[SQUEAKING]

[RUSTLING]

[CLICKING]

JUSTIN REICH: Good. All right. So we're heading in to our last of the as-yet intractable dilemmas. We talked about the curse of the familiar, EdTech Matthew Effect, the trap of routine assessment, and, today, the toxic power of data and experiment. Let's do this as an exercise. Grab one other person. Your goal is to make a list as long as possible. What is all the data that MIT has about you?

If you could go through every server that is somehow even tangentially under the control of MIT, what are all the different types and sources and nature and example of data that MIT has about you? Does that make sense? Make the list as long as you can, as fast as you can. Ready? Go.

All right. Let's start aggregating some big categories of things.

AUDIENCE: Financial information.

JUSTIN REICH: So they have a lot of financial information. Maybe just what are a few examples of some of the most sensitive or personal parts of that? They know your parents' income.

AUDIENCE: They know your income.

JUSTIN REICH: Your income.

AUDIENCE: They know your bank account.

JUSTIN REICH: Bank account. They know your bank account number, or you give them literally--

AUDIENCE: Yeah.

JUSTIN REICH: But they don't have a screenshot of your [INAUDIBLE]. So they know a lot of financial things about you. What are some other categories?

AUDIENCE: Health.

JUSTIN REICH: What are some sensitive things in there?

AUDIENCE: History.

JUSTIN REICH: History.

AUDIENCE: Vaccinations.

JUSTIN REICH: Vaccinations, prescriptions.

AUDIENCE: Allergies.

JUSTIN REICH: Allergies, mental health visits.

AUDIENCE: Your insurance.

JUSTIN REICH: Insurance.

AUDIENCE: You can also tell if people are LGBT from their medical records.

JUSTIN REICH: Sexual orientation, activity. What else you got?

AUDIENCE: Personal information, like your name and age.

JUSTIN REICH: Yeah. Let's call it registrar information.

AUDIENCE: Social Security number. Yeah, Social Security number.

JUSTIN REICH: Address, SSN, phone.

AUDIENCE: Oh, they might have their travel data.

AUDIENCE: Yeah, if [INAUDIBLE] your travels.

AUDIENCE: You have to register--

AUDIENCE: If you register it yourself--

AUDIENCE: Oh, really?

AUDIENCE: MIT knows what I did.

AUDIENCE: Especially if you've been international. If you do it through the school, you have to register.

AUDIENCE: You have to. Or if you're going to a country that they have warnings for, you have to be like, I was there.

JUSTIN REICH: What else we got?

AUDIENCE: Academic records.

JUSTIN REICH: Good. That's part of it. Academic records. What would that include these days? They know your grades. What else?

AUDIENCE: Registrations, like what classes you signed up for.

JUSTIN REICH: Registration.

AUDIENCE: Test scores.

JUSTIN REICH: Test scores.

AUDIENCE: Major.

JUSTIN REICH: Every click ever in Canvas, attendance. Yeah? Academic records is a good example of one in which the granularity of data over the last 10 years has transformed dramatically. If we had had this discussion in 1980, they would have been like, I guess they know what my grades were and what classes I signed up for.

But the volume of data about every activity that you've ever taken online in any of your classes is substantially higher than it used to be. Those records might not be maintained forever. Maybe all those sites get deleted every 18 months or so, something like that. But some of them might be kept for longer for research or other things like that. All right, other categories?

AUDIENCE: Residential, home and current.

JUSTIN REICH: Home. Let's make it even bigger. Let's say location. So they know your residence, home and campus, track your devices on Wi-Fi, card swipes in buildings. So essentially, as you move around campus, somewhere, there are databases that record all of those activities. How long they maintain those materials, we don't necessarily know. I'm sure they'd tell us if we asked, but-- what else they got?

AUDIENCE: On that location, they can also tell who you hang out with.

JUSTIN REICH: Yeah. I just learned about this today. What's the system where you add people?

AUDIENCE: Guest lists.

JUSTIN REICH: OK. So I guess if you live in a residence, you create a guest list of people that are allowed to visit you. You could just reconstitute the entire social network of MIT from the guest list. There's all kinds of things you could learn from that.

AUDIENCE: There's extracurricular activities. So they know what sports teams and athletics stats on that. And then if you signed up for club teams, or just clubs.

JUSTIN REICH: It would be all those kinds of things.

AUDIENCE: PE, as well.

JUSTIN REICH: Yeah, your gym membership swipes, activity.

AUDIENCE: Political affiliations.

JUSTIN REICH: How would they get your political affiliation?

AUDIENCE: Through your extracurriculars, like if you're involved with the recent stuff that's been going on on campus.

JUSTIN REICH: Yeah, good. So there are increasingly, presumably, lists of people who are affiliated with pro-Palestinian, pro-Israeli, any of those other kinds of things, but also people that have just been able to tell before, if you remember-- I don't know, I assume there's a Democrat and Republican club at MIT, I would imagine-- someone, somewhere.

AUDIENCE: Emails.

JUSTIN REICH: Yes. They have the entirety of your email record.

AUDIENCE: Even broader, just online activity. Because you have emails, websites, everything you've registered for.

AUDIENCE: They also offer a VPN. So it's secure to everyone but MIT.

AUDIENCE: They also have your Google Drive. If you sign up for the MIT Google Drive, they have all your documents.

JUSTIN REICH: Google Drive. Yeah, I had a congressional committee that wanted to find out more about my work, not necessarily in a generous way, this past year. And the Office of General Counsel did a whole search throughout my email to find terms that this congressional committee was interested in learning more about. And we were going back and forth. And I was like, what do you need from me? And they were like, well, it's better if you help us with this. But either way, we're going to do it.

So all the records that you generate-- and that's a good example of how even-- I'm reasonably confident that in most circumstances-- MIT is not going through my email every day and like, what's Justin up to? They don't care. But simply having those records allows all kinds of things to happen with those records-- do you guys have automated laundry machines?

AUDIENCE: Yeah.

JUSTIN REICH: Washing frequency.

AUDIENCE: It's an app.

JUSTIN REICH: Yeah, it's even an app.

AUDIENCE: Yeah, it's an app. You pay for your machine, and then you--

AUDIENCE: And you have to sign up through your MIT email.

AUDIENCE: Yeah, you have to do it through MIT.

JUSTIN REICH: And so that, I think, also raises some questions of-- it's possible, actually, that MIT doesn't have your laundry data but that MIT just somehow mandates that a third party has all of your laundry data, which, again.

AUDIENCE: How about keys to your room if you live on campus?

JUSTIN REICH: Yeah.

AUDIENCE: Oh, like physically.

JUSTIN REICH: Yeah-- keys. What's good about them having keys?

AUDIENCE: If you get locked out.

[LAUGHTER]

JUSTIN REICH: Yeah. So if there's a day that you're locked out of your room, you're going to be like, it is so great that MIT knows exactly what key goes in my door and can make another one of those.

AUDIENCE: They had room inspections a few weeks ago where they went into every person's room to check if they were abiding by the rules.

JUSTIN REICH: Yeah, good. What might be good about room inspections for everyone?

AUDIENCE: Safety.

JUSTIN REICH: Yeah, safety. If your neighbors are having halogen lamps that can catch on fire and stuff like that, you would be glad that they knew about that. But obviously, it also seems like a huge invasion of your privacy.

AUDIENCE: I would say what also made the room inspections better is also you're trusting MIT to be responsible with it. So they told everyone ahead of time, and they made sure that it's a visual inspection. Obviously, they're not going through your stuff. But obviously that's not a thing for a lot of colleges. A lot of colleges can just like come barging into your room and look at anything.

JUSTIN REICH: Yeah. So institutions make choices about how-- so, hopefully, I don't know. What kind of feelings do you have when you start looking at this completed list?

AUDIENCE: There's some more I have. The one that I've been thinking about lately, given the affirmative action stuff, is just general demographics [INAUDIBLE]. And also, something that was not mentioned in financial is purchase history, so if you buy anything on campus.

JUSTIN REICH: They know you got sushi today.

AUDIENCE: Yeah. Like, Tito and all the coffee stores, like Dunkin', the ones in Forbes, stuff like that.

JUSTIN REICH: Yeah, particularly if those things somehow-- can you put money on your ID card and spend directly from your ID card?

AUDIENCE: Yeah.

JUSTIN REICH: So there's two units that we should be thinking about anytime we think about school data is that schools have a bunch of data, and then schools authorize third parties to get a bunch of data. And sometimes only the third party has access. Sometimes both parties have access. Like, both Canvas and MIT people have access to all of your Canvas data.

The laundry app might be a good example of-- if somebody told me that the maintenance department had access to all the laundry data, or IT, I wouldn't be surprised. But if they were like, yeah, no, we make you sign up with an email, but only the laundry people know your laundry data, that wouldn't surprise me, either. But those are two useful, salient categories that will come up as we keep talking about things.

AUDIENCE: Your deliveries, too.

AUDIENCE: Oh, yeah, your mail deliveries.

JUSTIN REICH: Oh, because things go through the mail room?

AUDIENCE: Yeah. So they store all of your information and your deliveries into a tracker system and then send you emails of your delivery has come in. You need to pick it up.

JUSTIN REICH: Good. Yeah. And so, typically, the data is exchanged for some kind of service. You want to know when your new headphones are coming or something like that. And so you're glad that they have that. But in order for them to be able to know when your new headphones are coming, and to do other kinds of things with it-- the other thing, you could say, over the past 10 years, was it a good idea for MIT to track the changing volume of deliveries to individual students? Yes. I'm sure MIT has had to build all kinds of infrastructure to make it possible for you all to get your stuff in a sensible way.

And it's probably a good idea that MIT has data about aggregate-- particularly in the aggregates. It's probably a good idea to know, oh, in 2014, the typical student got 2.3 packages a year, and now they get 30.6 packages per year. And it just requires a whole different infrastructure to support those two kinds of ways of people doing commerce. Anyway, what other feelings do you have as you look at the whole list of data that MIT might have about you?

AUDIENCE: I feel like, ultimately, I'm not really that surprised. I feel like we grew up in a generation where digital data has been collected for our entire lives. It was not something that was introduced but always there. And so I feel like I've kind of grown up in this world knowing that all of this type of information can and is being collected on me. And so I'm still going to live the same way. But I just-- it just is what it is in kind of a sad way.

JUSTIN REICH: Yeah, there's sad-- you're clearly not comfortable with it. Because if you listen to-- if you stop talking for a second while people were making the list and listen, there's all kinds of awkward laughter that happens throughout the whole time. There's something about this which is like, oh, this doesn't feel good. Any individual category can make you not feel that great. Do you really want MIT's IT department to be able to track where everyone can go? That seems like it could go awry.

And then just the whole volume in aggregate, you realize how much-- you could make a very similar list for K-12 schools, as well. You can probably guess the places in which things are not exactly the same. And the data collection that people can do can be really influenced by policy. States have different rules about how attendance is connected to funding. Who's there on a particular day? Who's there for what periods of time?

You could imagine that you want to make sure that if a kid moves schools three times in a school year that not all three of those schools get like a full student's tuition worth of-- or a per-pupil expenditure. But there are states that part of the reason why they issue ID cards to students and track their entrance and things like that is to pay really close attention to that attendance data, just for that particular policy purpose. Was there another?

AUDIENCE: Adding on to it being not surprising, I would say a lot of the information that they took while we were here, like current residence or laundry and stuff like that, I feel like is much more unsurprising just because it is something that is novel when you come to a college or an institution like this, where it's like, oh, wow. They really do have this information. But I think what's kind of a little crazy is how much of this information they have before you even get here.

JUSTIN REICH: So yeah, for applicants, for people who are admitted into the school and things like that. Yeah, there's a lot that you need to tell MIT for them to be able to come here and get here. There's a lot that you need to be able to-- to get in. Again, these days, you have to take the SAT, which means you are required to give a bunch of information to the College Board. And you also, in the process of doing that, you're probably asked to opt in to a bunch of things.

I had a master's student-- I can't remember all the details now-- but did their thesis on, essentially, the kinds of things that the College Board did with information that they got, which, to some extent, you could say something like, if you opt in to flowers.com or something like that-- you're like, man, I really want good information about what flowers are available, and then flowers.com sells your data. You're like, well, maybe that's a terrible system to exist in. But flowers.com did ask me if I wanted to give them my data, and I did agree to let them do anything with it. And that was just my voluntary relationship.

But you didn't really have a voluntary relationship with the College Board. You had no choice but to interact with the College Board to make it through this major life milestone. And so, to the extent that the College Board does things with your information, that's a different relationship that you have with them than you have with flowers.com or pets.com or your own favorite thing.

So we live in a world in which schools have enormous amounts of information about their individual students, that there's probably a pretty big generational shifts in that experience. One of the main laws that governs these records is FERPA, the Federal Education Records Protection Act, which I think was authored in the 1970s. We basically have a legal framework for supervising this data, which was just built in an entirely different era.

FERPA refers to this thing called student records. At the time, it would have been very, very clear what a student record was. You would have gone to the registrar's office, and there would have been big file drawers. And you would have pulled out a file and been like, that is the student record. Are your clicker questions part of your student record? Are your Codio assignments? Are your Canvas entries? Are your Piazza forum things? Are those part of your student records? There's much less clarity over those things than one might think.

The term "toxic" has a kind of negative connotation, but I borrowed it from a security researcher named Bruce Schneier. And part of his argument was that toxic things are powerful. Chemotherapies are toxic, and they save your life. They're great. Sometimes it's really good to interact with powerful, toxic things. But toxic things are also dangerous. In particular, I think most of us have an inclination that when something is toxic, you should not leave it lying around for a long period of time.

That was the heart of Bruce's argument was that companies were making a big mistake by having a very capacious approach to the collection and storage of data, that, actually, what you should be doing is just taking the data you need and getting rid of the rest of it because it's a toxic asset to have lying around. The more you have it lying around, the more you're vulnerable to breaches, to other kinds of actors doing various nefarious things with that data. If you're an educational researcher, what kinds of thoughts might you have when you see this giant list of the data that schools collect about people?

AUDIENCE: Honestly, the first thing that came to my mind was excitement in the sense of if you're forming any type of research and trying to study how anything about a person can affect whatever you're studying. If you have all of this data, then there's really no limit to what you're able to research.

JUSTIN REICH: This was an article from today-- two days ago. I'm going to give you a couple of cutting-edge things. "Middle schools in Norway banned smartphones. The benefits were dramatic, a study shows." A study published earlier this year from a Norwegian doctoral student, where there were hundreds of schools across Norway that, in various ways, banned smartphones. Some of the outcomes they look at are student outcomes like learning but also mental health.

"I show that banning smartphones significantly decreases the health care take-up for psychological symptoms and diseases among girls. Post-ban bullying among both genders decreases. Girls' GPA improves. And their likelihood of attending an academic high school track increases. These effects are larger from girls from low socioeconomic backgrounds." So in Norway, they have vast informations about students. Here are some things that you need to know to make this study work. You need to know all the students' grades.

You need to know where all the students go to college. You need to know whenever the students visit the Norwegian health care system and what kinds of requests they're making from the Norwegian health care system. And you need to have them, every year, take a well-being survey that includes a bunch of questions about bullying.

That's a lot of information for the state to collect about these students. But it certainly seems to me like a pretty pro-social thing to be able to say, hey, if we look at the schools that ban smartphones in middle school versus the ones that don't, there seem to be all of these health outcomes. And we can even, actually, say that the health-- it's not just academic outcomes, it's also health outcomes, although the health outcomes are probably related, in some way, to the academic outcomes.

But it's particularly for girls. And it's particularly for students in low socioeconomic environments. That seems pretty useful stuff to know. And so that is the kind of trade-off that people would face as they're going back and forth between-- the mass of data that we collect about students is also what lets us do pretty sophisticated, complicated research about those students to be able to make claims about how well they're doing in various parts of their lives.

Toxic power of data experiment. All right, I'll tell you about at least a couple of other things. There was a study that you read about in the chapter last night. This is a headline that came out-- it was in 2018-- this is a headline that came out about it. "Pearson Tested Social-Psychological Messages in Learning Software, with Mixed Results." Did we talk about mindset in this class? Maybe we did briefly-- growth mindset and fixed mindset? Something like that.

Anyway, you're probably all familiar with it because teachers talk about it all the time, but there-- or education researchers, other folks. There are some social psychologists who have identified two kinds of mindsets that people often have towards learning or other kinds of things. One is a fixed mindset, which generally says, some people are smart, and some people are not smart. And a growth mindset suggests that people have fluid intelligence, and you can make yourself more intelligent and other kinds of things

Seems to be a pretty good idea to help young people adopt the latter mindset rather than the former mindset. Better to have them have a growth mindset rather than a fixed mindset. Exactly how much it matters is a subject of enormous debate. There were a number of early studies that suggested it could matter quite enormously to all kinds of people. And some of the more recent, larger studies suggest that the best things that we know how to do to improve growth mindset only helps some students and maybe only help them a little bit, like a lot of things that we study.

So Pearson offers all kinds of software products. And I think this was a line of computer science software products. And so you do a bunch of programming exercises and multiple-choice questions or things like that. And the thing that they decided to add was not just right or wrong messages but some people getting growth mindset messages and some people not getting growth mindset messages.

So I won't get this exactly right, but an example of a growth mindset message might be something like, that's not right, but keep trying and you can learn more, or other things to suggest that if you keep working at this, you'll get better. What seems good about implementing that kind of intervention in a system like this, and what seems problematic about implementing an intervention in a system like this?

AUDIENCE: Well, problematic is that the control group is, essentially, not necessarily being hurt but not benefiting at all. And if you're saying that a growth mindset really does help people, choosing to, essentially, not help them by putting them in the control group can [INAUDIBLE].

JUSTIN REICH: Yeah, that's interesting. So Pearson goes and reads a bunch of research about growth mindset. And they're like, hey, this growth mindset stuff seems to work sometimes. But they don't decide to just add it to their product. They add it to their product in this experimental paradigm where some people get it, and some people don't.

And so people in the same class are going to have a different experience. So Dana proposes that one problem with that is that the people who get the experimental intervention might benefit in the way that people in the control group don't. What are some other problems that potentially could show up with this?

AUDIENCE: I guess you have to take into account who's in the control group and who's in the experimental group. How good of a job do they do at filtering out their students to make sure it's roughly equal in terms of socioeconomic background or prior experience with the subject, et cetera?

JUSTIN REICH: That's good. And I would say, under most circumstances, especially in these kinds of digital systems, we can be really good at randomization. You could imagine that if you're randomizing across whole schools or something like that, there might be people who are like, well, I don't want my school to do it, or you put me in a control group, but I just want to get the intervention, anyway, or something like that. These kind of digital systems can be very strict about the implementation of randomization. And you can be pretty sure that there's not going to be any kind of bias.

You could imagine ways for bias to show up. But for the most part, there's going to be some computer code which is like, if exercise 4 assigned someone a 0 or 1-- control is 0, experiment is 1-- and especially if you have hundreds or thousands of people who are participating in the experiment, you can be pretty sure that those two groups are the same. Not only that, but you can also verify that they're the same if you collect all this information about them going into it. So these things are going to be pretty good at that.

AUDIENCE: Well, I don't know if there was any consent given, but from what I can gather is that this was just done without the students' knowledge.

JUSTIN REICH: Yes.

AUDIENCE: So I wouldn't necessarily like it if I came out of MIT and graduating, and then someone's, like, OK, here's a paper of what we analyzed during your four years here. I don't necessarily want to know that people have been like watching every movement, analyzing certain things about me psychologically.

JUSTIN REICH: Why not?

AUDIENCE: It feels a little creepy. It feels like you're being watched.

JUSTIN REICH: It could feel a little creepy, feels like you're being watched.

AUDIENCE: Without any consent, I can see why this is--

JUSTIN REICH: Good. Other observations that people have?

AUDIENCE: Also, calling it a social-psychological message makes it feel like the experimental group's being propagandized or something like that. And so it's like, oh, they're being experimented with these different messagings to make their brains these think different things.

JUSTIN REICH: With the social-psychological messages.

AUDIENCE: It seems like that specific verbiage can be uncomfortable for people to accept as something that is potentially beneficial.

JUSTIN REICH: Good. Yeah. So the reason why people are doing this social-psychological messaging is because maybe it works, actually. And in this particular case, it's not just like, hey, we got kind of a hunch this works. These are like, well, actually, at this point, there is maybe a decade of research that was totally, plausibly suggesting that this could genuinely help students learn and improve their life outcomes and other kinds of things like that. And the way you do that is through a social-psychological intervention, although it's not clear to me what, in schools, is not social-psychological.

AUDIENCE: I was going to say another thing that, as much as we need the two populations to be like just as representative, are the experimental groups even representative of the general population? You have to imagine that people aren't being forced to participate in these things. Or maybe, if they are, the schools that they chose, are they actually representative of the entire population? Because there, obviously, are studies where they get outstanding results, but then the population used is not representative of the general population. So then, once they apply those, it doesn't actually work.

JUSTIN REICH: Yeah, good. And to some extent, you might think that organizations like Pearson would have an advantage over much smaller companies. Because if you have products that are adopted very, very widely across the country in lots of different contexts, you might, for practical purposes, say, let's just pick these handful of schools to be able to test things in.

But you could say, we're going to pick these handful of schools because these are particularly representative schools. Or there might be systems that are adopted and laid out in such a way that you say, well, let's just pick 1% of all students in any of the schools who are using our system to participate in this randomized study or something like that.

AUDIENCE: I feel like we talked a lot about all of the things that go into using a software program. Because, obviously, that then entails that you have something to run the software program on. So anything online already comes with its own set of biases and things that affect the types of people that are using it.

JUSTIN REICH: Yeah. No, I think that's fair.

AUDIENCE: Also, another thing that I just realized in what Dana said was the population that they're testing this on is in college, so they've already probably developed a mindset. And also, they are in college. They probably have already a good enough mindset that got them to college.

JUSTIN REICH: Yep, although-- well, one thing that I really love about this study, which I think-- so after this article came out, I wrote a bunch of things which basically said, I think this is a pretty unfair article. Here, I'll give you the case for why-- I think what Pearson did here is admirable and needs to be done more, although you don't have to agree with me.

So, number one, generally speaking, there's a body of research that suggests these things are a good idea. We don't know, however, are they a good idea in this particular product for this particular population? So I think it makes more sense to run an experiment in this particular product for this particular population to test the thing rather than just roll it out.

This is an important counterfactual. If Pearson had simply added these messages to everyone in the product, there never would have been an article about it. Nobody would have ever written like, "encouraging messages show up in software product" is not an article that even the Education Press is going to populate.

Number two, another counterfactual, there is no non-social-psychological response to-- every mark your teacher has ever put on your paper to indicate whether you're right or wrong is a social-psychological message. If you go on EdX and get something right, you're going to get a green check. If you're going to get something wrong, you're going to get a red X.

That is a set of messaging. If you've ever had a-- none of us would say that teachers who say "try harder" or "that was great. I'm really proud of you," no one would be like, Ms. Jenkins, stop manipulating my children. No, that's exactly what we want them to do.

Some people are concerned about consent. People who go to school do not consent to their learning experiences. One of the things that we do as a state is say, you must learn stuff. And, in fact, you must learn stuff that the state just requires you to learn. These people didn't get to decide which Pearson product or which computer science project they chose. Why should they get to decide whether or not they get an experimental version or a control version?

And, in fact, the US government, for the most part, agrees with this principle. So there's a rule called the Common Rule, which dictates how research can be conducted. There's a bunch of policy guidance that's associated with that. And there's some categories of research that are exempt.

The first category of research that's exempt is research about typical educational practices. If you're studying the kinds of ways people teach and learn in the classroom, you are not held to the same standard if you're doing pharmaceutical research or something like that. There are some exceptions. If you're doing things that you could reasonably believe in advance might harm people, then you're not exempted in the same way, although you can still conceivably do the research.

Another thing that's important about the study is that people talk about the potential benefits of an experiment. But experiments can also harm people. It could be that, even if, on average, this growth messaging was great and worked in lots of studies, it could be that, in this particular context or other kinds of things, it made things worse. And we should probably make sure that when we introduce things in the classroom, we make things worse.

How many people would have been concerned-- let's say that in 2017, they had everyone use one Pearson product, maybe, that doesn't have any growth messaging. And in 2018, everyone uses a Pearson product that had the messaging associated with it. Do you think that would have raised people's concern or felt creepy? Why not? Why does that feel OK? You're like, wait a minute. It's the exact same thing.

AUDIENCE: I think there's this idea of potential discrimination. Hey, why can't I be part of that? It's either everybody or nobody.

JUSTIN REICH: The more an intervention is particularly powerful, the more you're like, it feels kind of like if control group gets this intervention and gets an average grade of 89 and experimental group gets the intervention, and they have an average grade of 89.5, there's something that seems unfair about that, although, again, if, in 2018, we give you a software product that you get an average grade of an 89, and, in the following year, we give you a software product with an average grade of 89.5-- your birth year was pretty random, too. And so there's something about that.

The case I want to make is that here's another way to think about it. Most people would be appalled by an education system that didn't have variation. My hunch is all of you believe that variation is an essential part of educational systems. You believe that your teachers, your textbook publishers, your software developers, should be trying to improve their products. They should be trying to improve their instruction. They should be trying to improve their lesson plans.

The only way you do that is through variation. You teach one lesson plan one year. You teach a different lesson plan the next year. Sometimes it's better. Sometimes it's worse. My hunch is you all are totally comfortable with the idea that some of that variation will be bad and that most of it, on average, will be good. The main thing that randomized trials like this do is they take that variation, and they make it systematic so we can learn from it.

If we do one thing in 2017 and a different thing in 2018, it's actually much, much harder to figure out if the different thing worked or not because all the people in 2017 might be, in some systematic way, different from the people in 2018. The best way to be sure that the difference between two groups is just because of the thing we're intervening about is a randomized trial. That is the magic of randomized trial.

Everyone in the education system believes in variation. We all want things to improve. It's actually not that hard to convince people that the best way to systematically vary things is through randomization. And almost all of us find that randomization creepy. Even if you explain all of it, you're like, ah, it still doesn't feel right. It still doesn't feel-- there's been some cool studies they've done in the past.

It shows up in health care. It shows up in other kinds of things, like you ask patients like, do you want an unproven treatment that might work better? And they'll be like, well, yeah, maybe. Do you want to be randomized to an unproven treatment that might work better? No, definitely-- and it's like, it's the same thing, except we can learn from the randomization.

AUDIENCE: My question is, in this case, how are these different from when companies release betas that some people get and some people don't?

JUSTIN REICH: Oh, here's-- every time you interact with a software product, every time you interact with a web-based software product, there is a reasonable chance you're participating in an experiment just like this. The numbers won't be right. One out of every 100 times you go to Amazon, the buy button is going to be green instead of blue. And someone is doing a test to figure out whether or not you pushing the green button is better.

One out of every 100 times, or 1,000 times or 10 times you go to Google, they're going to give you some variation of the search algorithm to see if you're happier or you linger longer or you're more likely to click ads. We interact every day with software platforms that are collecting vast amounts of information on us and conducting experiments on us all the time.

The reason why those companies use those two approaches is because they are enormously powerful at improving products. The reason why just about any query you have-- you go into Google and ask it a question, and it tells you an accurate answer that's relevant to the question you asked-- is because they have conducted billions of experiments on millions or billions of people all throughout the last 20, 25 years that they've been operating. It is an essential part of our software infrastructure.

And I don't like-- does the idea that you are participating in experiments all the time when you go Amazon shopping, does that have the same level of creepiness to you? For some reason, it's like, yeah, Jeff Bezos, do whatever you want. But we feel differently about Pearson, for some reason.

AUDIENCE: I have a question about beyond the, is this creepy or not creepy question, but if I have decided to buy a product, like I'm paying to use Amazon or I'm paying to use Pearson, and with that is the assumption that I understand the thing I am buying because you pitched it to me--

JUSTIN REICH: I love this.

AUDIENCE: --in a certain way and I will get it. So then how does the question of, are you allowed or not allowed to do this go from there?

JUSTIN REICH: And it would be a huge difference from historical educational curriculum material purchases. It used to be I bought Houghton Mifflin *Biology,* eighth edition, and I just know exactly what's in eighth edition. And, in fact, the salesperson is going to come back when ninth edition is going to come out. And they're going to be like, here's what's different about ninth edition, why you could buy it. And I might be like, no, I don't like what you did in ninth edition. I'm going to switch to a different company's products because these improvements are not improvements.

Under what circumstances should companies be able to dynamically improve their educational products? What kind of information should they make accessible about that? Should they tell families? Should they tell educators? Should they tell-- people could come up with different answers to these questions. I think actually publishing a bunch of that information is probably enormously important but not to parents and teachers and educators.

Parents and teachers and educators have no time to be tracking how your Pearson computer science practice problems are changing. There are specialized advocates across the country who focus on education, who focus on student privacy or other kinds of things, who actually would have the time and expertise to follow those audit records.

But if we started sending home a notice to parents every time a company who used one of their products was conducting an experiment, it would just be the terms and service conditions of your-- presumably, too, by the way, it's very unlikely that when whatever school bought this Pearson product, presumably their lawyers are competent, and they made them sign a purchase and sale agreement that included these kinds of conditions in them, although it's also the case that the researchers who did this thing didn't sit down with these schools and are like, let me tell you what we're doing in the next phase so that you-- they might. I think, in this case, they didn't give them much indication.

AUDIENCE: Would it be-- I guess, back to the conversation of if it's creepy or not, do you think it might have anything to do with the illusion of choice that you're given? For example, if you're on Amazon or something, or if you're on an app, you have the choice sometimes not to update the app and just stay on the previous setting, or if you have something like Amazon, you can not use Amazon, or you're perceiving it as you're choosing to opt into that, while in a situation where you have to use a certain technology in school, you could argue that this student doesn't have a choice to opt out of this if they--

JUSTIN REICH: And you could see that choice operating at different levels. So a grade school student has zero choice about whether or not to go to grade school. Every college student chose to go to college. Now, once you've chosen to go to college, it doesn't feel like that should mean you have to accept everything that comes along with college, although, again, you could choose some majors over other majors based on the technology. You choose some classes over classes.

The moment recently in which some of this most came into focus was when schools started requiring students to adopt proctoring software. So probably none of you-- have any of you ever taken a remotely proctored test? At MIT?

AUDIENCE: [INAUDIBLE]

JUSTIN REICH: Where did you take a remotely proctored test at MIT?

AUDIENCE: I believe it was at the ASE during my freshman starting year. They used some weird proctoring software for that.

JUSTIN REICH: Where you had to take your laptop or webcam, show the rest of your room, all these kinds of things?

AUDIENCE: Yeah, essentially.

JUSTIN REICH: Good. So there are a number of cases where, for instance, universities implemented this kind of proctoring software mid-semester and, in fact, implemented at mid-semester and required students to pay for it. You can imagine that as a set of circumstances which most draws the ire of people because I've already committed to this college. I've already committed to this course. Now you're making me, essentially, install spyware on my machine and then, I don't know, have some random person see what my dorm room looks like and other kinds of things-- or my bedroom. These sort of things seem creepy.

Arguably, maybe, they're less creepy the more that they're disclosed to people over time, although I also use the phrase "illusion of choice" because, in fact, for lots of things-- for instance, there are no cell service companies that compete on the basis of not selling your location data. It is not really a choice to not have a mobile phone anymore in society. And so you're not really-- in theory, that's a choice, but it's not really one. Going to college for some people, it's not really a choice. Like you're going to have to go to a choice to have the life that you want and things like that.

But I do think K-12 students, in particular-- now, another unusual feature of this is that-- and it goes back to this sort of data collection-- many K-12 students across the country are mandated to create a Google account. And then Google has reams of data about all these kinds of things that they do with that data. And there might be various ways that, again-- so to what extent these things are legitimate or not. It's probably much less of a debate these days.

But definitely when schools were first adopting Google for Education, it was not uncommon to hear that school boards had really vigorous complaints from parents. And oftentimes, the most vigorous complaints came from parents who worked in the software industry. They're like, I know who these people are. I work for these companies. How are you going to make my kid do these kinds of things?

Let's talk about another one of these cases. So another story that you read about was inBloom in 2013. So the Gates Foundation, along with a number of other organizations-- Wireless Generation, some other people-- observed, man, here's a weird thing. Companies who serve schools have tons of data about students. And the only way we can make this system work, or the way the system currently works, is some company goes to a school district and says, we'll operate this service for you, but here's all the data we need. And the schools are like, yeah, OK, deal.

And if you make enough of those kinds of arrangements-- another exercise we could do here is make a list of all of the educational software products that you've ever used in schools. And you all could probably come up with lists of dozens or more software products that you've encountered in some kind of way. Those are all people that have some kind of data about you somewhere. That seems like a terrible infrastructure. You require people to go to schools. The schools make contracts with third parties to provide services. And all those third parties end up with shards of data.

So the idea of inBloom was, let's concentrate all of the data about students in one nonprofit organization. It would be something along the lines of trying to generate the kind of data set that the Norwegian study that I just showed you would require. Let's get all their student records. Let's get all their app usage. Let's get all those kinds of things and have a nonprofit entity hold on to that data.

And, in particular, let's make it so that, instead of companies making arrangements with individual school districts to get access to the data they need, they just get in touch with this nonprofit. Now, what could potentially be good about having a nonprofit intermediary between schools and third parties that want to provide services to schools but require data to do it?

AUDIENCE: I think public perception is that nonprofits are a lot more trustworthy than for-profit companies, so people won't get as freaked out about it.

JUSTIN REICH: Yeah, good. So do you want Pearson to have all of this data, or do you want inBloom, funded by a consortium of state departments-- it was funded by the Gates Foundation but sponsored by a set of state departments of education to have this data? What else?

AUDIENCE: I had a question of how it functions. So if they have the data and then a company or some kind of researcher is trying to access it, do they have final say on how it's being used? Or do they then go back to the schools?

JUSTIN REICH: So inBloom failed. And we can talk about why it failed. So you don't have to worry about it existing, although I'll show you a new thing that showed up this past week, which is remarkably similar. But I think some of the key value proposition was that the companies would go to inBloom and get just the data they need. What do you think inBloom would potentially be better at than schools might be?

AUDIENCE: Raw data processing?

JUSTIN REICH: Good. So first of all, they're just like, your job is not to teach kindergarten and Mandarin but just to process student data, you're probably going to be better at processing student data than this organization that has to have a field hockey team and run buses and other kinds of things like that.

AUDIENCE: Maybe security is better, too, if that's your main focus.

JUSTIN REICH: There are 13,000 school districts in the United States of widely varying capacities in all kinds of IT things. It seems like an organization that is just focused on IT things is going to be-- in a lot of ways, if you have a society where a school has to be good at IT things, you may not be organizing that society correctly.

And so you can find-- if you go to other countries during the pandemic, we had schools provision laptops and hotspots to students. Insane. There's no reason to think schools should be any good at that. There should be other institutions in society that are good at IT procurement. It shouldn't be your local-- sometimes I would compare it to people in the 19th century when we decided that every household in the United States should get-- or in the 20th century-- we decided every household in the United States should get electricity.

We didn't go to the local school principal and be like, so how are you going to run wires up the holler? We invented the TVA and other kinds of organizations that was really good at electrification so that the schools didn't have to be good at electrification. Electrification is closer to provisioning broadband and laptops than it is to other kinds of educational things. So these institutions could conceivably develop a whole bunch of expertise around data, around privacy, things like that.

Another thing that they could probably get pretty good at doing is only giving providers the exact data they need. So schools have a tough time vetting all of the data that they're making available to all their different providers. And so, presumably, they make arrangements, and people just collect whatever. If there's a intermediary in that collection process, you could imagine that inBloom could be pretty good at being like, yeah, Canvas, you just asked us for these 14 things, but I'm pretty sure, to operate your system, you need these six. So why don't you start with these six and see how you do from there?

And they might be able to do all kinds of other-- right now, for Canvas to operate, it needs to have your actual email address and other kinds of things like that. You could imagine building all kinds of intermediary layers that only hashed identifiers are passing on to these third parties, and inBloom collects all this.

inBloom fails almost immediately. Well, here's a few things that were written about it when it started. "Nonprofit inBloom offers an internet database service that allows schools to store, track, and analyze data on school children. If you think about it, that information is more than just test scores. It's whether kids receive free lunch, a telling indicator of the family's finances, the time the school got into a fight in the schoolyard. It could be your child's prescription medicine.

The upshot of storing all that data in one location is that it can be used to tailor curricula to each child. If Johnny's data suggests he's a tactile learner"-- which is not true, there are no learning styles-- "and he's failing math, inBloom's analytic action might suggest a particular teaching approach. This is all about building personalized learning environments for kids." But as more school districts team up with inBloom, including New York, parents are becoming increasingly vocal critics of the data collection. 'This information, I have no idea what it is. I have no idea who's using it. And I have no idea for what purpose.'"

So part of what the existence of inBloom did was to go to communities and be like, hey, you know what's happening right now? There's tons of data being collected about children. And we're going to put it all in one place. You can imagine that, for people like me, they're like, yeah, that's a great idea. We're totally going to be able to have all these benefits. But there's tons of data being collected about children, and it's all going to be put in one place is not, actually, as it turns out, a very popular public pitch.

"inBloom CEO is quick to point out that the company isn't collecting data the school districts don't already have. It's just providing a one-stop shop to make the data accessible and usable to teachers," although, really, a lot of what it was doing was making the data accessible and usable to third parties, which might then benefit teachers. "Schools and districts collect a lot of data, but it's all over the place, Steinberger says. Different systems are disconnected. And so, as a result, this data is not usable."

Can anybody think of-- so that was a very serious problem. Schools are collecting tons of data. It's fragmented across all these services, all these kinds of things. And so, in a sense, there's constant ongoing either privacy risk, privacy violations, and not sensible ways to manage it. And that's the problem that inBloom's trying to solve. Can anybody think of, around 2013, major things that are happening in the United States related to people's perception of their data and security? You all are a little young for this now.

AUDIENCE: Is that [INAUDIBLE] Target [INAUDIBLE]

JUSTIN REICH: Target, I think, is not that far away from that. So we start seeing some of the major data security breaches.

AUDIENCE: It's like Cambridge Analytica.

JUSTIN REICH: I think Cambridge Analytica is a little bit afterwards because that is around the 2016 election. Yeah, Snowden. This is the Edward Snowden era of recognizing the federal government is collecting much more data about people than was previously thought. So in 2013, first of all, people are far less accustomed to surveillance than you all described yourself as accustomed to surveillance. And there had just been this major national revelation.

An interesting thing about the inBloom story is-- so, eventually, what happens is there were 11 states that signed on initially. And the hope was is that then 13 and 14 and 18 and 20, that, eventually, lots and lots of states would come on. Almost immediately, states started withdrawing from it, in particular, in part because of the concentrated objection from local advocates, local advocacy groups, including student privacy groups that were just formed around this time.

New York was one of the lead ones. It was one of the last ones to fall out. But it also had one of the most vociferous, determined community of student privacy advocates opting. So states started-- one of the main outcomes of inBloom was not its existence, actually, but a bunch of state laws about student privacy, in part, that would make it more difficult for things like inBloom to exist.

A common problem that shows up when trying to fix data and privacy problems-- and I'm giving you an example from schools, but this is a thing that you can find in almost any other sector-- the pre-inBloom counterfactual is really, really bad. It is not a good system to force kids to go to public schools and then have a bunch of third-party, for-profit companies get their data from schools. The schools are bad at managing it. They don't have the expertise, all these kinds of things.

However, by trying to fix the problem, inBloom draws attention to the problem. Like, man, this data is such a mess, and we're going to collect it all. There are all kinds of circumstances in which if you draw attention to data and experiments, even if the status quo is really terrible, people are not going to be enthusiastic about the fix because nobody thinks day to day about the status quo, but they think really intensely about this crazy inBloom thing that you're doing.

Does that idea make sense? Essentially, there's all-- other studies come out along the lines of, hey, we've come up with this really good way to protect your privacy. Will you opt into it? People will be like, whoa. Why would I have to protect my privacy? Why would I opt into this thing? It's dangerous. They would prefer the status quo, where their privacy is not protected, towards this thing in which you've raised their concerns about.

So this is an organization that just came into life last week. It's called SafeInsights. It was funded by $90 million from the National Science Foundation. It is out of Rice University, out of the same people that developed OpenStax. We talked about OpenStax the other day. They're the company that creates free and open-source textbooks for community college folks. Well, we have enough time. I'll show you the one-- let's see if we can find the SafeInsights welcome video.

[VIDEO PLAYBACK]

[MUSIC PLAYING]

- As a longtime college instructor, every day of my career has been dedicated to helping my students reach their academic goals. I'm always looking to better support their learning in ways that are proven to work best.

- There's so much we have to understand about how people learn. Every mind is beautiful and special. That means we all learn in different ways. We all have our own definitions of what success looks like. If researchers are able to uncover new and better ways of learning, that will have a profound impact on how educators approach teaching. To do this, we need a way to securely connect with a wide variety of students as they study over time in real classrooms.

- Student needs are changing. With more learning happening online, it gets harder and harder to understand what each student needs and how best to help them at the moment when they really need it the most.

- Education research is essential for advancing teaching and learning so that every student can succeed. We know that research-informed teaching works, but it's still too hard to conduct large-scale, reliable research and then apply the results in the classroom. SafeInsights brings together learning researchers, educators, schools, and colleges in a secure environment to get the answers we need while strongly protecting students and their interests.

- Every student deserves the chance to succeed in the classroom and beyond.

- SafeInsights will give researchers, educators, and students what they need to take learning to the next level.

- And as educators, we will benefit from better research from SafeInsights to effectively help all our students.

[DRAMATIC MUSIC]

[END PLAYBACK]

AUDIENCE: Great soundtrack.

JUSTIN REICH: It is a little dramatic for a database. [LAUGHS] But I don't know. I like databases. OK what are your first instincts, having spent a whole bunch of time-- having spent an hour and 20 minutes talking about the toxic power of data and experiments? And how do you think a typical American parent or a typical American college student would react to that video?

AUDIENCE: I think it would change based on different generations. Because I think our generation, who is now using TikTok when we openly know they use our data and [INAUDIBLE] to us, is completely different from our parents, who are like, oh, my god, don't have a profile picture. Don't do this and that. So I think our generation will be way more accepting of this. And I think, in 10, 20 years down the line, I think people and parents will be so accustomed to their children's data just being, whatever.

JUSTIN REICH: Good. So conceivably, inBloom launched today might have had a very different experience than inBloom launched in 2013, not because of anything different that they did but because of the context that they operate in. I think there's evidence of that. I was just talking to somebody who runs a video repository for child development studies. And one of their conditions is that the videos can only be used for non-commercial purposes.

And I was like, why did you do that? And they were like, well, we made it 10 years ago, and people were really worried about stuff, and that helped calm them down. But if we did it again today, I don't think the same level of concern exists, not only among people generally but institutionally, as well. What were you going to say, Courtney?

AUDIENCE: I think it was really smart that they've attached themselves to Rice. Because I think, especially our parents' generation, maybe less so now, there's a lot of goodwill given to universities. And so if inBloom came out today and it was like, oh, in partnership with MIT, I do think people would have received it a lot differently. And people have a lot of trust that, oh, it's connected to Rice. How bad could it really be?

JUSTIN REICH: Yeah. And I would say the Gates Foundation-related conspiracy theories were not quite as strong in 2013. But the Gates Foundation is not a trusted organization in the same way that, I think-- Rice University, universities in general, state schools, are still some of the most trusted institutions in society.

AUDIENCE: I think, maybe, actually, a little connected to that trustworthiness, I think, is that if you say, oh, my god, look, all your data is in one place, to someone who finds education research and things like that really important and is much more aware of how that might help, that might sound good. But I think, to the average person, first and foremost, what's going to pop out when you just tell them, oh, we have everything in one place, and we promise it's safe, it's like, one, you're not giving me any information about how you're keeping the data safe, and, two, I think it's always been said of, don't put all your data in one place.

So it's like, well, why are you saying this is a good thing? Because then this means that someone can have all my data, as opposed to, let's say, if it is split up, even if it's there, I can be like, OK, my teacher might have this piece of data on me, but they might not have this other piece of data.

JUSTIN REICH: And, actually, probably the main technical-- there are probably a bunch. We don't know exactly where they'll be then. But one of the earliest proposed technical innovations of SafeInsights is not to bring all the data together. So it doesn't propose that all of it gets collected.

One of the main things that they want to be able to do is to be able to conduct research queries across data without having people have to directly access those data. So there's a whole field of study called things like differential privacy and stuff like that, which basically says, how do I tell you the kinds of things that are in a data set, let you run a query over that data set, but never actually encounter that data set?

And in this kind of environment, there might be, how would you run a query that connects people's student behavior in a learning platform with their registrar information with their state test scores without having to make one giant data set out of all those things but, instead, to have the query just run over the data it needs-- have the people who own that data still hold on to that data but have the results of that query go to technology developers, researchers, things like that, without having to have them collect all of the data?

So in some ways, it's explicitly trying to be the opposite of inBloom. Don't bring all the data in one place. Try to get the benefits of aggregated data without having to share it with either a trusted third party or everyone or something like that.

AUDIENCE: Oh. I was just going to say-- I feel like you answered it right there with what you were saying. But in your opinion, do you think the people who are creating this, the SafeInsights, do you think they really understood what went wrong in inBloom? And do you think like, ultimately, does it lead back [INAUDIBLE]?

JUSTIN REICH: Boy, it sure sounds like it to me. Powerful, privacy-preserving learning research. So the very first concept they want to ingrain in your head is safe. The second concept that I think they're doing rhetorically is leaning into insight rather than data. So I think if you asked people what inBloom was, they would have described it as some kind of data repository. My hunch is that the SafeInsights people are going to describe themselves as an insight generator, as a research producer.

Now, it's the exact same thing, right? Because in order to get the insights, you have to have the data somewhere. And inBloom's purpose was never just to hoard data. It was to make learning better for kids. But I think there are-- I guarantee you that many of the people who worked on SafeInsights have done plenty of studying of what went wrong with inBloom and are designing this enterprise so that-- it's with a trusted University. It's founded by the National Science Foundation, which I assume also has very high trust. But all this language, it definitely strikes me as people who read up on the inBloom case study and are trying a different tack.

AUDIENCE: I think another good thing that they did was associate themselves with a previous product that was successful, which was OpenStax, which, in itself, OpenStax, they are open-- what is it open-source, free-to-use textbooks. And that, in itself, has proven to be like, OK, we are transparent, quite literally transparent, about what we're doing. And we've already provided a useful, successful product for the masses.

JUSTIN REICH: And they have a ton-- they have 40 partners, 39 collaborating institutions. Of their collaborating institutions, 77% are minority-serving institutions. So they're trying to start from the beginning, saying, we're not just going to do this to improve Columbia and Rice. We're going to do this to improve lots of different kinds of organizations.

It also, instead of being a consortium of states, it's really mostly a consortium of digital learning platforms. It probably matters, too-- there's clear emphasis on college. ASSISTments doesn't do anything for college. So they definitely have some things that are not-- I'm not sure it's literally true, but ASSISTments, 99% of what they do is serve K-12 students.

But I think it maybe does make a difference to-- college students are adults. College students opt in to go to college. The state doesn't force anyone to go to college. And so you're just operating in, maybe, illusory choice, but you're operating in a space where you feel like people have more agency, to begin with, to operate.

Unlike inBloom, which said these 11 states are the organization-- these state education agencies are the key people we're interacting with, they don't mention higher education accreditors or state boards of higher education. They basically have left government out, except from the National Science Foundation, of this development. Maybe people are more trustworthy of these organizations. Or maybe they're just-- even if they're not more trustworthy of these organizations, critics are potentially drawn to things like New York State approves X versus this kind of arbitrary group of universities, some of whom might be in New York, approve X.

So it'll be super interesting to watch. The grant that they got was from the same-- $90 million is probably the largest federal grant to an educational research project ever, although there's a couple of educational research projects that if you totaled up all the grants they got over a period of time might be at least within that ballpark. It came from the same grant funding that supports telescopes and ecological plots. It's called Mid-scale Research Infrastructure, things that are like-- no one university can build a giant radio telescope.

And you don't want one university to. You want to build a thing that the entire field of astronomy can all collectively use together. And so this grant stream is meant to build enormous things that everyone can use together. So it'll be interesting to see what they do in the decades ahead.

But I think, in some ways, especially coming about 10 years after the collapse of inBloom, to me, it's neat. People still have optimism that if you pull together a bunch of student learning data and data about students, and you conduct a bunch of experiments, you can build things that help them learn better. But there are enormous real risks. And there may be even more enormous reputational risks that go into this work.

One thing that I've tried to communicate, which it sounds like these folks are adopting, to many different groups-- because I'm basically part of the community of people that would like to collect lots of data about students. And I've handled data files that have way more information about people than I feel comfortable having access to. And part of the job is doing things responsibly. But the other part of the job is constantly talking to the public about what we're doing. The only way people will not be creeped out by doing experiments is if, A, we conduct a bunch of experiments that meaningfully improve learning.

A huge challenge that education has is we don't have the equivalent of the Human Genome Project. We don't have a thing that you could point to being like, well, yeah, we took a whole lot of your data, but we're curing cancer here, people. If SafeInsights came up with something that made students learn math 33% faster, it would totally change the way people think about the collection of-- just your cost-benefit data would transform quite dramatically.

But even in the absence of that, it's incredibly important to be engaged with these student privacy groups, engaged with families, trying to explain to people there's always going to be variation in education. What we probably could benefit the most from is systematic variation, where we can tell which parts of the variation work and which parts don't. And the only way that we can do that is through some of these approaches that include data collection and randomization and things like that.

AUDIENCE: So you just made the statement that SafeInsights comes up with some solution. So is SafeInsights, is it like a third party that is--

JUSTIN REICH: It is less of a third party than inBloom.

AUDIENCE: Is it actual researchers?

JUSTIN REICH: Yes. Clearly, some of the things that Rice is going to do with this money is build systems and study OpenStax with it, much more so than inBloom. inBloom never, to my knowledge, never had a list of partners that looked like this list.

They never said, from the beginning, oh, look, Kahoot! and Google Classroom and all these other people are our lead partners and are going to use this to figure out stuff. They really saw themselves solving an infrastructural problem more that-- I think these folks are positioning themselves more like, first, we're going to have a set of tech products that improve learning through better research practices, including better forms of data management and data sharing and data privacy.

But if it's a real infrastructure product, part of what-- I'm sure Rich's goal is to say, we're going to develop these privacy-protecting research enclaves. And we're going to develop them in an open-source way that whatever future EdTech companies come along are going to be able to benefit from this infrastructure. They're going to be able to do all the same kinds of things that OpenStax is doing to conduct cool experimental research with lots of data while protecting people's privacy.

Great. It's 2:25, so I should let you go. We'll come in on Wednesday. And you have a little bit of reading about implementation in schools. But mostly, what you should be working on is getting some words on paper for your final project and thinking a little bit about-- oh, a thing that we'll do probably by email this week, but maybe a bit in class on Wednesday, is I need you to sign up to either present on Monday or Wednesday. Maybe I'll send you something pretty soon that invites you to sign up for one of those two slots.