papers, write comments judiciously and legibly. Do not obliterate the text—use the margins, the back, or append a note. Try to be specific enough with your suggestions so that the student has a good chance of doing better next time. If you find that you are saying similar things to several students, prepare a handout on whatever the students are stumbling over—how to write a review, for example, or how to develop an argument. Even better, give such a handout at the time an assignment is announced, so students are prepared.

A paper should be judged on its content, organization, and style. It is useful to the students if you evaluate the paper in each of these areas; however, students should understand that the overall strength of a paper's "content" (ideas, analysis, or insights) cannot really be separated from the execution (organization, mechanics, and style). After all, language is the medium through which students must present and arrange their thoughts. Some teachers have had good success with asking students to write papers twice. The first draft is submitted and subjected to constructive criticism on these areas of content, organization, and style. The second draft is graded and usually shows the kind of improvement that is satisfying to both the student and the teacher.

Follow the same strategies for grading papers as

you would for essay exams: read a few papers before you actually start grading to get an idea of the range of quality. Stop grading when you get too tired or bored. When you start again, read over the last couple of papers you graded to make sure you were fair.



The teaching process is not over when students hand in their papers. Your prompt and thorough feedback is key to student learning.

Grading Projects and Presentations

Projects and presentations can present special grading challenges because of their unique formats. Make sure you have given students explicit guidelines for the assignment and consider preparing a grading checklist or "score sheet" based on these guidelines. You can include anything from assignment length to use of sources to overall creativity in these guidelines. Whether or not you return this score sheet to your students is up to you; however, students always appreciate (and deserve) some comments explaining the grade.

Grading Group Assignments

While group assignments can achieve learning goals (such as improving students' collaboration skills) not easily addressed by traditional coursework, they are notoriously difficult to grade fairly. Work is often distributed unevenly among group members. For this reason, some instructors allow members of a group to individu-

ally suggest a grade for “effort” for each of the group members, including themselves. In addition, because collaboration limits the ability of any one student to “control” the final product, group work may not perfectly reflect the true abilities or effort of either a struggling student or an outstanding student. For this reason, consider implementing both individual and group accountability. For example, each student might be individually responsible for a certain topic or section, as well as receive a holistic grade for the group’s performance. In this case, be sure to provide some classroom time or other structured instructions for group coordination and discussion, so that the group does not splinter.

Also recognize that some projects do not lend themselves well to collaboration; traditional or scientific papers, for example, are almost always “divvied up” by students, with little discussion, feedback, and integration of perspectives. Assignments that work well with collaboration often result in “products,” such as films, computer programs, and physical inventions, or “proposals,” presented in class or in writing, based on a problem-solving assignment or case study.

Academic Honesty and Dishonesty

Academic honesty and dishonesty are both moral and administrative concerns for a teacher at Stanford. Stanford University’s Office of Judicial Affairs (within the Office of the Dean of Students) administers the student judicial process for Stanford and works toward an honest and responsible community. Under the process, students are held accountable for adhering to established community standards including Stanford’s Fundamental Standard and the Honor Code. The Fundamental Standard states: *Students at Stanford are expected to show both within and without the University such respect for order, morality, personal honor and the rights of others as is demanded of good citizens. Failure to do this will be sufficient cause for removal from the University.*

The *Honor Code with Interpretations and Applications* is quoted in full in the Appendixes (and is available on the web at <http://honorcode.stanford.edu>).

Spend some class time at the beginning of the quarter discussing the code, as well as the broader topic of academic honesty. Your discussion of academic honesty should presume the integrity and honesty of your students and be used to clarify expectations as well as answer any questions students have.

Three main points should be emphasized in discussing the Honor Code with students:

1. The *Interpretations and Applications of the Honor Code*, enacted by the Board on Judicial Affairs, supplement and clarify the Honor Code. The Board on Judicial Affairs does not presume, nor is it possible, to eliminate all ambiguities or uncertainties. It is the responsibility of each instructor to define what type of aid is and is not permitted in his or her course. The effectiveness of the Honor Code depends ultimately upon the good faith and conscientious judgment of all individuals concerned. You can get further information on the Honor Code by talking to the judicial advisor at 725-7425.
2. The Honor Code was not imposed upon the students by the administration or faculty. The students originally assumed its responsibilities at their own request.
3. Those who suffer most from students’ academic dishonesty are not administrators or faculty but the honorable and conscientious students. Hence it is in their interest to make individual and collective efforts to see that the highest standards of honesty are always maintained. The code specifically enjoins students, in the name of “third-party responsibility,” to discourage dishonesty by drawing attention to violations, talking with offenders, or—if all else fails—initiating formal procedures. The judicial advisor has pointed out that because students too rarely take such actions, faculty are tempted to question the code and resort to other means to prevent cheating.

For questions about appropriate procedures in particular cases or ambiguous areas, the judicial advisor may be consulted. TAs, students, and faculty are all encouraged to use the services of the judicial advisor with regard to the Honor Code. If you are TAing, you should discuss the Honor Code and academic honesty with the faculty member in charge of the course at the beginning of the quarter. Make sure your interpretations are compatible and you agree on what to do if violations occur. This will ensure that all students in a course are treated fairly.

Not only should you inform students about the Honor Code and procedures in regard to violations, you should also try to create a learning environment that will reduce the temptation to cheat. Make sure students know your grading criteria, what kinds of exams they will be given, and what materials they are responsible for. If you assign any term papers, you ensure higher quality work if you regularly check on students’ progress on their papers during the quarter. You may ask them to submit their first draft early on or to turn in rough copies along with

the finished version. This reduces the likelihood of receiving “file” or purchased papers. The issue of plagiarism should be discussed in some detail, particularly in introductory or writing-in-the-major courses, since not all forms of plagiarism are understood and recognized by students.

Effective learning does not occur in an atmosphere of suspicion. You have an obligation under the Honor Code not to proctor exams or to take unusual measures to prevent cheating, and to treat students as if they are honest, until proven otherwise.

Writing Letters of Recommendation

One of the most satisfying evaluation tasks is writing letters of recommendation for your students. When you write letters of recommendation, you are not just evaluating the students’ performance in your class, contribution to your research, or potential for future work; you are also directly helping them achieve their personal and professional goals.

You may be asked to write a letter of recommendation for graduate school, a summer job, or full-time employment. First ask yourself if you know the student well enough to write a helpful recommendation. What are your impressions of that student? Can you be honest in writing a letter? If you have reservations, be straightforward with the student and explain why it would be better if the student requested a letter from another source. If you have a positive opinion about the student, put in the effort to learn as much as you need to about him or her in order to write a compelling letter.

Here are a few points to remember when writing a recommendation:

- Set up an appointment to meet with the student, asking him or her to bring a resume, a transcript, and any outstanding work from your class. If the student is applying to graduate or professional school, you might ask him or her to bring the personal statement, even in rough draft form. The resume and transcript can provide you with information about the student’s background, in addition to insights into his or her interests and activities outside your class.
- Use the appointment time to question the student more about his or her specific purpose (e.g., “Why are you going on to graduate school?” or “How does a full-time job as a newspaper reporter relate to your long-term career goals?”)



Writing letters for students you have helped nurture and mentor can be a very rewarding experience.

- Have the student give you the name and complete address of the person you’ll be writing to, along with the date by which the letter is needed.
- Try to write the letter as soon after this meeting as possible, while the information is still fresh in your mind. You’ll be surprised how quickly you can forget the important details necessary for a strong letter.
- Use a standard business letter format on your department stationery or the form provided by the Career Development Center (if the student is opening a placement file). Undergraduate Advising Programs provides a list of guidelines for writing recommendations for students applying to graduate programs. Letters are generally one typed page and contain the following information:
 - Your relationship to the applicant and length of time you have known him or her.
 - Specific details about the applicant’s skills; past work for you or present job responsibilities; strengths or weaknesses; any unusual aspects that might contribute to or hinder the applicant’s performance; and motivation. Be vivid and concrete, but do not exaggerate or inflate. You want to make the student stand out to the degree he or she deserves, but you also have to preserve your credibility as a recommender.
 - Comments on how the above information relates to the student’s choice of graduate program or job opening. When writing to a prospective employer, translate academic skills into business skills (e.g., a

Teaching at Stanford

Interactions with Students

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When you ask a teacher what the best part of teaching is, the response almost always describes some aspect of the teacher-student relationship. Whether it's the one-on-one conversations in office hours or the joy of seeing a classroom discussion come alive, positive interactions with students remind us why we became teachers and scholars. As described in previous sections, you can maximize positive interactions with your students through your use of electronic communication, office hours, and classroom teaching strategies. In this section, we address teacher-student interactions, from valuing the diversity in our student population to supporting academically vulnerable students to handling conflict in the classroom.

The Diversity of Our Students

As you walk around Stanford, you will note that one of its strengths is the diversity of its students. Even beyond the diversity that you can observe from the outside, Stanford students carry with them rich and diverse backgrounds that shape their experiences inside and outside the classroom. It is not possible to tell when you walk into a classroom what varied backgrounds your students bring to the current learning environment. Therefore, it is important not to make assumptions about your students based on superficial characteristics or your ideas about the "typical" Stanford student. Explore ways to foster an open, safe environment for all

students, while learning more about the varied backgrounds and experiences your students bring into your classroom. This is the best way to ensure that all students will feel comfortable, and supported, in rising to the academic challenges you set for them.

Examining Assumptions

We all have generalized notions about Stanford students, including both positive and negative stereotypes. This extends not just to Stanford students as a whole, but to different populations within the Stanford community. Often these assumptions are not even based on our own direct experiences with students; they may be shaped by conversations with colleagues, our own college experiences, and general cultural ideas about different groups. It is important to examine these assumptions, as they influence your expectations of, and interactions with, your students. The most helpful attitude you can take toward your students is one of general, undifferentiated positive expectations, paired with a willingness to provide extra help to any student who demonstrates the need and a desire to accept it.

In the classroom, you can encourage students to examine their own assumptions, especially if stereotypes or other negative comments come up in class discussion. You can help your students become more informed, more sensitive, and more conscious about ethnic, racial, and gender issues, as well as other issues unique to a college population (for example, attitudes about student athletes, nontraditional students, and students in different majors). One way to deal with bigoted or insensitive comments made in class is to ask the student to repeat the comment—and to take responsibility for it. You can then ask the student why she or he holds that assumption, what evidence there is for it,

I think there's nothing better in a classroom than to find somebody has brought something new to a text that I've read ten or twelve times. And being open and receptive to that as well as being able to provoke them, to bring that out of them, and to allow a space in which a variety of views can be heard: it's a challenge and it remains a challenge each time we enter the classroom.

**Harry Elam, Olive H. Palmer
Professor in Humanities**

and what other factors might be involved. In certain cases, you may want to discuss the issue further with the student outside of class, or invite the other students to think about the issue and email you responses that can be discussed in the next class meeting. Both of these strategies encourage careful reflection, rather than heated defensiveness. You can also sharpen students' awareness of their biases by discussing your own learning experiences. For example, if you have changed your course materials in some way (to be more inclusive or to represent the work of certain communities), you can discuss your reasons for doing so.

Supporting Vulnerable Students

There are two kinds of academically vulnerable students: those who are genuinely struggling with material and those who believe that their instructors and peers doubt their abilities. It is important to recognize both threats to a student's achievement and to construct an environment where students who need help are comfortable asking for it and students do not feel pressure to dispel stereotypes about their race, ethnicity, age, or gender.

Students in academic trouble may feel reluctant to show weakness, and they often conceal their problems until an exam or deadline passes. One way to identify students in need of extra help is an ungraded background knowledge quiz the first week of class. You can also introduce graded assignments or exams early in the quarter. Students who do poorly can be given supplemental material or advised to meet with a tutor. It is important not to discourage these students from taking the course, unless there is a good reason to. You may want to invite struggling students to your office hours. When meeting with them, take the time to find out why the student thinks he or she is struggling. There may be extenuating circumstances, such as family or personal problems; at the least, students may have insight into their study habits. Remember that your primary role is to help students learn, and you do not need to solve all of the students' extenuating problems to help them do better in your course (see "Counseling Students" later in this section for more advice on this matter). In addition to helping students who clearly are struggling, make a habit of offering clarification, feedback, and assistance to all of your students.

One common assumption held by instructors is that students from low-income households, and some students of color, may be underprepared for college

work. However, many of these students perform at the highest levels of academic achievement at Stanford. It is true that some of these students do not come from a home or neighborhood with role models for university-level academic achievement, and in the beginning they may ask themselves, "Do I really belong here?" However, you cannot always tell which of your students come from such a background, nor is self-doubt limited to students without role models. Most Stanford students go through a stage of believing that they were admitted by mistake. It is important for you to assume that yes, all of your students belong here, and it is important that each of your students knows you believe this. Professor John Rickford of Linguistics sees confidence as particularly crucial to success in academics. "It takes guts to take an original position, to challenge—the secure and self-confident are more likely to do so." It is crucial that you not allow your own assumptions about students to compound students' self-doubts. Rickford suggests that faculty and TAs challenge students to their limits by holding them to demanding standards while also building up and supporting their abilities to meet those standards. For example, you might encourage a student to rewrite a paper and give clear guidelines on how to approach the revision; this is demanding, but supportive. You can also get undergraduates involved in your research, an effective way to motivate and inspire promising students who may not yet feel that they belong at Stanford. In addition, instructors should emphasize the positive and avoid harsh remarks whenever providing criticism. Students often trust an instructor's judgment about their ability; this is why a simple encouragement can launch a student's passion and a simple criticism may devastate a student. The idealized notion of an excruciatingly critical yet brilliant and inspiring professor is more fiction than reality. You will best inspire your students with a balance of encouragement and constructive criticism.

Psychology professor Claude Steele's research has found that certain groups of students are vulnerable to the consequences of stereotypes, even when they know the stereotypes aren't true or don't believe the stereotype applies to them individually. For example, members of a stereotyped group may feel an extra burden to disprove the stereotype, resulting in increased anxiety during exams or in other classroom situations. He believes that this "stereotype vulnerability" may help explain why many talented women and minorities drop out of math, science, and engineering programs, and why the African American college dropout rate nationally is higher than

for other groups (though at Stanford the African American dropout rate is not higher than that of other groups). To counter stereotype vulnerability, Steele recommends that instructors demonstrate their confidence in students' abilities through challenge, mentoring, research groups, and peer advising. Recent research has shown that when faculty and TAs can create learning or mastery-oriented classrooms, students focus more on developing their understanding of the material rather than on how they are being evaluated in comparison to their classmates.

Students with Disabilities

As an instructor, one of your primary goals is to help students discover the power and freedom that ideas can bestow. This is particularly true for students who have faced any significant challenge in their life, including physical and learning disabilities. Working with such students provides you the opportunity to make the learning environment more effective; you will become a better teacher for all students by increasing the variety of your instructional approaches. Students with disabilities are as diverse as any other group of Stanford students. They are bright, talented, motivated, positive, enthusiastic, goal-oriented, and academically prepared. It is important to remember to focus on their individuality, not their disability. All disabling conditions occur on a spectrum, so generalizations about a particular type of disability are seldom accurate or constructive. Each student with a disability will have a different level of functioning, even within the same disability category. Additionally, compensation skills will vary widely from one student to another.

Who Is a Person with a Disability?

As legally defined, a "person with a disability" is someone who (1) has a physical or mental impairment that substantially limits one or more major life activities (e.g., eating, caring for oneself, learning, etc.); (2) has a record of such an impairment; or (3) is regarded as having an impairment. The disabling conditions themselves are numerous: the disability can be visible or invisible; congenital or the result of disease or traumatic injury; produce formidable challenges to everyday living or cause relatively minor inconveniences.

Legal Obligations

Two federal laws prohibit colleges and universities from discriminating against qualified students with disabilities. The first, Section 504 of the 1973 Rehabilitation Act, applies to institutions that receive federal assistance (grants, contracts, etc.). More recent federal legislation, the Americans with Disabilities Act (ADA), passed in 1990, extends the prohibition against discrimination to areas not covered under Section 504, such as private businesses, non-governmental-funded accommodations, and services provided by state or local governments. Modeled on other civil-rights legislation, these laws are designed to eliminate discrimination in any program or activity on the basis of disability. The spirit of both these laws is not to guarantee students with disabilities equal results or achievement, but to afford them the equal opportunity to achieve equal results.



Reasonable accommodations for students with disabilities can be made for a wide range of teaching situations. Stanford's Office of Accessible Education and Student Disability Resource Center have a rich set of resources and ideas to support this effort.

Handling Student Disability-Related Requests

The Disability Resource Center (DRC) at Stanford is responsible for administering the policies and procedures for disability-related needs of undergraduate and graduate students who have documented disabilities. Students are responsible for initiating the process by requesting academic accommodations from the DRC. As an instructor, it is important for you to refer students who ask about disability accommodations in your course to the DRC. A DRC staff member will meet with the student, review professional documentation submitted in support of the need for academic or other accommoda-

WAYS TO HELP STUDENTS WITH DISABILITIES ACHIEVE THEIR ACADEMIC GOALS

Students with disabilities, faculty, and the Disability Resource Center staff share a collective responsibility to ensure that adjustments made in a particular class accommodate the student's disability, without altering academic standards or course content. The following suggestions can enhance the general teaching environment while helping students with disabilities achieve the academic goals of your course.

Early identification of required textbooks and reading assignments

Whenever possible, complete syllabi at least three weeks in advance of the beginning of the quarter. When this is not feasible, instructors are encouraged to identify the required reading assignments for the first three weeks of the quarter. Early identification of textbooks and assignments allows the DRC the lead time necessary to prepare course materials in alternative formats such as braille or audiotape, as is required by law.

Statement for course syllabi

Include the following statement on the class syllabus and review it during the first class meeting: "Students with documented disabilities: Students who have a disability that may necessitate an academic accommodation or the use of auxiliary aids and services in a class must initiate the request with the Disability Resource Center (DRC). The DRC will evaluate the request with required documentation, recommend appropriate accommodations, and prepare a verification letter dated in the current academic term in which the request is being made. Please contact the DRC as soon as possible; timely notice is needed to arrange for appropriate accommodations. The DRC is located at 563 Salvatierra Walk (723-1066; TDD 723-1067)."

Class handouts and writing on the board

Handouts and writing on the board are barriers to students who are blind or who have visual impairments. Read what you write on the board as you write it and verbally describe visual aids. For example, you might say, "The five-inch-long steel rod," rather than "this" or "that" (which are basically meaningless phrases to not only a visually impaired student but to any student who is focusing on taking notes). Acknowledge students by name during discussions so the students know who is participating. Offer to provide your syllabus and

other handouts in large print, on computer disk, or on audiotape. The Disability Resource Center can assist students with taped texts, large-print software, readers, and adaptive computer equipment.

Lectures and discussions

Students who are hearing impaired and read lips cannot follow the lecture or conversation when the speaker's back or head is turned. Be aware of the direction that you are facing and try to face the class. Speak slowly and clearly without shouting; don't exaggerate or overemphasize lip movements. Refrain from chewing gum or otherwise blocking the area around your mouth with your hands or other objects. Try to avoid standing in front of windows or other sources of light. The glare from behind you makes it difficult to read lips and other facial expressions. In group discussion, ask one person to talk at a time so that the student will not miss out on information. The Disability Resource Center can assist students who are deaf or hearing impaired with notetakers and sign-language interpreters or stenocaptionists. If an intermediary is used, look at and speak directly to the student, not the interpreter/stenocaptioner. This is more courteous and allows the student the option of viewing both you and the interpreter to more fully follow the flow of conversation. When using slides, movies, or overheads, leave enough light so the student can see the interpreter. If a written script is available, provide the interpreter and student with a copy in advance.

Notetakers and laboratory assistants

From time to time, you will be asked by the DRC staff to identify potential notetakers or laboratory assistants to facilitate academic accommodations for a student with a disability. All such assistants receive payment for their services and the DRC appreciates your assistance in the recruiting efforts.

Classroom accessibility

Access is one of the major concerns of the student who uses a wheelchair or has a mobility impairment. In the event that the classroom you are assigned is inaccessible for a particular student, contact the DRC. It is this office's responsibility to work with the student and the academic department to remedy issues of classroom inaccessibility or modifications that are needed in a laboratory setting.

tion(s), and then prepare an “Accommodation Letter.” This letter, which the student will bring to you, details the recommended accommodation plan.

What Is a Reasonable Accommodation?

Under both the ADA and Section 504, educators and service providers must analyze in detail which accommodations are feasible and effective for particular individuals. This involves a case-by-case analysis of the student and the requested accommodation. The regulations do not preclude or interfere with the right of institutions to impose and enforce acceptable criteria and standards. Essentially, the law requires institutions of higher education to make those reasonable adjustments necessary to eliminate discrimination on the basis of disability. In all instances, the requested accommodation needs to be directly linked to the underlying disability. For example, a student with a learning disability who presents professional documentation substantiating a slow reading rate is likely to be granted the accommodation request for extended time on a reading-intensive history examination. In this example, the accommodation of extra time allows the instructor to measure the student’s achievement in history, not his or her impaired reading rate (except when this skill is the factor being measured).

As a rule of thumb, for an accommodation to be considered reasonable there are two key questions: (1) Is the accommodation necessary in order for the student to enjoy equal opportunity? (2) Is the accommodation reasonable in the context of the student’s course of study? In the context of postsecondary education there are four types of accommodations that are not considered reasonable: (1) It is not a reasonable adjustment if making the accommodation means making a substantial change in an essential element of a specific course or curriculum; (2) It is not a reasonable accommodation if making the accommodation poses a direct threat to the health or safety of others; (3) It is not a reasonable modification if making the accommodation means making a substantial alteration in the manner in which the university provides its services; and (4) It is not a reasonable accommodation if it imposes an undue financial or administrative burden.

Teaching Challenges

Even the most carefully prepared instructor cannot anticipate the unique consequences of each combination of instructor and student personalities, backgrounds, and goals. We begin by discussing the most seri-

ous of these teaching challenges—conflict with students—and then discuss some common classroom challenges.

Preventing Conflict

A sensitive approach to your work with students can save you from many problems. If you phrase questions and criticism carefully, you can generally avoid defensive or hostile responses. If you are supportive, encouraging, and respectful of student ideas in class, then you can correct wrong answers or point out weaknesses without discouraging your students. Always show students the courtesy of listening to and responding to their answers when they offer an idea. Rather than dismissing a weak or inaccurate idea immediately, ask the student to clarify it using the material for the session. Often, students can talk their way into a more thoughtful response. You will also want to be careful about teasing or sarcastic humor, since these are all too easily misinterpreted.

You are also less likely to run into conflict with your students if you resolve any mixed feelings you have about your authority as a teacher. Students are confused by and often alienated from a teacher who acts first as a friend or peer, then as a stern authority figure. Students expect you to set clear boundaries and to hold students to their academic responsibilities.

Managing Conflict

Sometimes serious conflicts do arise between teacher and student—charges of poor instruction, irregular or unfair grading, deviation from announced procedures about course requirements, and the use of nonacademic criteria in computing grades. Although you may assume such problems are rare, in fact they are not. Concerns about academic performance (including grade disputes, Honor Code violations, credit and registration issues, and concerns about faculty conduct) are among the most frequently registered student complaints to the ombuds-person’s office. Ideally, such problems can be avoided by carefully formulating, communicating, and following classroom policies, especially regarding grading. However, if a problem does arise, there are steps you can take to resolve the conflict.

- First try to resolve the conflict through discussion with the student. If you are the TA, you will also want to involve the professor early on. Fortunately, most conflicts can be worked out cooperatively at this stage. If you anticipate the discussion being particularly difficult or confrontational, you may want to invite (with the student’s permission) a colleague (e.g., the depart-

ment's student services officer) or another member of your teaching team (e.g., the student's TA) to ensure that the meeting serves everyone's interest.

- For those conflicts that cannot be addressed through informal discussion, the university has a formal grievance procedure, outlined in the *Stanford Bulletin*.
- An alternative to the formal grievance procedure is to go to, or refer the student to, the ombudsperson's office. As a mediator, the ombudsperson can talk with all the parties involved to try to find a mutually satisfying resolution. The ombudsperson can only offer advice; he or she does not have the authority to impose solutions. Nevertheless, meetings with the ombudsperson often are effective.

Conflicts can also arise when teachers are attracted to their students or vice versa. To avoid such potential clashes, the university very strongly discourages such relationships. Stanford has an explicit policy on sexual harassment and has committed itself to creating an atmosphere "free of sexual harassment and all forms of sexual intimidation and exploitation." See the Appendixes for the summary of this policy, or refer to the website <http://harass.stanford.edu/>.



For the most part, Stanford students express their opinions politely and debate respectfully; however, a positive learning climate can be lost if inflammatory or insensitive comments are allowed to dominate. Keep your cool and help maintain the focus on ideas, not individuals.

Classroom Challenges

Sometimes, particular students may cause you problems in class, without warranting major negotiation or intervention. A few common situations, and ways to work with them, are discussed below.

Arguments in Class

When arguments erupt in class, or when a student makes an inflammatory comment, your role as the instructor is to preserve the learning environment. This task is twofold: first, you need to maintain a safe environment for your students, which means preventing the debate from turning into a prolonged attack on either individual students or groups with whom a student might identify. It also means keeping your cool and staying respectful if a student challenges you; this preserves students' trust in you. Second, you need to look for the learning opportunity in the experience. What is the value for students in hearing opposing viewpoints or challenging commonly held stereotypes? Is there a way to use the content of the argument to serve your teaching goals? Or is student learning best served by defusing the tension and swiftly refocusing students?

When a discussion between students becomes more heated than you would like, you can use the following strategies to transform arguments into productive debate:

- Take a deep breath and try to assess what is happening. Is a student voicing frustration? Is a student enthusiastically expressing a heartfelt opinion? Are two students misunderstanding each other?
- Whenever possible, encourage students to discuss ideas, not individuals, in the classroom.
- If a student attacks another student's idea, ask that student to restate what he or she thinks the other student meant. Make sure that the interpretation is accurate and allow both students to clarify their statements.
- Ask the students to generate all possible evidence for both sides of a debate as a way of suspending judgment and encouraging reflection. Ask students to find counterexamples as well as examples.
- Offer to continue a discussion after class or ask interested students to email you their thoughts, if the topic of the argument is not central to the goals of the class session.

When a student challenges or criticizes you, take the following steps to stay calm and find some value in the exchange:

- Again, take a deep breath, and try to understand the content of the student’s complaint or challenge. Ignore, for a moment, any rudeness; if you respond to the content, the student’s attitude and approach may soften.
- Remain calm and nonjudgmental, no matter how agitated the student becomes. Your emotional response will only become further fuel for the student’s anger. This is especially true if a student makes a personal attack.
- Don’t use your authority as a teacher to simply claim superior knowledge or logic; while in some cases it may be true, it will almost never convince your students, and it discourages their active engagement with the ideas.
- Use evidence when disagreeing with a student and ask students to provide evidence for their positions. You may ask other students to evaluate the evidence that you, or the student, provide, if the argument is related to course content.
- Never get into a power struggle with a student. As the teacher, you already have power; any retaliation to a student’s provocation is likely to be viewed as an abuse of power.
- If a student is agitated to the point of being unreasonable, ask him or her to carry the grievance to a higher authority. Do not continue trying to reason with a student who is highly agitated.

In general, make your response as calm as possible and avoid making an issue out of a small incident. Try to use any conflict in the classroom as an opportunity to further your teaching goals: it may be possible to use an argument to clarify material, model critical thinking skills, foster open-mindedness, and enhance students’ trust in you.

When One Student Dominates the Classroom

Overtalkative or disruptive students can derail a class. If a student dominates the classroom, try the following strategies to refocus the class and involve other students:

- Ask other students to comment on the dominant student’s ideas and to propose an alternative perspective.
- Try participation strategies that involve the whole group, such as taking a vote, breaking up into pairs, or doing a “round robin,” where every student gives a brief response to a question, problem, or thought-provoking quote.
- If the dominant student seems to be well-intentioned, you might meet with the student privately, thank her for her enthusiastic participation, and ask for advice on how to involve other students. Let the student know

that you want to distribute participation more evenly, and invite her to be your “collaborator” (e.g., by not answering a question right away to give others an opportunity, or by phrasing comments in a way that encourages others to respond).

- If a student dominates by asking too many disruptive questions, you can ask the full class how many students would prefer that you spend class time answering a specific question. If the class does not vote yes, let the student know that you can answer his question after class or in office hours.

Recognize that talkative and even disruptive students often think they are displaying enthusiasm and thoughtfulness; show appreciation for their commitment to the class, even as you help them find an appropriate way to demonstrate it.

When Students Remain Silent

Some days, the silence in a classroom can make you long for a little heated debate. If you have students who never answer a question, offer an opinion, or participate in a demonstration, try these strategies for involving them in the classroom:

- Make sure that you know the names of your students and that all the members of a class know each other by name.
- Create a safe environment by responding positively to all student feedback, even if you need to correct a statement. Thank each student for his or her contribution and try to find the seed of a correct or more developed answer in the student’s response. Give students the opportunity to revise or clarify their response.
- Prepare students for full-group discussion by having them first discuss the topic in pairs or by spending a few minutes writing out their response to a question. This can make it easier for a shy student to open up.
- Do not put a silent student on the spot unless you have established a norm of calling on students who have not volunteered. A student’s embarrassment at being singled out may make it even less likely he or she will want to participate in class.
- If you decide to establish a norm of calling on students who have not volunteered responses, begin with questions that do not have a single correct answer or questions that ask students to make a choice between options. This makes it more likely that students will be able to answer your question without feeling embarrassment or resentment.

- Require all students in your class to stop by your office hours at the beginning of the quarter. Getting to know each student may encourage them to participate in class.
- Consider asking quiet students to email you their thoughts before or after class. Some students will readily accept this invitation. If they email before class, you will have an opportunity to draw them into the conversation at an appropriate point. If they email you after class, they have the chance to put together a thoughtful response without the pressure of being in the classroom.

Talking with the student privately can also help. Reasons for being silent vary. One silent student may simply enjoy listening. Another may lack the confidence to contribute. Some students have quiet personalities; others may be undergoing personal difficulties that inhibit their speaking in class. Some may be unprepared and embarrassed to admit it. Others may come from an educational background that discouraged active participation. Even after you gently encourage them to speak, they may remain silent. This is their right, and ultimately you must respect their privacy.

Student Excuses

I was locked out of my dorm all night. I had to visit my grandmother, who was having surgery. I slept through my alarm clock because I was up all night studying. I had the flu, then I had bronchitis, then I had a bad reaction to the antibiotics they gave me. I had two other exams the day the paper was due. I need to miss the exam in order to go to a national Scrabble tournament.

Which of these excuses would you allow? Does it depend on who uses the excuse and how many other excuses you've heard from him? Deciding how to respond to students' excuses can be a major challenge, especially for new instructors. No single policy is perfect—invariably, some deserving students will be unfairly punished for life's inconveniences and some manipulative students will be unfairly rewarded for creative excuses. The best you can do is have a policy, let students know about it at the beginning of the quarter, and retain the right to be accommodating if the situation merits it. Some policies you might consider:

- Offer all students some flexibility to use at their discretion, e.g., one “grace day” for a single major assignment or one missing assignment if you have frequent assignments. Students don't need to provide an excuse, but they get only one free pass.
- Have a standard grade penalty for late assignments. It should be strict enough to encourage on-time assign-

ments but not so harsh that it discourages students from turning in work at all (one-half of a letter grade per day late is probably just right).

- All excuses related to other courses, athletic travel, or other events that students know about in advance need to be discussed *before* the due date/exam.
- Recognize that not all students feel comfortable giving excuses, even for valid and serious problems. You might invite your students to include a note with each major assignment or exam if they think that the work is not a reflection of their abilities or preparation. Let them know that it won't influence the grade they receive for that assignment or exam, but it may be taken into account in the final grading.

Sometimes a student's excuses push the boundaries of plausibility or pile up one after the other as each due date comes around. In these cases, have a conversation with the student about your concerns. You can require some reasonable evidence for their excuse; often this is enough to dissuade malingerers. If it's a matter of too many excuses, have a discussion about accountability, time management, and fairness. Particularly if the excuses are not compelling, let the student know that other students have had similar difficulties but have not required special accommodation.

Above all, have compassion for your students. Life's little and big disasters do get in the way, especially for students, whose lives are densely scheduled. You don't need to give students grades or credit they didn't earn, but you should empathize with their situation and help them formulate a plan for the rest of the course.

Grade Complaints

Inevitably, some students will complain if you give them a lower grade than they expected. Many faculty and TAs report that they have had even As vigorously contested—for not being A+s! Keep in mind that this generation of students is under pressures you may not have had as an undergraduate. Because grade inflation is common at many top universities, and because family pressures can be overwhelming, many students believe they need to maintain a near-perfect GPA in order to achieve their personal and professional goals. You will have more success handling grade complaints if you listen to and respond to their anxieties. In addition, there are ways to minimize the likelihood of grade complaints:

- Make it clear from the beginning exactly what you expect in papers or tests.

- If possible, hand out guidelines for a good essay or examples of a superior exam answer.
- When you return a graded assignment, note in some detail the weak or strong points of the work and make suggestions for a better performance next time.
- Give students the option of handing in a first draft of an assignment that you will not grade but will critique.
- Save examples of student work or exams that represent the full grade distribution; this will help you explain to students why they did not receive the grade they hoped for.

When students contest their grades, let them know that when you reconsider their marks, you retain the right to adjust them up or down. If you are the TA, advise students that in difficult cases the professor will make the final decision. (Be sure to discuss this with the professor beforehand, however.) When no resolution is possible, let the student know which office (such as the ombuds-person) will help him or her pursue an appeal.



Counseling Students

Whether you are a professor, instructor, or graduate student, many students will look up to you. At times, you may find yourself in the position of counseling a student about matters beyond the scope of your official academic relationship. For some teachers, this is an uncomfortable role, with murkier boundaries than intellectual mentorship. For all teachers, it is a challenging balance between respecting the limits of your position and wanting to offer as much support to a student as possible. The following suggestions are offered as guidelines for effective counseling.

Know Your Limits

Although you are not expected to act as an amateur psychologist, you can function as a concerned and understanding support person. In cases where you are uncertain about your ability to help a student, however, it is best to be honest about this. Trust your intuition when you think an individual's problem is more than you can handle and the assistance of a professional is warranted. You can consult Counseling and Psychological Services (CAPS) (see next page) for advice or help in your efforts to assist a student. Call CAPS at 723-3785.

Clarify Your Role

When you assume or are placed in the counseling role, role conflicts are possible. Some students will see you as an authority figure, which may make it difficult for them to be totally straightforward. It may also give your advice or opinion added "baggage," if a student thinks it will influence his or her outcome in your course. Other students will see you as a friend, complicating things when you need to evaluate their performance in your class. If you feel role confusion or conflict, address it clearly by letting your student know how you see your role.

Listen

Listening has frequently been called an art, but it is also a skill that can be acquired with practice. While a student shares a problem or questions, refrain from immediately imposing your own point of view. Withhold advice unless it is requested; concentrate instead on understanding the feelings and thoughts of your student (rather than your own). Allow the student enough time and latitude to express thoughts and feelings as fully as possible.

Help Clarify Concerns

Sometimes students simply need the opportunity to figure out what is bothering them without being directly advised. You can help a student clarify his concerns by “mirroring” the feelings and thoughts you heard expressed and by helping him define the area of concern as precisely as possible. Once both you and the student understand the nature of the problem, you may then want to provide honest and considerate feedback, if it is desired by the student.

Offer Support

Offer support by directly expressing concern, understanding, and empathy, and conveying an attitude of personal acceptance and regard for the student. Support does not mean you have to endorse every action, thought, or feeling that a student shares with you; it simply shows that you care about her well-being.

Suggest Alternatives for Action

Students will often generate the best plans of action themselves, but you can help a student assess and use both personal resources and outside support for solving problems. If requested, you can also suggest alternatives. Try to do so, however, only after the person in need has exhausted his or her ability to generate ideas. However, if the problem is merely a need for information, provide it or point the student to someone who can.

Follow Up Your Efforts

If a student has made a decision or approached a conflict with your help, politely and nonintrusively check back a few days or weeks later to get feedback on what has happened. Such information can be rewarding if your help has been useful, and corrective if it has not.

Become Acquainted with the Resources of Counseling and Psychological Services (CAPS)

CAPS (723-3785) has a staff of professionally trained psychiatrists, psychologists, psychiatric social workers, and counselors whose help is available to students without charge (except for long-term treatment and special services such as biofeedback or medication management). The staff works with individuals, couples, or groups of students and offers consultation, counseling, psychotherapy, and referrals to other mental-health professionals. CAPS can assist students with personal problems and difficult concerns or situations they encounter while at Stanford, including stress, anxiety, depression,

relationship distress, low self-esteem, procrastination, sexual concerns, or family problems. Special services are available for minority-group members, women students, and gay, lesbian, bisexual, and transgender students from staff members who focus on the concerns of these groups.

Making Referrals to CAPS

Referring a student to CAPS should be neither difficult nor intimidating. It is the natural course of action when you recognize that your help may not be enough and that a student needs professional assistance. The following information is provided so that referrals, when necessary, can be made with confidence and understanding.

Each year, about 10 percent of the student population makes at least one appointment at CAPS. The average number of visits is five, and half the students seen come for four or fewer visits. These students come with a variety of issues, including anxiety, depression, uncertainty about career or vocation, difficulty in sexual and romantic relationships, questions of identity, difficulty with interpersonal relationships, and other personal crises. The stereotype that one must be “sick” or seriously disturbed in order to seek counseling is simply not the case for Stanford students. Referring a student for professional help, then, need not be a monumental or traumatic undertaking.

If you decide referral is appropriate, discuss your thoughts with the student involved. You can make the process of referral a comfortable one by expressing your concern and letting the student know that going to CAPS is neither complicated nor atypical. If a student turns directly to you for help, be aware that a referral can feel to a student like a personal rejection. If a student chooses to confide in you, it reflects a degree of trust in you and your judgment and possibly is an expression of a desire to know you. Too quick a referral in such cases might well be felt by the student as a lack of interest on your part instead of a show of your concern. To prevent this, hear the student out, show understanding and empathy, and let the student know explicitly that in making the referral you are not turning her aside.

In referring students, it is also important to be sensitive to differing attitudes toward seeking professional help. These attitudes range from strong resistance to definite acceptance and vary according to the student age, sex, cultural and family background, and geographic origin. While attitudes toward seeking help have changed in the direction of general acceptance, prejudices and stig-

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We began this handbook by stating our conviction that great teachers are made, not born. The key to becoming a great teacher is taking the time to reflect on your teaching, seeking and making use of the feedback you receive about your teaching, and observing changes in your students' performance over time. CTL provides a number of services that can help you evaluate and improve your teaching throughout your career.

Teaching Evaluation

In May 1977, Stanford's Faculty Senate approved a resolution calling for universal evaluation of courses by students at the end of each quarter. Since then, course evaluations have become a standard fixture of teaching life at Stanford. And, indeed, they can be a source of essential feedback to teachers on how a course has gone and how it might be strengthened. However, a vast literature on student evaluations of teaching also indicates that these evaluations in and of themselves—while generally valid and reliable in their data—do not necessarily lead to improved teaching. Alone, the questionnaire data do not seem to motivate teachers to change. Instead, change is more likely to occur if teachers discuss their evaluations with a sympathetic and knowledgeable colleague or teaching consultant. At Stanford, the Center for Teaching and Learning will provide you with such a consultant if you call 723-1326. For faculty teaching in the schools of Humanities and Sciences, Education, and Earth Sciences, a brochure is available to help interpret end-quarter evaluation results. For a copy, call CTL or

check the CTL website faculty resources section (<http://ctl.stanford.edu/Faculty/index.html>).

Moreover, there are other often more timely ways to evaluate how well your course is going. You can arrange some of these methods yourself; others are available through the Center for Teaching and Learning.

- Midquarter, pass out your own carefully thought-out questionnaire for students to fill out anonymously. Focus on those issues that are of most interest or concern to you. Follow up on the students' feedback; consider discussing the feedback in class and letting the students know what changes you will be making.
- Talk to some students informally after class or during your office hours about how the class is going. Ask them what's gone well and what hasn't worked. Choose students who you think will be comfortable giving you feedback. Even then you will have to be careful that they don't feel "on the spot."
- Ask a friend, a colleague, or a consultant from the Center for Teaching and Learning to observe your class. CTL has trained consultants who have learned specific observational techniques and have considerable teaching experience. If you invite a friend or colleague in, brief them carefully on what specifically you would like them to look for. Colleagues, especially, tend to focus exclusively on content unless you also ask them to attend to how ideas are presented and how students respond.
- Be videotaped. This is the only evaluation method that lets you see your teaching more or less as your students do. Although teachers generally feel great anxiety about having it done, most feel reassured and motivated afterward. You can arrange free videotaping through the Center for Teaching and Learning by calling 723-1326 approximately a week before you'd like it done and arranging a time, or submitting a request via our website. We will send out a videotape technician who will record your class with a minimum of disruption. Consultation is available and encouraged during viewing of the tape. If you want to keep the tape—to make it a part of your teaching portfolio, for example—you may do so by paying its (small) replacement cost.

- Have a small-group evaluation conducted by the Center for Teaching and Learning. At your request, CTL will send a consultant to your class during the last twenty minutes of the period. Once you have left, the consultant will divide your students into groups of six (or fewer if it is a small class). Each group is given ten minutes to select a spokesperson and agree on what they value about your course, what areas need improvement, and what specific suggestions they would make for change. At the end of the allotted time, the consultant canvasses each group and makes a record of their comments. He or she then summarizes the results, identifying patterns of agreement and clarifying areas of disagreement. The information is given to you later in a private consultation.

Course Evaluations for TAs

The same course evaluation services that CTL provides to faculty are available to TAs, and increasingly, departments and schools provide formal course evaluations for TAs. TAs who want formal feedback, but who do not have access to evaluation through the department or school, can develop their own forms or use resources provided by CTL. The latter are available free of charge by visiting the CTL website or by calling 723-1326.

Assessing Student Learning

How do you know if your students are achieving your specific learning goals for a course? Class evaluations and observations provide excellent feedback about student satisfaction and teaching style, but they don't provide the important detail of how much your students are learning. Changing the way you assess student learning can dramatically improve your teaching effectiveness, as it provides immediate feedback on what works and what doesn't.

Traditionally, many teachers have evaluated their students' knowledge by giving examinations and papers, often only at the middle and end of the quarter. As a result, a professor lecturing to a large introductory class might not recognize until final exams are finished that students consistently confused two important and closely related ideas. Other professors, who track their students' work more regularly—through problem sets, for example—might assume that such written homework is helping achieve a major goal of the course, such as to develop students' general problem-solving ability. Yet students who do well on homework might be unable to apply their

knowledge to the novel situations created for exams; they've learned how to follow the textbook examples without understanding larger principles of problem solving.

In recent years, instructors in a variety of fields have developed techniques of in-course assessment (also called classroom assessment). In-course assessment techniques systematize the process of getting useful and timely feedback on student learning. Because these assessment techniques are designed to gauge the effectiveness of the teaching and the quality of the learning taking place (and not simply to see who is or isn't studying), they are usually anonymous. These anonymous assignments typically can be completed quickly, and focus on three areas: (1) students' academic skills and intellectual development (e.g., do students have sufficient background knowledge or academic skills to move onto the next topic?); (2) students' assessments of their own learning skills (e.g., do students feel prepared to learn new material from the textbook, without classroom review?); and (3) student reactions to various teaching methods, materials, and assignments (e.g., do students believe the exams fairly cover the material stressed in class?). Based on this feedback, faculty can adjust their teaching to help students learn. The following are some examples of assessment techniques you might consider using:

- **Documented problem solution:** Rather than simply requiring students to do a number of problems for homework, the instructor asks students to solve a problem and also to write down step-by-step what they were thinking at each stage of the problem-solving process. Reading through these solutions gives an instructor a sense of how well the students are developing their problem-solving skills and can help the instructor determine how much class or section time should focus on improving this academic skill.
- **Studies of time spent learning:** This technique asks students to estimate, check, document, and reflect on how well they use study time. Using one assignment or activity, students estimate how much time it should take to finish the task and then monitor themselves as they complete the assignment. Afterward they write a brief account of the process and the results. In reading these accounts, teachers can gain a sense of how well students use their time and whether students' learning skills are developed sufficiently to handle the course load. Students become much more aware of their habits regarding study time and this awareness usually encourages them to use their study time more effectively.

• **One-minute papers:** The teacher ends class a few minutes early and asks one or two questions that students answer, on index cards or notebook paper, and hand in. Questions often asked are, “What were the main points of today’s class?” or “What point or example in today’s lecture would you like to see reviewed or clarified?” Even in a large class, reading through student responses takes relatively little time. At the next class session, teachers can address questions or problems students have raised.

In short, good assessment techniques both assess and teach; the time spent doing these assignments helps students learn more effectively and efficiently. When students are encouraged to take the time to gauge what they know and how well developed their learning and academic skills are, they begin to recognize the importance of learning how to learn, as well as the importance of course content.

The Center for Teaching and Learning sponsors workshops and provides individual consultation on in-course assessment techniques. You can also consult the Angelo and Cross (1994) work listed in the bibliography for an excellent and comprehensive treatment of assessment techniques. This section has drawn heavily on their work.

Teaching Improvement

Most instructors regard their teaching as an intensely personal matter. While they may be more than willing to allow colleagues to critique their written work, they are unlikely to invite them into their classrooms to observe and make comments. However, teaching is like any other academic endeavor—it is an acquired skill, one more easily gained if you get specific feedback on how you are doing.

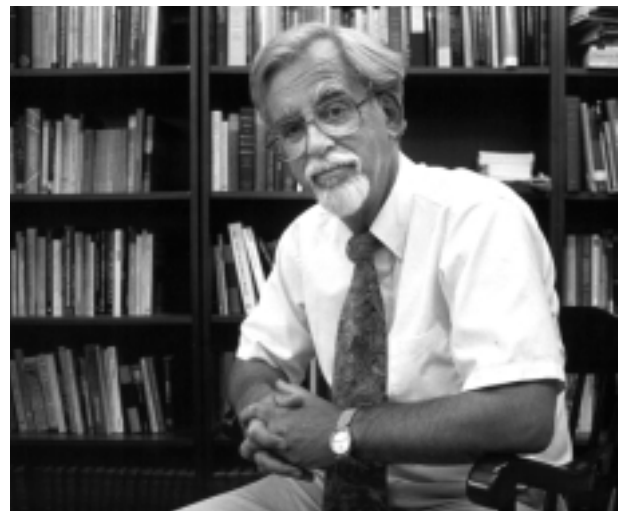
If you decide that you wish to make significant improvements in your teaching, the Center for Teaching and Learning can help you identify the specific skills and strategies that will enhance your teaching style. This is particularly true when you aren’t quite sure what needs improving. For some faculty and TAs, it has taken as little as a student small-group evaluation to enhance their questioning technique or grading policy. For others, it has required considerable time to learn better methods of organization or delivery. The crucial factor in each case has been the teacher’s willingness to recognize the need for change and to try new approaches.

You may be motivated by a specific goal, such as the desire to try a particularly innovative class format or

to increase the average attendance in your large lectures from 60 to 90 percent. In this case, turning to the collective wisdom of your colleagues, the advice of students you know well, or the resource library available at the Center for Teaching and Learning may be enough. CTL has a wide collection of books, journals, and videotapes on almost every aspect of teaching. You will find dozens of ideas on better lecture techniques alone, for example.

Any steps that you take to improve your teaching are likely to be worthwhile both professionally and personally. Faculty at research universities are increasingly expected to teach well, as has long been the case at student-oriented liberal arts colleges and most state colleges and universities. When well done, teaching can be a source of enormous personal satisfaction and pleasure. Successful contact with students can balance the sometimes lonely aspects of pure scholarship; it also gives you a chance to pass on those values, ideas, and passions that are at the core of your commitment to scholarship.

You can begin by looking over the checklist of CTL services and committing to trying at least one over the course of your next teaching quarter.



I think there is certainly something to the idea that some people are natural teachers. They have a certain charisma; they have the ability to relate to students and pick up on their questions. And some people are non-teachers, who will never be able to communicate, who probably couldn't even communicate with their mothers, but in between there are most of us, who would be better off ... if we just went about teaching the way we go about our golf games or our tennis games ... and say, well, gee, there are probably some things I can do that would make it go better.

John R. Perry, Henry Waldgrave Stuart Professor of Philosophy

Putting It All Together: The Teaching Portfolio

Teaching portfolios have recently gained attention as a tool for both self-improvement and hiring/promotion processes. A portfolio documents your experience, growth, strengths, and accomplishments as a teacher. Typically, portfolios include a brief table of contents, a personal statement, syllabi and/or other course materials, and evidence of your teaching effectiveness, such as student evaluations, student papers, or a videotape of you in action. (See Seldin's 1997 work, listed in the bibliography, for helpful examples and further discussion.) While most of the documents in a portfolio may sound familiar, the personal statement is probably new to many instructors. It can be as short as one page or as long as six pages, and may include the following items:

- a reflective statement of your pedagogical philosophy, strategies, and objectives
- a short list of your main teaching interests
- a summary of your past and present teaching responsibilities
- a description of steps taken to evaluate and improve your teaching, including changes resulting from attending teaching workshops, being videotaped, or talking to a teaching consultant
- an explanation of appended supporting material such as syllabi, exams, or handouts

Teaching portfolios are best prepared in consultation with others. As you put your portfolio together, seek the advice of colleagues, your academic advisor (if you are a TA), and CTL consultants. CTL also has sample teaching portfolios that you can look over.

One great benefit of building a teaching portfolio is that it helps you clarify your pedagogical aims and

The teaching portfolio was a great help in my job search. I brought it with me to interviews and when someone asked, "What would you teach?" I reached into my bag and handed over the answer. I could see that just the fact that I was that prepared surprised people. At one interview, I was asked to give a separate talk specifically about teaching, and I was able to use the material from my teaching portfolio—both to help me prepare the talk and to use as a handout. When I sit down to start planning my courses, I know the first thing I'll look at is my portfolio and my folder of teaching ideas.

Christian Sandvig, Ph.D. in Communication from Stanford, Assistant Professor of Speech Communication, University of Illinois, Urbana-Champaign

teaching strategies. By reviewing your course materials and evaluations, and by reflecting on your approach to teaching, you will recognize important trends and progress in your teaching. This process will allow you to be more intentional in your teaching and will also likely be useful for the academic job market or the tenure review/promotion process.

The Oral Communication Program

The Center for Teaching and Learning's program in Oral Communication reflects the enduring relevance of the spoken arts at Stanford and the university's renewed commitment to "provide students instruction in oral communication," as it was phrased in 1994 by the Committee on Undergraduate Education. Since then, CTL has developed a full-scale program that serves the university—undergraduates, graduates, and faculty—in a variety of ways. The Oral Communication Program offers courses and workshops, trains and provides tutors through our Speaking Center, and works with faculty across the disciplines to integrate oral communication training into their curricula.

Students can take a number of courses for credit in the Oral Communication Program; these courses provide a comprehensive approach to speech communication, training students in the fundamental principles of public speaking and the art of delivering effective, compelling oral presentations. The program provides innovative, discipline-specific instruction to help students refine their personal speaking styles in small groups and classroom settings. The Oral Communication Program also offers workshops for the entire Stanford community on a range of speech-related topics.

Those interested in individualized instruction or independent study are invited to visit the program's Speaking Centers on the third and fourth floors of Sweet Hall, where a staff of trained student tutors, an array of audio/video technology, and a variety of instructional resource materials are available.

CTL's Oral Communication consultants have been part of Civil and Environmental Engineering Sophomore Seminar 45Q for three years now. This aspect of learning fits right in with the class without displacing anything else. Having this input to prepare presentations in our public forums really motivates the students to take their presentations seriously and aspire to professionalism not just in the presentations but in other aspects of the course. CTL's input has been a valuable resource for us.

Professor Boyd Paulson, Civil and Environmental Engineering Department

CHECKLIST OF CENTER FOR TEACHING AND LEARNING SERVICES FOR FACULTY

Teaching Orientations

At the beginning of each quarter, a half day of presentations and, in the following few weeks, workshops on a variety of teaching topics are offered to prepare new instructors and teaching assistants for their duties, and to suggest new ideas and methods for the already experienced.

Consultants

Consultants are available to advise you on your teaching by making classroom visits, reviewing videotapes, suggesting specific improvements, or talking over a particular problem. All consultation is completely confidential and individualized.

Videotaping

Videotaping is one of the most effective ways to evaluate and improve your teaching. This can be arranged by calling CTL approximately a week in advance and setting up a time; the entire service is free and confidential. Consultation is available and encouraged during viewing of the tape.

Student Small-Group Evaluation

A consultant comes to your class midquarter and, after you have left, divides your students into groups of six or fewer. Each group is given ten minutes to select a spokesperson and agree on what they value about your course, what areas need improvement, and specific suggestions for change. The results are given to you later in a private consultation.

Teaching Assistant Questionnaires

Midquarter student evaluation questionnaires are available in both electronic and hard copy format. You can use these evaluations to get feedback on TA performance and to help TAs develop their teaching.

Lectures and Workshops

Each year CTL sponsors talks on various aspects of effective university teaching. Given by some of Stanford's most outstanding faculty, the talks can be viewed live or on videotape. Watch the *Daily* or posters in your department for announcements of future talks. CTL also designs workshops, at departmental request, for specific groups of faculty or TAs.

Personalized Practice Sessions

If you are going to be giving a talk or seminar or presenting a paper at a professional conference, you may want to perfect your presentation ahead of time. At your option, you can practice alone, with a videocamera, a consultant, or a small audience of volunteer peers. There is no charge for this service.

Newsletter

CTL produces a quarterly newsletter, *Speaking of Teaching*. Call 723-1326 to be put on the mailing list. Copies of past issues are available at CTL or on the web at <http://ctl.stanford.edu/Newsletter/>.

In-Course Assessment

Materials and workshops on in-course assessment are available from CTL. You can also request assistance in designing assessment techniques appropriate for your class.

Teaching Portfolios

CTL can assist you to put together a teaching portfolio to use on the academic job market or for your own reflection and professional development. Sample portfolios are also available for you to look over at your convenience.

Resource Center

A library of materials (videotapes as well as books) on teaching and teaching improvement is available for browsing or borrowing. CTL staff can also serve as liaison to other resources on campus.

Technology in Teaching

CTL's academic technology specialist is available to consult with faculty on using technology in teaching. Call 725-4164 to set up an appointment.

Oral Communication Program

The Oral Communication Program's consultants are available to work with you on your presentation and public speaking skills throughout the quarter, at the Speaking Center at CTL, in workshops and in classes throughout the academic year.

For information on any of the above, call 723-1326.

Teaching at Stanford

Teaching Assistants

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The Teaching Assistant's Role

The TA experience can be an outstanding way to learn the art of teaching and to have a positive influence on many students. As a TA, you are the key link between professor and students. This gives you the opportunity to observe and influence higher-level decisions about course design and content, as well as the opportunity to maintain daily, close interactions with students. If you keep this perspective, you may find TAing to be one of the most rewarding experiences you have in your education at Stanford. In most cases, you will have to take some initiative to make sure that your TA experience provides both the mentorship you hope for and a set of responsibilities you can handle. Clear conversations with the professor you are TAing for can set the stage for both.

How to Have a Successful TA Experience

- Meet with the professor and other TAs as soon as possible.
- At this meeting, set clear expectations about both what you can contribute to the course (in time, responsibilities, and skills) and what you hope to get out of the opportunity (in training, experience, and mentorship).
- Schedule regular weekly meetings with the professor and other TAs to maintain open communication and to iron out course details.
- Balance your TA work with other academic and professional obligations; consider this practice for a faculty position that combines teaching and research.

- To help you manage your responsibilities, recommend university academic support and tutoring services to students who need more extra help than you can provide.
- Invite the professor to watch you teach and request feedback on your teaching performance.
- Offer feedback to the professor about the course and initiate conversations about those aspects of teaching that interest you most.
- Make use of CTL services for evaluating and improving your teaching. (See the end of this special TA section for details.)

What Makes a Great TA?

- **Preparation.** Whether you're leading a discussion section, a review section, or a lab section, plan your materials in advance. Ask former TAs and the professor for materials developed for previous classes.
- **Knowledgeability.** In addition to whatever advanced background training you have in your field, be sure to stay up to date with the content of the course you are TAing for. Nothing is as disappointing to students as finding out that their TA hasn't read the textbook or doesn't attend lecture.
- **Communication skills.** In particular, you need to be able to explain complicated things clearly, develop interesting examples, and listen carefully as students ask questions or try to explain their confusion. In addition, basic public speaking skills can contribute enormously to your comfort and success as a TA. (See the end of this special TA section for details on CTL services to improve communication skills.)
- **Accessibility and availability.** You need to seem approachable to your students; achieve this by maintaining a friendly attitude, staying after class to talk with students, and encouraging students to visit your office hours or email you their questions. Then, make sure your office hours are at times your students can actually attend.
- **Concern for students' learning.** Students can tell the difference between a TA who considers TAing a waste of his or her time and a TA who enjoys teaching and inter-

acting with students. Focus on the positive aspects of the course and your interactions with students.

- **A good relationship with the professor.** A great TA provides the bridge between a professor's goals and his or her day-to-day achievement. To do so, maintain regular, positive interactions with the professor and provide feedback about how the course is going, from the students' perspectives as well as your own.
- **Organization.** Anticipate ways that you can make the course run more smoothly for both the professor and the students. Look for ways to streamline, document, or improve course activities and teaching responsibilities.



TAs commonly interact with students in discussion sections. Clear communication with the course instructor about section goals and explicit understandings about student and TA roles greatly enhance the quality of the experience for all involved.

Discussion Sections

For all their challenges, discussion sections are for many the most rewarding kind of teaching. You have a relatively small number of students whom you will get to know well; if you are like most TAs or teaching fellows (TFs), there will be many students eager to talk to you when they see you on campus. You will have an enormous potential to influence these students. Students crave intellectually surprising, challenging, and stimulating discussions. If you can successfully impart your own passion while helping students reach their own insights, you will have achieved one of the highest goals of the university. As the years pass, you may even run across students who chose your field because of the great discussions they had in your section.

Most of the skills that you will need for discussion sections are described on page 29 under “Discussion Leading” and on page 53 under “Teaching Challenges.” There you will find suggestions for preparing for a discussion, keeping a discussion going, and improving participation. You can also find suggestions for preparing for your first discussion section on page 17 under “Preparing for the First Class.” Here, we focus on some of the concerns common to first-time discussion leaders:

“How can I lead a good discussion on the material when I’m not an expert?” Many TAs or TFs, especially TFs in the Introduction to the Humanities Program (IHUM), feel overwhelmed by the breadth of material to be covered in section. They often find themselves going over texts for the first time just a few days before the students do. In other cases, you may be TAing an undergraduate course that you took years ago at a different institution. Unfortunately, there is no simple remedy for this situation. Your first time TAing a course, you may simply have to do a lot of preparation. It will be easier, however, if you talk with your colleagues in the course. Help them in your strong areas while they work with you on theirs. Experienced TAs or TFs can be of particular assistance. Also, simply attending lecture, even if the professor does not require it of you, will go a long way in preparing you for discussion sections. In addition, discuss with the professor what his or her expectations for the section are. Be clear about the major themes or goals of the course and how these should be reflected in your group’s discussion. Even without being an expert, you will be able to guide the discussion toward the most important ideas. It’s also fine to tell students when you don’t know something (and much better than giving them an incorrect answer!). It’s important for students to recognize that

scholars continue to learn all the time. If possible, tell them how you'd go about finding an answer or bring it to the next class.

“How do I know if my discussions are going well, and how can I salvage a section that isn't going well?” Usually student attendance, degree of participation or responsiveness, and even expressions, gestures, or body language will give you some indication. Ask students how the section is going, both informally and formally (e.g., through midquarter evaluations or a small-group evaluation). You can often transform a flailing section simply by asking students how they think their time could best be used in section. Do not be afraid that by acknowledging the lackluster spirit of a discussion you are showing weakness; instead, use it as a springboard to ask students what they really care about and what it would take to turn up the excitement of the section. Students respond positively to any sign that a TA is willing to take feedback and is interested in helping students to succeed in the course. Be willing to shake things up a bit if discussion section stagnates over time; for example, if you usually direct the discussion for the full hour, consider having students discuss the material in pairs first. Consult “Improving Your Teaching” on page 60 for further information on how to assess student learning and improve your discussion leading skills.

Reviews

Leading a review session presents a number of unique challenges, particularly for an inexperienced TA. In the usual case of a section that is part of a lecture course, you have less than an hour to go over material covered in three or four 50-minute lectures. You have to present your material at a pace and level that will be meaningful to students having trouble with the class without boring those who are doing well. You want to challenge students to think for themselves about the topics addressed by the course, but you need to avoid lengthy discussions that consume valuable class time.

To plan an effective review, make sure you understand what the professor thinks the students need to know and what the students will need to know to do well in the course. Students will not respond to even the most brilliant or entertaining TA if he or she does not cover topics and problems central to the course. To ensure that you do this, you should attend course lectures and obtain notes for any you must miss. Regular meetings with the professor and other TAs, as well as looking at past

quizzes, problem sets, and exams, will help you determine your priorities and strategies.

Once you decide on key topics, you will probably realize that you cannot review all of the material in detail. You will have to choose between covering most of the material somewhat superficially or only representative parts in depth. Both strategies have their advantages. The former, by briefly reviewing all the important topics, will usually stimulate questions. Simply asking the students if they have any questions about the lectures rarely yields much response. If you decide to cover lots of material briefly, be sure to let the students know that they should investigate the same topics more deeply on their own. Encourage them to see you during office hours if they have any questions. If you choose to cover only a few topics in greater depth, mention other subjects that you won't have time to cover but which are important. By concentrating on particularly difficult aspects of the course that may not have received adequate time in the lectures, you may trigger questions that students would otherwise be unable to formulate.

In preparing your presentation, if you come across some aspect of the material that you don't understand, don't hesitate to contact the professor for clarification. It is quite common for faculty, even in elementary courses, to present material that TAs may not have previously learned. Of course, you need to plan your review early enough so that you will have time to contact the professor with any questions.

When actually conducting the review, your style will usually be closer to that of a lecturer than a discussion leader. You will probably need extensive notes. You may also decide to put an outline on the board or distribute one on a handout. If you are new to lecturing, practice your presentation a few times beforehand. Don't assume that just because you are “reviewing” material, you can improvise as you go or depend on students' questions. The students are also more likely to come prepared if they see that you have taken the time to prepare.

Although every lecturer should attempt to gauge whether students are really understanding the topics, this is especially crucial for a review. Use plenty of examples to make your points and ask students to generate their own examples. Give students short problems to solve during the review. Let students practice the kinds of applications that they should be able to make if they have really grasped the major concept. After you ask a question, give everyone a minute or two to think before acknowledging a response; this way, less vocal or more

reflective students will also have a chance to test themselves. An excellent alternative is to ask the students to pair up with their neighbors to discuss a problem or question for a couple of minutes. This active learning technique will increase the participation and understanding of your students.

By encouraging students to respond to the material with solutions or more questions, you will undoubtedly find that you are sometimes sidetracked. Because time is short and important topics are always too many rather than too few, you will have to cut off digressions—but tactfully. For example, respond to a question briefly, and then invite the questioner to pursue the topic with you further in office hours. Or explain that the issue raised is a good one but too complicated for the time you have left. Indicate that you will pursue it in the future, or that you can suggest other readings on it for those who are interested. Never cut a student off without explanation.

It is especially important in a review session to get feedback on whether you are covering what students feel they really need. The question “What would you like to do?” usually elicits little response, but you can expect more success by asking whether students would like you to review a specific topic or asking if the pace of the session has been too fast or slow. If you do sessions on a weekly basis, it is also helpful to hand out brief evaluation questionnaires to the students after the first few meetings so that they can tell you before it is too late if any improvements are needed. You can also ask your students to email questions or confusing points to you ahead of the review session so you can design it accordingly.

Finally, since reviews often require a great deal of preparation—either of notes or handouts—you might consider keeping a file of your efforts and making it available to future leaders of those sessions. Think how much easier your job might have been if someone had done the same for you! The professor will undoubtedly be grateful if you contribute such resources to his or her course teaching file and will remember your effort and organization when it comes time to prepare letters of recommendation.

Labs

Most of the laboratory teaching by TAs at Stanford takes place in introductory-level laboratory courses. Each lab session typically lasts two hours and fifty minutes a week (three Stanford “hours”), during which students usually complete one experiment. Some sections also include a one-hour discussion section. Some of your lab section time may be devoted to explaining some of the finer points (and pitfalls) of the experiment or to addressing students’ questions on homework or lecture material. As a lab TA, you are really a facilitator, a person who is there to help people learn; if you keep that in mind, you will help make the laboratory a pleasant learning experience for students and a rewarding teaching experience for yourself.



As lab facilitators, TAs ensure a safe environment for hands-on exploration and help students develop important inquiry skills.

Preparing for Your Lab Section

- Find out what orientations, written materials, or procedures your particular department has for graduate students assisting with laboratory courses.
- Meet with the professor and other TAs to establish a regular method for preparing and reviewing labs each week.
- Familiarize yourself with the laboratory room you’ll be teaching in, including the layout and equipment.
- Find out the location of the first-aid kit, basic first-aid rules, and the procedure for getting emergency assistance. Then make sure the students know them too!

Your First Lab Section

- Go over the grading methods and requirements of the course.
- Make sure the students know the procedures and rules for writing up and submitting their results.
- Show students how to handle and care for the laboratory equipment they will be using.
- Introduce students to any safety procedures and precautions.
- You may want to let your students divide themselves into smaller groups of two to four lab partners. The exact number of lab partners per small group will depend on the actual class size, the number of experimental apparatus available for each lab session, and the wishes of the course professor.

Helping Lab Run Smoothly

- Come into the lab well in advance and actually do the experiment yourself. Your students will come across a number of stumbling blocks in even the best-designed experiments; both you and they will benefit if you are as prepared as possible to help them over these difficulties by knowing the tricky or confusing parts of the experiments.
- Shortly before class begins, make sure the lab is properly set up for the day's experiments. For example, check water-bath temperatures and make sure all required apparatus is on hand and warmed up, if necessary.
- Have students construct a flowchart of the procedures for each day's experiments before coming into lab. Then, begin each lab period by reviewing the lab protocol and anticipating potential pitfalls.
- As students conduct their experiments, circulate among the various groups and see how they are doing. Do not wait for them to approach you, especially in the first few weeks, since they may be hesitant to ask. This also gives you a chance to learn their names.
- Because all labs and apparatus are shared, laboratory courtesy is important. Be sure to have your students clean up the lab benches before leaving. You may want to check and "okay" bench spaces as people leave.
- If a piece of apparatus breaks, set it aside with an appropriate sign and notify the laboratory supervisor as soon as possible. This way the damaged equipment can be put back into service quickly, an important consideration when a limited number of pieces of equipment have to be used by a large number of students over a few days' time.

Increase Student Learning

- A few strategic questions, such as: "Once you plot these points on your graph, how are you going to find the best straight line through them?" or "Why do they tell you to make measurements with the current going both ways through the coil?" will help you figure out what the students understand and on what points they are still a little hazy.
- You can also relate the experiment to current topics of research and embellish otherwise "cookbook" labs by asking students to think about how their results (or the ones they hope for) relate to a larger, more basic scientific question. In a biology lab, for example, rather than having the students just identify plant pigments and learn a technique, you might also ask them to think about how the different properties of pigments relate to the evolution of plants' coloration.
- Another way to enliven experiments is to have students present short (five to ten minute) talks on related topics, perhaps for extra credit.
- Offer supplemental readings and resources for students interested in learning more about a topic.



Avoid lab problems by running through the lab yourself and by making sure the materials are in place before the students arrive for section. Missing materials or an overlooked step in the instructions can result in frustrating, or even disastrous, lab experiences.

TAing and Your Professional Future

Satisfying as teaching can be in its own right, a record of successful TAing has become increasingly important to Ph.D.s seeking their first academic position. Even at research universities such as Stanford, search committees look for candidates who combine outstanding scholarly credentials with evidence of teaching ability. In fact, appointment papers for junior faculty at Stanford now specifically include a section in which the candidate's potential or experiences as a teacher must be documented. When you apply for an academic position, you typically will be asked to include a curriculum vitae and three or more letters of recommendation. A vita should list the courses you have taught or TA'd and those you are prepared to teach, but this by itself is not very informative. You should ask at least one of your faculty letter writers to comment on your teaching ability. Also consider preparing a teaching portfolio that best presents your abilities and experience. To increase the value of your TA experience on the job market, we recommend the following:

- Make sure your faculty supervisors are aware that you will want them to write letters of recommendation that can comment favorably, and specifically, on your teaching.
- Be visible. Your professors cannot praise your teaching ability if they never see or hear of it. If you give a lecture, try to arrange for the professor to be present. (This may be difficult, since you may lecture to cover for a traveling professor. If this happens to you, ask the Center for Teaching and Learning to videotape your lecture and the professor to listen to or view it.) If you mainly lead reviews, arrange for an observation. At the least, spend some time discussing the course and your contributions to it with the professor, making sure that you convey your enthusiasm and your ideas. Do not just talk about your problems with your students!
- Show evidence of organization and efficiency. Most TAs approach their initial teaching assignments enthusiastically. They are willing to devote a great deal of time and effort to making their section intellectually stimulating. This kind of enthusiasm makes teaching and learning exciting, but remember not to neglect your own graduate work. Learn to budget your time carefully; you will need to do so for the rest of your academic career. Your future job will probably require a number of obligations besides teaching, and you will only be able to accomplish them by developing an organized and efficient approach toward your classes. Realize that your

faculty supervisor may not be impressed by the simple fact that you spend a great deal of time on your course or section (in fact, this could make an unfavorable impression, if your own research falls by the wayside). The best way to make a good impression is to show that you can juggle the teaching and your own work. Be as systematic as possible in things like classroom preparation and grading. Keep your outlines, notes, classroom handouts, etc. in proper files; you can make these files available when the time comes to evaluate your performance (e.g., when the professor is writing that letter of recommendation).

- Arrange for student evaluations of your teaching and make the most of them; with careful planning and reflection, they can help you improve your teaching. These evaluations will also be used by other people to judge how effective a teacher you are. Many TAs design their own evaluation forms, but you might use a standard form instead to provide meaningful numerical data for future letters of recommendation. TAs not covered by an end-quarter evaluation system can use questionnaires developed by the Center for Teaching and Learning for this purpose. Call CTL at 723-1326 to order as many as you need.
- Take advantage of the Center for Teaching and Learning's videotaping service. An increasing number of institutions request evidence of teaching ability; a tape of your class is one way to document your excellence. Consider being taped more than once to judge your progress as an instructor and to be able to select an example of your teaching at its best.
- Consider putting together a teaching portfolio, a more comprehensive way of documenting, reflecting on, and strengthening your record as a teacher. See the section on teaching portfolios on page 63. As teaching continues to be an important factor in the academic job market, the portfolio is a practical asset as well as a way to develop professionally.

The teaching portfolio was particularly helpful during my job interviewing process. Since I had thought quite a bit about my approach to teaching while assembling the portfolio, I was very comfortable discussing my teaching methods and philosophy during interviews. I also had tangible evidence to present to the interviewing committee that demonstrated my success in the classroom. I think my portfolio effectively emphasized the priority I place on teaching.

Dana Rowland, Ph.D. in Mathematics from Stanford; Assistant Professor of Mathematics, Merrimack College, North Andover, Massachusetts

CHECKLIST OF CENTER FOR TEACHING AND LEARNING SERVICES FOR TAs

Teaching Orientations

At the beginning of each quarter, a half day of presentations and, in the following few weeks, workshops on a variety of teaching topics are offered to prepare new instructors and teaching assistants for their duties, and to suggest new ideas and methods for the already experienced.

Consultants

Consultants are available to advise you on your teaching by making classroom visits, reviewing videotapes, suggesting specific improvements, or talking over a particular problem. All consultation is completely confidential and individualized.

Videotaping

Videotaping is one of the most effective ways to evaluate and improve your teaching. This can be arranged by calling CTL approximately a week in advance and setting up a time; the entire service is free and confidential. Consultation is available and encouraged during viewing of the tape.

Student Small-Group Evaluation

A consultant comes to your class midquarter and, after you have left, divides your students into groups of six or fewer. Each group is given ten minutes to select a spokesperson and agree on what they value about your course, what areas need improvement, and specific suggestions for change. The results are given to you later in a private consultation.

Teaching Assistant Questionnaires

Midquarter student evaluation questionnaires are available in both electronic and hard copy format. You can use these evaluations to get early feedback on your teaching and to prepare for end-quarter evaluations.

Lectures and Workshops

Each year, CTL sponsors talks on various aspects of effective university teaching. Given by some of Stanford's most outstanding faculty, the talks can be viewed live or on videotape. Watch the *Daily* or posters in your department for announcements of future talks. CTL also designs workshops, at departmental request, for specific groups of faculty or TAs.

Personalized Practice Sessions

If you are going to be giving a talk or seminar or presenting a paper at a professional conference, you may want to perfect your presentation ahead of time. At your option, you can practice alone, with a videocamera, a consultant, or a small audience of volunteer peers. There is no charge for this service.

Newsletter

CTL produces a quarterly newsletter, *Speaking of Teaching*. Call 723-1326 to be put on the mailing list. Copies of past issues are available at CTL or on the web at <http://ctl.stanford.edu/Newsletter/>.

In-Course Assessment

Materials and workshops on in-course assessment are available from CTL. You can also request assistance in designing assessment techniques appropriate for your class.

Teaching Portfolios

CTL can assist you to put together a teaching portfolio to use on the academic job market or for your own reflection and professional development. Sample portfolios are also available for you to look over at your convenience.

Resource Center

A library of materials (videotapes as well as books) on teaching and teaching improvement is available for browsing or borrowing. CTL staff can also serve as liaison to other resources on campus.

Technology in Teaching

CTL's academic technology specialist is available to consult with TAs on using technology in teaching. Call 723-1326 to set up an appointment.

Oral Communication Program

The Oral Communication Program's consultants are available to work with you on your presentation and public speaking skills at the Speaking Center at CTL, in workshops, and in classes throughout the academic year.

For information on any of the above, call 723-1326.

Appendixes

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Honor Code

The Honor Code is the university's statement on academic integrity, written by students in 1921. It articulates university expectations of students and faculty in establishing and maintaining the highest standards in academic work:

- A. The Honor Code is an undertaking of the students, individually and collectively:
 1. that they will not give or receive aid in examinations; that they will not give or receive unpermitted aid in class work, in the preparation of reports, or in any other work that is to be used by the instructor as the basis of grading;
 2. that they will do their share and take an active part in seeing to it that others as well as themselves uphold the spirit and letter of the Honor Code.
- B. The faculty on its part manifests its confidence in the honor of its students by refraining from proctoring examinations and from taking unusual and unreasonable precautions to prevent the forms of dishonesty mentioned above. The faculty will also avoid, as far as practicable, academic procedures that create temptations to violate the Honor Code.
- C. While the faculty alone has the right and obligation to set academic requirements, the students and faculty will work together to establish optimal conditions for honorable academic work.

Examples of conduct which have been regarded as being in violation of the Honor Code include:

- Copying from another's examination paper or allowing another to copy from one's own paper
- Unpermitted collaboration
- Plagiarism
- Revising and resubmitting a quiz or exam for regrading, without the instructor's knowledge and consent
- Giving or receiving unpermitted aid on a take-home examination
- Representing as one's own work the work of another

- Giving or receiving aid on an academic assignment under circumstances in which a reasonable person should have known that such aid was not permitted

In recent years, most student disciplinary cases have involved Honor Code violations; of these, the most frequent arise when a student submits another's work as his or her own, or gives or receives unpermitted aid. The standard penalty for a first offense includes a one-quarter suspension from the university and forty hours of community service. In addition, most faculty members issue a "no pass" or "no credit" for the course in which the violation occurred. The standard penalty for a multiple violation (e.g., cheating more than once in the same course) is a three-quarter suspension and forty or more hours of community service.

Interpretations and Applications of the Honor Code (last amended 2002)

In the spring of 1977, the Student Conduct Legislative Council authored and adopted the following guidelines to assist students and faculty in understanding their rights and obligations under the university's Honor Code. The most recent revisions to the original text were adopted in the winter of 2002 by the Board on Judicial Affairs. It must be understood that the individual and collective responsibility of the students for upholding the Honor Code was not imposed upon the students by the administration or the faculty but was assumed by the students at their own request starting in 1921. Without such student responsibility, the Honor Code cannot be effectively maintained.

1. General

- (a) The Honor Code is agreed to by every student who registers at Stanford University and by every instructor who accepts an appointment.
- (b) The Honor Code provides a standard of honesty and declares that compliance with that standard is to be expected. It does not contemplate that the standard will be self-enforcing but calls on students, faculty, and administration to encourage compliance and to take reasonable steps to discourage violations. If violations occur, procedures are prescribed by the Student Judicial Charter of 1997. However, the Honor Code depends for its effectiveness primarily on the individual and collective desire of all members of the community to prevent and deter violations rather than on proceedings to impose penalties after violations have occurred.
- (c) In interpreting and applying the general provisions of the Honor Code, it should be kept in mind that although primary responsibility for making the Code effective rests with the students, faculty cooperation is essential, since the faculty sets the academic requirements which

students are to meet. The faculty should endeavor to avoid academic requirements and procedures which place honorable and conscientious students at a disadvantage. The faculty should also be ready and willing to consult with students and should be responsive to their suggestions in these matters.

(d) While an instructor's failure to observe these guidelines might be viewed as an extenuating circumstance in evaluating penalty options for a student's misconduct, it would not preclude the initiation of an otherwise warranted charge against the student.

2. Specific Interpretations and Applications

(a) "Third-party responsibility." A primary responsibility assumed by students is to discourage violations of the Honor Code by others. Various methods are possible. Drawing attention to a suspected violation may stop it. Moral suasion may be effective. Initiating formal procedures is a necessary and obligatory remedy when other methods are inappropriate or have failed. Faculty members have like responsibilities when suspected violations come to their attention.

(b) "Proctoring." Proctoring means being present in the examination room during a written examination, with the following exceptions:

1) The prohibition against proctoring should not be construed to prohibit an instructor or teaching assistant from remaining in the examination room for the first few minutes to distribute and explain the examination; or from visiting the examination room briefly to transmit additional information; or from returning at the end of the examination to collect examination papers.

2) Nor does the prohibition against proctoring prohibit an instructor or teaching assistant from visiting the examination room in response to specific reports from students that cheating has been observed, to investigate the basis for such reports. The instructor or teaching assistant may also visit the examination room briefly and infrequently in order to answer students' questions.

(c) "Unusual and unreasonable precautions." In interpreting and applying this provision, consideration should be given to standard procedures which are customary to Stanford and the need for cooperation between students and faculty in making the Honor Code effective. The following situations are cited as examples: An instructor should not require students to identify themselves before being admitted to an examination room, or require students to submit in advance to being searched for notes or other materials, or maintain surveillance upon students who leave the examination room. Nor should the instructor take deliberate steps to invite dishonesty in order to entrap students. Procedures of this kind would be unusual and unreasonable. On the other hand, an instructor may require copies of an

examination or test to be returned after the examination. When possible, alternate seating should be provided and used for all examinations. To avoid controversy in any rereading or regrading of students' work, the instructor may take measures by which the original work may be clearly identified. With clear advance notice, an instructor may systematically compare work submitted to current or previous submissions. An instructor who requires students to make up a missed test or examination may administer a different test or examination of equivalent range and difficulty. Such procedures are not to be construed as unusual or unreasonable.

(d) "Procedures that create temptations to violate the Honor Code." Although students are expected to resist temptations to cheat, the faculty should endeavor to minimize inducements to dishonesty. Examples of undesirable procedures include the following: failure to give clear directions and instructions concerning course requirements and the limits of acceptable collaboration in coursework; treating required work casually as if it were unimportant; carelessness or inconsistency in maintaining security of examinations or tests; reusing an examination which is neither kept secure from public exposure nor made available to all students. If take-home examinations are given, they should not be closed-book examinations, nor should there be a specific time limit less than the full period between the distribution of the examination and its due date. Such procedures place honorable and conscientious students in a difficult position and often at a disadvantage, and could be interpreted as mitigating by a judicial panel.

(e) "Penalty grading." Students are not to be penalized for violations of the Honor Code without adjudication under the procedures specified by the Student Judicial Charter of 1997. An instructor may not, therefore, lower a student's grade or impose any other academic penalty on the grounds of dishonesty in the absence of such formal proceedings.

(f) "Instructor discretion." Procedures falling under instructor discretion would include exam location, alternate times for exams, and alteration of due dates. Tests will be taken from the classroom only with the consent of the instructor.

(g) "Basis of grading." All student work in a course or independent study (exams, quizzes, problem sets, drafts of papers, oral presentations, Internet/websites, research, classroom discussions, etc.) forms the basis for evaluating and/or grading. The Honor Code applies to all academic work whether or not the work is given a letter grade, and whether or not the Honor Code is cited and/or signed. Therefore, regardless of the nature or extent of an assignment, academic dishonesty of any type is expressly prohibited and should always be considered a violation of the Honor Code.

(h) "Dual submission policy." One of the principal motivations behind the Honor Code is to prevent one student

from taking unfair advantage over the other students in a class. For example, receiving unpermitted aid on an assignment or consulting notes on a closed book exam gives a student an advantage that students who adhere to the Honor Code do not have. In much the same way, submitting the same work in more than one course without the knowledge of the instructor undermines fairness because faculty assume that student work prepared for a course is done for that course alone. To this end, the Interpretations of the Stanford Honor Code shall include the following: No student may submit substantially similar work in more than one class without the approval of any instructors who might otherwise assume that the work has been undertaken in their classes alone. Thus, submitting work that was prepared for a previous class requires the approval of the current instructor. Submitting substantially similar work in concurrent classes requires approval, in advance, from each instructor.

Sexual Harassment Policy

We provide below a summary of Stanford's policy on sexual harassment:

Stanford University strives to provide a place of work and study free of sexual harassment, intimidation, or exploitation. Where sexual harassment is found to have occurred, the university will act to stop the harassment, prevent its recurrence, and discipline and/or take other appropriate action against those responsible.

We also highlight the following important paragraph on consensual sexual or romantic relationships with students:

At a university, the role of the teacher is multifaceted, including serving as intellectual guide, counselor, mentor and advisor; the teacher's influence and authority extend far beyond the classroom. Consequently and as a general proposition, the university believes that a sexual or romantic relationship between a teacher and a student, even where consensual and whether or not the student would otherwise be subject to supervision or evaluation by the teacher, is inconsistent with the proper role of the teacher, and should be avoided. The university therefore very strongly discourages such relationships.

For a full discussion of Stanford's sexual harassment policy and resources pertinent to it, you can request *Understanding Stanford's Policy on Sexual Harassment and Consensual Relationships*, a brochure available from the Sexual Harassment Policy Office (723-1583), or you can consult <http://harass.stanford.edu>.

Speaking of Teaching Newsletters

These newsletters are available at Center for Teaching and Learning and on the web at <http://ctl.stanford.edu/Newsletter/>. If you would like to be added to the newsletter mailing list, please call CTL at 723-1326.

1989–1990

- *CTL Services for Teachers*
- *TAing in a Multicultural University*

1990–1991

- *Teaching and Your Professional Future*
- *Videotaping and Evaluating Your Teaching*

1991–1992

- *Juggling Teaching and Research*
- *Freshmen and Critical Thinking*
- *Responding to Student Writing*

1992–1993

- *Testing and Grading*
- *Classroom Assessment and Student Learning*
- *Teaching and Multimedia*

1993–1994

- *Active Learning: Getting Students to Work and Think in the Classroom*
- *Teaching with Case Studies*

1994–1995

- *Gender Issues in Teaching*
- *Being a Teaching Assistant at Stanford: Results of CTL's TA Survey*

1995–1996

- *Multiculturalism in the Liberal Arts Classroom*
- *From Research or Teaching to Research and Teaching*
- *Promoting a Culture of Teaching: The Teaching Portfolio*

1996–1997

- *Encouraging Top Students in Large Undergraduate Classes*
- *Promoting a Culture of Teaching: The Pedagogical Colloquium*

1997–1998

- *Using Student Evaluations to Improve Teaching*
- *Designing and Teaching a Course*

1998–1999

- *Capturing and Directing the Motivation to Learn*
- *Cooperative Learning: Students Working in Small Groups*

2000–2001

- *Problem-Based Learning*
- *Oral Communication in the Academy*

2001–2002

- *Faculty/TA Teaching Partnerships*
- *Teaching in the U.S. Classroom*

2003–2004

- *The Socratic Method: What It Is and How to Use It in the Classroom*
- *Why Good Teachers Have Bad Classes*
- *Designing Courses*

Award-Winning Teachers on Teaching Videos

Memorable Videotaped Talks on Teaching by Stanford Faculty*

Please call the Center for Teaching and Learning at 723-1326 to reserve a copy of any of the following tapes.

Case Method Teaching

Teaching by the Case Method

Prof. Mary Barth, Graduate School of Business

Teaching Strategies for Case-Based Learning: Environmental Problems in the Classroom

Prof. Keith Loague, Geological and Environmental Sciences

Controversial Subject Matter in the Classroom

Addressing Controversial Issues in the Classroom

Prof. David B. Abernethy, Political Science

Controversy and Social Commitment in the Classroom

Prof. Luis Fraga, Political Science

Moral Commitments, Emotional Identifications, and Historical Evidence: Teaching the Arab-Israeli Conflict

Prof. Joel Beinin, History

Course Design

How to Design and Teach a New Course

Prof. Russell Fernald, Psychology and Human Biology

Teaching As Learning: The Process of Designing a New Course

Prof. Leonard Ortolano, Civil and Environmental Engineering

Critical Thinking

Teaching Critical Thinking about Gender

Prof. Laura Carstensen, Psychology

Discussion Leading

Discussion Leading and Small-Group Methods

Prof. John Rickford, Linguistics

How to Have a Good Class Discussion

Prof. Mary Louise Roberts, History

Maximizing Participation in Classroom Discussions

Prof. Susan McConnell, Biological Sciences

Diversity Issues in the Classroom

Controversy and Social Commitment in the Classroom

Prof. Luis Fraga, Political Science

The Difficulties and Benefits of Encouraging Diversity and Diverse Views in the Classroom

Prof. Harry Elam, Drama

Engaging and Challenging Students

Being a Machine vs. Being Curious: What Do Students Want?

Dennis Matthies, CTL

Creating the Urge to Learn

Prof. Sam Chiu, Management Science and Engineering

Cultivating the Capability for Rigorous Critical Analysis: A Vital Pedagogical Task

Prof. Robert McGinn, Science, Technology, and Society

Dealing with an Eclectic Audience

Prof. Brigitte Cazelles, French and Italian Languages

Galvanizing the Student Muse: Creative Work in an Academic Setting

Prof. Jan Krawitz, Communication

Getting Inside Your Students' Heads

Prof. Doug Osheroff, Physics

Letting Them Do It Themselves... In Groups!

Prof. and President Emeritus Donald Kennedy, Biological Sciences

Managing the Dreaded Essay Assignment

Prof. Roger Noll, Public Policy and Economics

Relating to Your Students

Prof. Sanford Dornbusch, Sociology and Human Biology

Some Tricks of the Trade: Connecting with Your Students

Prof. Brad Gregory, History

Students Helping to Change the Curriculum

Prof. Sheri Sheppard, Mechanical Engineering

Teaching a Project-Based Course

Prof. Kristine Samuelson, Communication

General Teaching Effectiveness

7 (Plus or Minus 2) Habits of Highly Effective Teachers:

Conversations with Colleagues

Prof. Anne Fernald, Psychology

Analyzing the Complex Task of Teaching

Dr. Kelley Skeff, School of Medicine

Back to the Basics: Presenting the Foundations of One's Discipline

Prof. Peter Sells, Linguistics

Classroom Burnout: Experiencing It, Dealing with It, and Learning from It

Prof. Christina Maslach, UC–Berkeley, Psychology

Is Teaching a Calling or a Profession? Teaching Literature in an Uncertain Age

Prof. Seth Lerer, English and Comparative Literature

Learning from Teaching: What You Know, What You Don't Know, and How to Teach

Prof. Estelle Freedman, History

Teaching across the Disciplines: Reflections of a Pedagogic Switch Hitter

Vice Provost Robert Weisberg, Law

Teaching American Foreign Policy

Provost Condoleezza Rice, Political Science

There Are No Poor Speakers, Only Poor Listeners
Prof. Emeritus James March, Political Science, Sociology,
and Graduate School of Business

*What I Learned about Teaching and Learning in Sophomore
College*

Vice Provost for Undergraduate Education Ramón
Saldívar, English

Introductory Courses

Introductory Courses: Some Teaching and Learning Ideas
Prof. John Taylor, Economics

Large Courses

Running a Big Course
Prof. Gil Masters, Civil Engineering

Lecturing

Five Essential Concepts for Successful Lecturing
Prof. John Bravman, Materials Science and Engineering
and Sr. Associate Dean, School of Engineering

How to Give a Lecture
Prof. David Kennedy, History

Student-Friendly Lecturing
Prof. John Perry, Philosophy

Mentoring Students

Reflections on Mentoring: A Crucial Part of the Teaching Role
Prof. Robert M. Gray, Electrical Engineering

Seminar Teaching

Teaching a Freshman/Sophomore Seminar
Prof. James Sheehan, History

Service Learning

Bringing Community Service into the Classroom
Prof. Al Camarillo, History

Controversy and Social Commitment in the Classroom
Prof. Luis Fraga, Political Science

Simulations

*Stimulation and Simulations: Getting Students Interested in
International Relations*
Prof. Scott D. Sagan, Political Science

Socratic Method

*The Socratic Method: What It Is and How to Use It in the
Classroom*
Prof. Rob Reich, Political Science

Teaching in the Sciences, Mathematics, and Engineering

*Active Learning, Peer Learning, Assessment-Driven Learning:
How Do They Apply to Introductory Science Courses?*
Prof. Christopher E.D. Chidsey, Chemistry

*How Can Organic Chemistry Possibly Be Interesting?
One Teacher's Answer*
Prof. Eric Kool, Chemistry

*Image Isn't Everything, but in Teaching Fluid Mechanics
It Sure Helps!*

Prof. Jeffrey Koseff, Civil and Environmental Engineering
and Senior Assoc. Dean, School of Engineering

*Listening to Students: Changing the Mathematics
Curriculum at Stanford*
Prof. Brad Osgood, Mathematics

Maximizing Participation in Classroom Discussions
Prof. Susan McConnell, Biological Sciences

*Planning the New Core: Math, Science, and Technology
for Nonscientists*
Prof. Sandy Fetter, Physics

Problem Sets, Failure, and Learning
Prof. David Freyberg, Civil and Environmental
Engineering

*Seeing the Forest through the Trees: Vertical Learning and
Teaching Science*
Prof. Robert Waymouth, Chemistry

*Soap Bubbles, Thermodynamics, and Engineering Science:
Teaching the Ideas behind All the Mathematics*
Dean Franklin Orr, School of Earth Sciences

Strategies for Teaching Science to Non-Technical Majors
Prof. Patricia Burchat, Physics

Teaching Science: What Works
Prof. Paul Wender, Chemistry

*Teaching through Problem Solving: Perspectives after
18 Years in the Trenches*
Prof. Patricia Jones, Biological Sciences

The Value of the Laboratory Experience in the Sciences
Prof. Richard Zare, Chemistry

Team Teaching

Reflections on the Experience of Team Teaching
Professor Emerita Barbara Gelpi and Professor
Emeritus Al Gelpi, English

Technology in Teaching

Creating Links between Technology and Teaching
Prof. Barbara Gelpi, English

In Praise of (Real) Classroom Presence
Prof. Hans Ulrich Gumbrecht, Comparative Literature
and French and Italian

Incorporating New Technologies into the Teaching Process
Prof. Diane Middlebrook, English

History Wired: Technology-Enhanced Teaching
Prof. Timothy Lenoir, History

A Learning Tool: The Student-Produced Video As a Coursework Option

Prof. Emeritus James L. Gibbs, Jr., Anthropology

Teaching in a Digital Age

Prof. John W. Rick, Anthropological Sciences

Testing

Designing the Exam: Necessary Evil or Opportunity?

Prof. Paul Turner, Art

* With the exception of Prof. Christina Maslach of UC–Berkeley, all speakers in the series have been Stanford faculty. Their titles reflect their position at the time that they gave their talk.

Short Bibliography on College Teaching

Members of the Stanford community can borrow all of the works listed below from the Center for Teaching and Learning library.

Angelo, Thomas A., and K. Patricia Cross. *Classroom Assessment Techniques: A Handbook for College Teachers*. 2nd edition. San Francisco: Jossey-Bass, 1994. A comprehensive and practical introduction to the use of classroom assessment techniques. Fifty assessment techniques from a variety of fields are provided.

Banner, James, and Harold C. Cannon. *The Elements of Teaching*. New Haven: Yale University Press, 1999. The authors divide their study into the “elements” that go into the making of a good teacher: learning, authority, ethics, order, imagination, compassion, patience, character, and pleasure. All teachers have all these attributes to varying degrees; the important thing is how the traits are developed and used to the students’ best advantage.

Bligh, Donald A. *What’s the Use of Lectures?* San Francisco: Jossey-Bass, 2000. A thoughtful, thorough work on when and how to use lectures most effectively, and especially how to be aware of, and compensate for, the inadequacies of lectures for many kinds of student learning.

Boice, Robert. *Advice for New Faculty Members*. Boston: Allyn and Bacon, 2000. A useful handbook covering not only teaching but all aspects of a new professor’s responsibilities.

Christensen, C. Roland, David A. Garvin, and Ann Sweet, eds. *Education for Judgment: The Artistry of Discussion Leadership*. Boston: Harvard Business School Press, 1991. An excellent, thoughtful work on achieving highly productive and successful discussions.

Davis, Barbara Gross. *Tools for Teaching*. San Francisco: Jossey-Bass, 1993. Gross has written a particularly comprehensive and practical introduction to effective teaching.

Edgerton, Russell, Patricia Hutchings, and Kathleen Quinlan. *The Teaching Portfolio: Capturing the Scholarship in Teaching*. Washington, D. C.: American Association for Higher Education, 1991. A thorough and practical orientation for teachers who would like to document and reflect on their teaching through the creation of a personal teaching portfolio.

Erickson, Bette LaSere, and Diane Weltner Strommer. *Teaching College Freshmen*. San Francisco: Jossey-Bass, 1991. Teaching first-year students presents particular challenges. This book offers valuable insight into students’ intellectual development and strategies to promote effective learning.

Fink, L. Dee. *Creating Significant Learning Experiences: An Integrated Approach to Designing College Courses*. San Francisco: Jossey-Bass, 2003. Fink makes an effective argument for learner-centered rather than content-centered course design, drawing on recent research and offering various theoretical frameworks.

Grunert, Judith. *The Course Syllabus: A Learning-Centered Approach*. Bolton, MA: Anker Publishing, 1997. A practical manual for constructing a syllabus that will help students acquire, use, and extend knowledge in an active, ongoing process of learning.

Hativa, Nira. *Teaching for Effective Learning in Higher Education*. Dordrecht: Kluwer Academic Publishers, 2000. This book draws together much of the recent research on effective teaching and learning, consolidating it and giving plenty of practical assistance.

Jacobs, Lucy Cheser, and Clinton I. Chase. *Developing and Using Tests Effectively: A Guide for Faculty*. San Francisco: Jossey-Bass, 1992. Tests have a profound impact on students’ approach toward and success in learning. This is a comprehensive guide to better examination design, analysis, and grading.

Light, Richard. *Making the Most of College: Students Speak Their Minds*. Cambridge, MA: Harvard University Press, 2001. A valuable collection of insights and guidelines for, among other methods, using collaborative work among students to enhance learning. This is an excellent analysis of the ways students learn best based on surveys and interviews of Harvard students but applicable to other research university undergraduates.

Lowman, Joseph. *Mastering the Techniques of Teaching*. Paperback edition. San Francisco: Jossey-Bass, 2000. Another excellent general introduction to university teaching. He stresses the skills that an instructor must learn to excel in both the presentation of material and the establishment of rapport with students.

Marton, Ferenc, Dai Hounsell, and Noel Entwistle. *The Experience of Learning: Implications for Teaching and Studying in Higher Education*. 2nd ed. Edinburgh: Scottish Academic Press, 1997. A collection of essays

by noted international figures that explores learning in higher education through the eyes of students. The major insight, now widely disseminated, is the distinction between two approaches to learning: “deep,” understanding and assimilating complex ideas for oneself, and “surface,” getting by with course requirements.

- Mazur, Eric. *Peer Instruction: A User's Manual*. Upper Saddle River, NJ: Prentice Hall, 1997. Harvard professor Mazur's interactive approach to teaching physics brings students into the teaching process and emphasizes understanding over memorization. This manual offers a comprehensive guide to preparation of a first-year physics course but is also useful to faculty in other sciences and mathematics.
- McKeachie, Wilbert J. *Teaching Tips: Strategies, Research, and Theory for College and University Teachers*. 11th edition. Boston: Houghton Mifflin, 2002. Although this book contains excellent suggestions for effective lectures, discussions, labs, office hours, etc., its particular strength is its reviews of research on teaching.
- Nyquist, Jody D., and Donald H. Wulff. *Working Effectively with Graduate Assistants*. Thousand Oaks, CA: Sage Publications, 1996. A comprehensive guide for faculty who supervise teaching or research assistants.
- Seldin, Peter. *The Teaching Portfolio*. Bolton, MA: Anker Publishing, 1997. Benefiting from Seldin's many years of pioneering work on portfolios and his contacts with scholars and practitioners active in the portfolio field, this book offers nuts and bolts assistance—including guidelines for preparation and examples of portfolios from many disciplines—and puts portfolios in a larger theoretical, national, and institutional context.
- Tufte, Edward. *The Cognitive Style of PowerPoint*. Cheshire, CN: Graphics Press, 2003. An insightful and amusing critique of PowerPoint accompanied by thoughtful strategies for the illuminating presentation of dense data.

Acknowledgments

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