

## Teaching strategies

If you have dropped into this Course Design Tutorial from somewhere else, you might wish to start at the [introduction](#), [overview](#), or [table of contents](#). If you are working through the tutorial, you should have completed [Part 2.1](#) before beginning this section.

### Part 2.2 Teaching Strategies

At this stage of the tutorial, you have set overarching goals, organized content, and developed a course plan with ideas for how to give students the practice that will make it possible for them to achieve the course goals. In this section of the tutorial, you will make choices about what you will have students do in order to learn the course content **and** practice the goals. Before presenting a smorgasbord of teaching strategies, this section of the tutorial will explore briefly what is known about how people learn.

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**Start by [downloading the worksheet](#) (Microsoft Word 22kB Jun16 05) that goes with this part, and use it as you work through the sections below.**

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### Student Learning

An enormous amount has been written in the last two decades about research on how people learn. While it is beyond the scope of this tutorial to summarize the literature, several points relevant to course design emerge in one of the best summaries of the field, the National Research Council's 1999 publication [How People Learn](#) :

- **Research shows clearly that a person must be engaged to learn.** People learn by actively participating in observing, speaking, writing, listening, thinking, drawing, and doing.
- Learning is enhanced when a person sees potential implications, applications, and benefits to others.
- Learning builds on current understanding (including misconceptions!).

#### What messages can we take home for course design?

- If student learning is the goal, effective teaching means creating effective learning environments, and **environments where students are actively participating and engaged with the material are crucial to student learning.**
- Students are more likely to learn and retain if we ask them to do more than learn information. **Including activities where students can explore applications and implications will improve learning.**
- A traditional lecture classroom focused on presentation of content by an instructor does not typically promote active participation and engagement.
  - Most students dutifully write down what the instructor writes on the board or shows on PowerPoint slides but are not actively processing the information. [For others, the statement "the light's on, but nobody's home" would be most appropriate]
  - A few students are engaged in thinking, comparison, analysis and projection during the lecture. They're the ones who raise a hand and say, "But what about X"? or "That must mean that"

- Because many faculty members were this latter type of student, it is hard for us to recognize that **traditional lecture is not an effective learning environment for many of our students because so many students do not participate actively during a traditional lecture.**

[Show an anecdote](#)



## Learning Styles

Before we get to teaching strategies that promote active student participation and engagement, we'll take a brief look at learning styles, another important aspect of learning that is useful to factor in to assignment and activity design. If everyone learned the same way, it would be easy to choose teaching strategies to optimize learning. How people learn, however, varies widely, as does individual preference for receiving and processing information. How does this influence teaching?

- **Your learning styles will certainly not match those of everyone in your class**, and your learning styles may, in fact, be quite different even from a majority of your students.
- **What works well for you may not work well for some (or even most!!) of your students.** Because each of us knows what works for ourselves, we're prone to selecting teaching strategies that favor our own learning styles. If you choose only teaching strategies that would optimize learning for students with your learning styles, many of the students in your class may be at a disadvantage.
- **Knowing something about learning styles in general and your own learning styles in particular can help you to plan assignments and activities** that reach students with as many different learning styles as possible.

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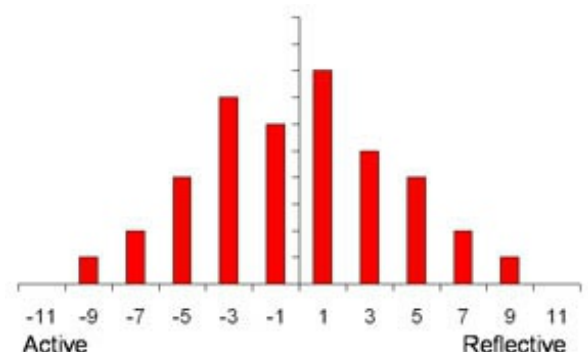
### Task 2.2a: Learning styles inventory

A commonly-used, web-based learning styles inventory was developed a number of years ago at North Carolina State University by Richard Felder and Linda Silverman. While other learning styles inventories exist, we have data from several years of Course Design Workshop participants with which you can compare your own results. Go to [the learning styles inventory](#), and take the short survey. Print out the results as well as the [interpretive text](#) and [additional information \(more info\)](#).

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At right, you'll see the learning styles results from a group of 40 Course Design Workshop participants for questions in the active vs. reflective category.

- Negative numbers reflect preference for processing information actively through engagement in physical activity or discussion; positive numbers reflect preference for processing information reflectively through introspection.
- Bar heights reflect the number of individuals with a given score.
- Individuals with scores in the mid range tend to process information actively sometimes and reflectively at other times (i.e., they do both with no strong preference). Individuals with scores at either end have a strong preference for either active or reflective processing.



- Suppose this group of 40 were your class. If you had a score of 7 on your own learning styles survey, you prefer to process information through introspection. 20% of your class, however, has a strong preference (scores of ~5 though ~9) for processing information actively. Designing a variety of assignments, or providing opportunities for *both* introspection and discussion within an assignment, will meet the needs of more of your students.
- You can find more information on the Index of Learning Styles, how it can be used, and how to avoid misusing the results in an [article by Felder and Spurlin \(2005\)](#).

[Show visual/verbal results for comparison](#)

[Show sensing/intuitive results for comparison](#)

[Show sequential/global results for comparison](#)



## Teaching Strategies for Actively Engaging Students in the Classroom

As you enter a classroom ask yourself this question: "If there were no students in the room, could I do what I am planning to do?" If your answer to the question is yes, don't do it.

*Gen. Ruben Cubero, Dean of The Faculty, United States Air Force Academy*

It's now time to make choices about what you will have students do in your course in order to learn the course content and to practice the goals. What kinds of teaching strategies can be used in the classroom that accomplish both course content goals and active engagement on the part of students?

The old adage "if all you have is a hammer, everything looks like a nail" is equally true of teaching strategies. If the only classroom teaching strategy you know is traditional lecturing, that's the teaching tool that you're likely to use for all classroom situations. **If, on the other hand, you have more tools in your toolbox, you will have the opportunity to choose the most appropriate tool for the task at hand.** In this section of the tutorial, you will explore various teaching strategies in which most students are active rather than passive in the classroom and in which the focus is less on the teacher presenting and more on the student learning.

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### Task 2.2b: Exploring teaching strategies

Below, you will find brief descriptions of teaching strategies that promote active engagement and participation of students in the classroom, plus links to sample assignments and activities and more complete information for using each strategy successfully. Browse the various techniques to find strategies that you might be able to use to accomplish the goals in your own course and enhance student learning. Be sure to keep in mind the context and constraints of your course. Go to the course plan that you began to develop in Part 2.1, and add teaching strategies to specific topics, along with outlines of ideas for assignments or activities using those strategies (e.g., jigsaw with geologic maps from four adjacent areas to give students practice in analyzing regional geologic history).

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The list of teaching strategies below does not by any means include all of the good ideas for structuring assignments and activities for students! But each is an effective way for actively engaging students and placing more responsibility on them for their own learning. And, while the specific examples might not be ones that you would use in your own courses, they are useful templates for designing your own assignments and activities.

Some of the links below will take you to the [Starting Point site](#) (a companion website to [On the Cutting Edge](#)) that is devoted to teaching introductory geoscience. Don't be put off if you are teaching an upper level course. The teaching strategies discussed are applicable to courses at all levels.

## **Making lectures more interactive**

What happens when you try to engage students by floating a question during class? Silence? The same eager student anxious to answer? Most of the students not thinking about the question but just hoping that you won't call on them? What can we do to make students more actively engaged with the material during lecture in order to improve student learning? Clicking "more information" below will take you to a discussion, at the Starting Point site, of strategies for making lecture more interactive. [more information and examples](#)

Below, you will also find links to useful material for making classes more interactive:

## **The jigsaw technique**

Have you struggled with group work in class? The jigsaw technique can be a useful, well-structured template for carrying out effective in-class group work. The class is divided into several teams, with each team preparing separate but related assignments. When all team members are prepared, the class is re-divided into mixed groups, with one member from each team in each group. Each person in the group teaches the rest of the group what he/she knows, and the group then tackles an assignment together that pulls all of the pieces together to form the full picture (hence the name "jigsaw"). [Jigsaw module from Pedagogy in Action](#)

## **The gallery walk**

The gallery walk is a cooperative learning strategy in which the instructor devises several questions/problems and posts each question/problem at a different table or at a different place on the walls (hence the name "gallery"). Students form as many groups as there are questions, and each group moves from question to question (hence the name "walk"). After writing the group's response to the first question, the group rotates to the next position, adding to what is already there. At the last question, it is the group's responsibility to summarize and report to the class. [more information and examples](#)

## **Effective discussion**

Discussion is an excellent way to engage students in thinking and analyzing or in defending one side of an issue, rather than listening to lecture. Students must also respond to one another, rather than interacting intellectually only with the instructor. Good discussion can be difficult to generate, however. Clicking "more information" below will take you to some tips for having a good discussion in class and a sample template for class discussion. [Download more information on effective discussions, with a template example](#) (Microsoft Word 35kB Jun16 05)

## **Concept sketches**

Concept sketches (different from concept *maps*) are sketches or diagrams that are concisely annotated with short statements that describe the processes, concepts, and interrelationships shown in the sketch. Having students generate their own concept sketches is a powerful way for students to process concepts and convey them to others. Concept sketches can be used as preparation for class, as an in-class activity, in the field or lab, or as an assessment tool. [Download more information on concept sketches, with examples](#) (Microsoft Word 475kB Jun15 05) :: [Download an example of a final project involving concept sketches, with samples of student work](#) (Microsoft Word 3.1MB Jun15 05)

## **Using case studies**

Case studies have been used successfully for many years in business school and in medical school for actively engaging students in problem-solving relevant to the discipline. The primary hallmark of a case study is presentation of students with a problem to solve that revolves around a story (the "case"). In medical school case studies, the "story" typically involves a sick patient. In science case studies, "stories" can range from public policy issues to science research questions. Good case studies give the students considerable latitude in deciding how to solve the problem, rather than leading them through the problem by the nose, and provide excellent opportunities to engage students in the classroom. [The National Center for Case Study Teaching in Science](#) has a collection of case studies in a number of different science disciplines. Also, clicking "more information" below will take you to a discussion, at the Starting Point site, of teaching with case studies.[more information and examples at the Starting Point site](#)

## Debates

Debates can be a very useful strategy for engaging students in their own learning. Debates force students to deal with complexity and "gray areas", and they are rich in imbedded content. Debates can also help provide relevancy of course material to everyday issues, which can improve student learning. Debates also improve student's oral communication skills. [Download more information on debates, including a rubric for grading debates](#) (Microsoft Word 35kB Jun15 05).

## Just-in-Time Teaching

Just-in-Time Teaching (JiTT) was developed as a way of engaging students in course material before class and preparing them to come to class and participate actively during class. Clicking "more information" below will take you to a discussion, at the Starting Point site, of using Just-in-Time teaching. [More information and examples](#)

## Role playing

Role-playing and simulations in class can be an excellent way to engage students. A well-constructed role-playing or simulation exercise can emphasize the real world and require students to become deeply involved in a topic. Clicking "more information" below will take you to a discussion, at the Starting Point site, of teaching with role playing.[More information and examples](#)

Once you have explored teaching strategies, [Go to Part 2.3: Assessing Student Learning](#)

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