SARAH HANSEN: Could you tell us a little bit about the history and development of 18.065, this new course?

GILBERT STRANG: Yes, OK. So this was my adventure into the subject of deep learning. So that's a special part of machine learning, a highly important part. It's in the newspaper all the time.

And students are graduating knowing about the deep learning and getting good jobs. And it's really amazing. So and then the other beautiful part is that it depends so heavily on linear algebra.

SARAH HANSEN: You've been known to say, "I certainly learned that projects are far better than exams. Students ask their own questions and write their own programs. From now on, projects."

GILBERT STRANG: That's right. Yeah. Sort of late to learn this because with the 18.06 linear algebra, totally conventional course with maybe three exams during the semester and a final exam. And maybe that's appropriate. But it's changing.

And then with this new course, where the computer's involved, and you-- for example, so I ask everybody to do a project. There is no final exam. Actually, there's no exam at all. I shouldn't like to say this. But it's really what the subject is is having an idea of how-- OK, I'll use deep learning for something.

SARAH HANSEN: What did that feel like to try something new pedagogically?

GILBERT STRANG: Oh, it's fun. You know, I like teaching. And this is a subject where students just come from everywhere. Because they know what stuff to learn. And they've heard about it. And they-- some of them know more than me. And then those students write even better projects.

Yeah, it's just-- so I do the lectures for the first three quarters of the course. And then I try to get them to present, which is a great experience for them, though it takes a little urging to get them. But, yeah, yeah, it's really just wonderful.

SARAH HANSEN: What insights have you gained about having more of a student-led course and a project-based course? Anything that other--

GILBERT STRANG: You realize, slowly but finally, that that's how people learn, by doing. That you couldn't give them a better way to learn than to create a project. Usually, it's on some topic they know about

or they're interested in, like, how do you find a criminal in a bunch of people?

Yeah, it's just a very effective way to learn. And it's something that gets remembered, where doing exam questions that I might make up, sort of mathy questions, I don't know if that's remembered 10 years later. But I think people's projects are.

SARAH HANSEN: Is there anything you learned from teaching it this way? Like something that maybe went wrong in the logistics of facilitating these projects that next time you want to do differently?

GILBERT STRANG: Well, sure. I didn't have any idea what to expect really. And maybe the students didn't either. They said, what's a project? Well, one student had said unwisely, when are the projects due?

I thought, what's that? I mean, I hadn't even thought about projects. So I was like, OK. All right. You asked for it. So we decided that the last-- the end of the semester, the final day of class, which is two weeks away, projects are due to come in. And then some of the class is able, has a chance, to present their project in the last weeks, but not everybody because it's a big class.

So it starts with each student or each group-- it could be two or three students together-- sends me an email about their plan. And I respond. I usually respond, wonderful. And maybe I have an idea of a reference or two that they could look at. But and then they just do it. Yeah, it's really very nice.

SARAH HANSEN: Do you give them any feedback along the way?

GILBERT STRANG: If they ask for it, yeah. And if I-- you know, usually they'll know more about their subject than me. But maybe what they learn also is presenting. That's an important thing.

So it's really just more-- it's richer than taking an exam. Well, the viewer may think, OK, Professor Strang says no more exams. I don't know if-- so don't quote me on that, please.

SARAH HANSEN: OK. In 18.065, in one of the videos, you talk about grading students' work. And you tell them that, although this is important to grade their work, it's not your main concern. That your main concern is actually learning with them.

GILBERT STRANG: Right.

This is what I want to say the most. And I say it to every class I teach near the start of the semester. My feeling about what my job is is to teach you things or to join with you in learning

things, as has happened today. It's not to grade you.

So typically, the first few days of class, these guys ask, you know, what's the class average going to be? How are we going to be graded? I don't have any answers for that stuff. So I say what is totally true, that I'm not-- I don't feel my main job is to grade them.

That my job is to teach them or learn with them. And that's what I continue to do. And gradually, they begin to believe. You know, at the beginning, they still think, OK, but he's got to give me a B, or a C, or an A. But really, that's not what 18.065 is about, a grade. It's just not.

SARAH HANSEN: What advice do you have for new professors starting out in teaching?

GILBERT STRANG: Well, probably this interview has expressed most of the thoughts I have about in the class. Yeah, yeah. Use big chalk, especially if it's a large class. It helps your writing get-- your writing looks impressively level, even, because of the chalk.

And don't rush. And don't think you have to cover everything. Just stay with the class. Yeah. Yeah. Well, so again, it's the best job possible.