

**SEAN ROBINSON:** For us, in practice, in the teaching lab, we try to get the students the information they need at the time when they're most ready to learn it. Let's take one example of one of the skills which takes some time to develop, which is analyzing data. Data analysis is hard.

Nobody has good intuition for it. It involves mathematics. It involves somewhat of a dark art of skills. So everybody requires practice at it. Several years ago, our approach to teaching data analysis in Junior Lab was we would have a few lectures. We would take the first hour and a half of each lab session on the first couple of days of the semester, and just lecture to the students.

We would give a blackboard talk or a PowerPoint presentation, and tell them everything there is to know that would get them at least through a semester or two of Junior Lab. Now of course, nobody would remember any of that by the time it came to actually do data analysis sometime in the next few weeks after that. And given everything we know about how people learn, that is not at all surprising.

So the way we do this now is there is a little bit of instruction, either by some reading or a video on the web, which is mediated through the open EdX platform on MITx. They do a little bit of what amounts to a reading quiz on MITx. But that's when-- we don't necessarily believe that watching someone give a lecture on a computer screen is much better than giving a lecture in person, not necessarily.

So we believe the real learning is going to happen the next day when they come to the classroom, and we're going to do some sort of very active exercise on this very same material which they just learned overnight. So the direct instruction that happens as part of the preparation, we really are treating it as the preparation.

It's not the main learning. The main learning is going to happen with the active exercise that happens in class. But we just need to have some sort of priming so that when they arrive, they are ready to start that learning.