

# Teaching

## THE CHRONICLE OF HIGHER EDUCATION

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Welcome to Teaching, a free weekly newsletter from *The Chronicle of Higher Education*.

This week:

- I show you how one college adapted project-based learning for first-year students.
- I share the results of a paper asking whether we have misguided ideas about how to teach critical thinking skills.
- I pass along some good reads you may have missed.

### **Introducing Project-Based Learning to First-Year Students**

Project-based learning holds a lot of appeal. It's hands on. It focuses on real challenges. And it engages students in self-directed, open-ended learning.

But how can you design a course appropriate for first-year students? They don't have the disciplinary knowledge or, perhaps, the organizational skills necessary to make project-based learning work well.

That was the challenge Worcester Polytechnic Institute faced when it set out a decade ago to create the [Great Problems Seminar](#) for first-year students, built around project-based learning. I heard about these seminars in a presentation given by Geoff Pfeifer, an associate teaching professor of philosophy and

international and global studies, and Derren Rosbach, an associate teaching professor of environmental studies, at WPI's annual summer [institute](#).

I followed up with them earlier this month to talk about some of the strategies they and other WPI professors have devised over the years. Here are the key pieces:

**Interdisciplinary teaching:** All of the seminars are team-taught by a STEM and non-STEM faculty member. This is important in several ways. For one, the seminars are focused on challenges like global health, animal extinction, and energy production, which have both a social and a scientific dimension. (You can find some sample syllabi [here](#).) Pfeifer, the philosopher, and Rosbach, the scientist, co-teach a climate-change course this semester called "[Biosphere, Atmosphere, and Human Fears](#)."

Because neither faculty member is fully an expert on the subject they're teaching, they learn alongside their students. Removing professors from the role as "expert," Pfeifer and Rosbach say, helps students take charge of their own learning — a crucial step in their intellectual development. "They're not used to a professor asking them, 'What do you think? What can you find? What did you learn?'" says Rosbach. "The challenge is showing them how to do that."

**Scaffolding:** Students complete two short projects, lasting a week to 10 days, in the first half of the course. (WPI is on a quarter system, so, technically, the course covers two seven-week terms.) In those projects they work in teams and individually, doing research and giving a short presentation on what they learned. The first project is more theoretical, with a highly structured set of questions students need to answer in their presentations. Putting those kinds of guardrails on the assignment ensures that the students don't veer off course, the professors say. The second assignment is more open ended and based on real-world issues.

In the course that Pfeifer and Rosbach co-teach, students research different climate-change issues for their first project. For the second project, on climate-

change disaster situations, teams are assigned a particular community to research and then give a presentation on its assets and vulnerabilities should disaster hit.

Professors introduce students to resources like the library and the academic technology center. They also spend a lot of time in class discussing projects and giving feedback on teams' progress.

**Team-based learning:** On the first day teams are organized, Pfeifer and Rosbach give students an assignment on [personal asset mapping](#), in which they are asked to reflect and write about their strengths and weaknesses, and lay out where they hope to improve. A student might describe himself as quiet and good at organization, for example, but want to work on his public presentation skills.

Students also read about team dynamics, and how bias and stereotyping around race, gender, and economic status can lead to team dysfunction. Women in teams frequently get assigned the secretarial or communications roles, for example, while men are often given the technical or leadership roles. "We're trying to disrupt patterns," says Pfeifer, by making students aware of these underlying default settings.

The final project takes up the second term. But even there, the professors say, the Great Problems Seminar builds in a lot of support. In class, students learn about research methods and analysis. They hear from people in the career center, who talk about why the skills they're developing are valuable in the workplace. They give project updates to their classmates and professors and get feedback to keep them on track. They're required to keep a research notebook to report and reflect on what they're reading. They're also expected to do interviews in the community or with experts and report on their findings midway through the term.

All of that builds toward a final project report, poster, and presentation, in which students from all the Great Problems Seminar gather to talk about what they learned.

About one third of all WPI first-year students enroll in one of these seminars. While WPI hasn't yet completed any formal research on the program, professors who run junior- and senior-year project courses say that students who take a Great Problems Seminar typically come in better prepared to work in teams and on open-ended projects, Pfeifer says. They are also better at conducting interviews, having practiced it during their first year.

Pfeifer and Rosbach say that project-based learning can be incorporated anywhere, and point interested readers to [\*Project Based Learning in the First Year: Beyond All Expectations\*](#), edited by their WPI colleagues Kristin Wobbe and Elisabeth Stoddard.

Have you adapted an advanced technique for first-year students? Tell me about it at [beth.mcmurtrie@chronicle.com](mailto:beth.mcmurtrie@chronicle.com) and your story may appear in a future newsletter.

### **\*\*A Paid Message From: Pearson**

Separate fact from fiction and explore 8 common myths and realities of inclusive access from a [Pearson partnership perspective](#). \*\*

### **How to Think about Teaching Critical Thinking**

Are we thinking incorrectly about how to teach critical thinking? A recent paper argues that we might be. "[How to Teach Critical Thinking](#)," by Daniel T.

Willingham, a psychology professor at the University of Virginia, reviews studies on the subject, including the effect of learning logic puzzles or Latin on students' broader critical thinking skills, and also more discipline-specific research. It turns out that people aren't so great at transferring general principles into different contexts. One reason is that they may not see the underlying patterns and similarities. Another is that they lack content knowledge. Willingham gives the example of asking someone to look for hidden assumptions — a critical thinking

skill — in an op-ed about the Afghanistan war. If you know nothing about the war, you'd be hard pressed to employ the skill.

Then there's the issue that "critical thinking" means different things in different contexts. Thinking like a historian is not the same as thinking like a scientist. Willingham also gives some advice to educators who want to teach these skills, such as: Define the specific critical-thinking skills you want to teach students in your field, as well as the essential content needed. (Hat tip to the Hechinger Report's Jill Barshay, who brought the study to readers' attention in her column, [Proof Points](#).)

## ICYMI

- "Show students you are invested in them, and they will feel a lot more invested in the work they do for your course," writes Carol E. Holstead, an associate professor of journalism at the University of Kansas, in this [advice piece](#) about the importance of personal connection to students' ability to learn.
- In this [essay](#), William Cheng, an associate professor and acting chair of the music department at Dartmouth College, explains why he continues to play the works of problematic musicians, such as R. Kelly and Michael Jackson, in his courses.
- A [report](#) by Cerego, an adaptive learning company, looked at the study habits of 1.5 million users. Among the findings: people seem to learn more effectively in the evening, and — no surprise to regular Teaching readers — cramming and re-reading are not great ways to retain knowledge.

Thanks for reading Teaching. If you have suggestions or ideas, please feel free to email us, at [dan.berrett@chronicle.com](mailto:dan.berrett@chronicle.com), [beckie.supiano@chronicle.com](mailto:beckie.supiano@chronicle.com), or [beth.mcmurtrie@chronicle.com](mailto:beth.mcmurtrie@chronicle.com).

Prefer to read the article version of the newsletter? Here's a [link](#).

—Beth

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