Hi! My name is Lyzi Diamond and this talk is called

From button pushing to problem solving: modern geospatial technology in the classroom

P.S. Today is Thursday, October 20th, 2016 and we are at NACIS in Colorado Springs, Colorado. You know, just FYI.

This talk is about what it's like to teach people how to use something that's changing literally five times a day, and how some of those techniques can maybe make their way into the classroom.

I can speak to my experience here, both as a student and recent graduate wanting to learn more about the world of geospatial technology, but also as an instructor of sorts.

Oh, me: I work at Mapbox teaching people how to use Mapbox and answering their questions about web mapping and mobile and analysis and really anything even tangentially related to what we do.

I also taught a community college class about web mapping and have taught many workshops and guided tutorials and other things. Teaching is really fun.

In my time teaching, I have learned some things about the weird and wacky nature of the geospatial technology world. I think some of these things might help when trying to teach new technology in university classrooms.

The 5 things I have learned

1. It’s easiest to get students to care about something if they can relate it to something they already care about.

2. People come to this field because they like solving hard problems, so give them problems to solve.

3. We need to help students ask better questions.

4. Teaching is hard but it’s also something everyone should learn to do.

5. Embrace complexity.

Thing #1: it’s easiest to get students to care about something if they can relate it to something they already care about.

It’s really tempting to send students to a site like Codecademy or some other equivalent to learn how to code. These tutorials are accessible, step-by-step walkthroughs.

Many people have found success with Codecademy, but the folks I've talked to struggle with its abstract nature. It feels like programming in a vacuum.

It lacks context.

The best way to learn is to work on something you care about. The way to make something hit home is the way it relates to your world, personally.

Geospatial analysis and cartography are literally present in our everyday lives, from Google Maps on your phone to Facebook and Twitter and Foursquare and and and

The way people really learn new technologies? They approach them as new tools in their belt for solving the same problems they've always been trying to solve.

Traditional GIS technology like ArcGIS (which many of us learned in school) is super useful. It's one amazing tool. But there are other tools, too, that may be better for solving certain problems.

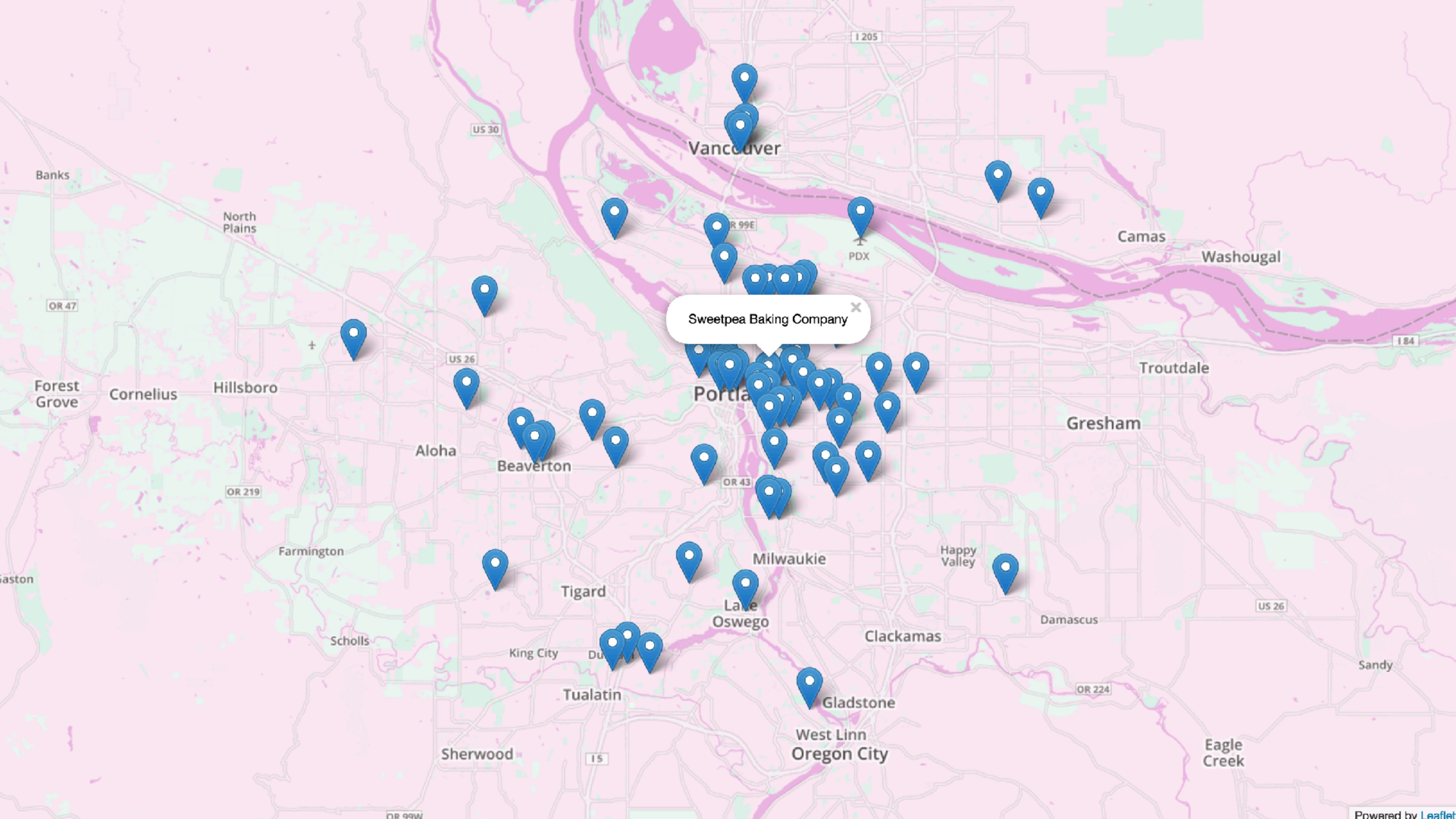
Real world example A: one of my former colleagues was trying to learn how to make web maps with Mapbox, but was struggling with our tutorials. She was trying to build a store locator, but it was a foreign problem to her. She didn't have a store that needed locating.

What she did need was a little map showing where in the world Mapbox employees lived and what time it was there. She couldn’t find a tutorial for this, so she didn’t know it was something she could make with Mapbox tools.

Whereas it took her weeks to even start the “Build a store locator” tutorial, she made a map of Mapbox employee locations in two weeks. She applied the technology to a problem she had, which motivated her to get it done.

Real world example B: I am here before you today and doing the things I am doing because I wanted to make a web map of places to get cupcakes in Portland.

I taught myself Leaflet, and I started teaching others the tips and tricks for getting started with web mapping and learning JavaScript. That sparked Maptime and it also sparked a really ugly map of Portland.


Sweetpea Baking Company
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Oregon City
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Powered by Leaflet

So if we break this into two parts for getting students excited about learning new technology:

1. **Appeal to the idea that a new piece of software or new library is like adding a tool to your toolbelt.**
2. **Make it real by putting it in the context of a problem or situation the student is in every day.**

Thing #2 (related): people come to this field because they like solving problems, so give them problems to solve.

This is not just about framing GIS projects as problems. This is about taking problems and applying them to the geospatial context.

If we assume our students like solving problems, we can give them an incredible gift: we can encourage them to approach their problems outside of the context of the technology they know to be possible.

We are in this cool time where we are inventing the future of technology. We are no longer hamstrung by what the technology can do.

This is where the value of teaching open source comes in. When you learn about open source and new technology, you can become part of the communities that build it.

We can literally set our students up to shape the future.

This is mindblowing.

Unfortunately this can sometimes involve some scary things… like pointing students in the right direction to learn git or JavaScript or whatever else.

Stay tuned.

Thing #3: we need to help students ask better questions.

This is the best preparation for industry I can think of. I ask Google questions literally every hour when I’m at work. The biggest challenge is learning how to ask the question and how to know you’ve found the right answer.

Amazing resources beyond Google to look out for for good answers:

- StackOverflow
- Twitter
- Product documentation
- Product support
- Weird blogs and tutorials (hi)
- GitHub
- Reddit (believe it or not, surprisingly helpful)

This applies to the problem space described in thing #2 as well — asking critical questions can help identify new problem spaces and/or reframe the problems we assume to exist.

So many of my assignments in college were problems that were given to me. I had to find the solution instead of the part that became much more important in my career: figuring out what the problem even is.

I see this in support and I see it when I’m writing code and I see it when I’m trying to make a map that isn’t going to make someone laugh. To succeed, you need to be able to define the problem space.

You also need to be able to communicate about the problems you see, even when someone is disagreeing with you. This is what I mean about inventing the future. This is what we get to do.

Thing #4: teaching is hard but it’s also something everyone should learn to do.

You never know something as well as when you know you’re going to have to teach it or explain it to other people.

Why should we deprive our students of this most basic skill? Maptime found success here in two ways:

(1) comprehensive understanding of a problem area, and (2) giving students the agency to teach something in the way they understand it.

Also, if we can have the humility to ask our students to teach themselves, we are both preparing them for jobs (see thing #3) and making sure that we don’t have to learn every new thing that comes along.

The most radical act for an instructor is letting yourself become a student. It’s so hard, but it’s so rewarding.

Thing #5: embrace complexity.

The folks I've found to be most successful are the ones who run towards hard problems instead of away from them.

The people who write into support complaining about changes in the product who haven’t even tried the newest versions are the ones who never publish a map.

New things are intimidating. You have a problem you want to solve and you want your tools to work in service of solving that problem.

But we don’t know what you want to do until you tell us. Maybe it’s not something anyone has ever done before. This is what we want from our students, right? New ideas and new approaches.

Geospatial technology is an interesting juxtaposition of old ideas and new technology being applied. Previously, that technology limited a lot of the possible. Now, with input, it's growing to encompass so many of the things it couldn't do before.

We don't have to compromise. We can do anything we want, and if we can’t do it yet, we can build it. We just have to roll up our sleeves and get dirty doing it, which means being able to say things like:

“I’m a beginner and I need some guidance.”

“I have an idea and I’m not sure if it’s possible, but I would love to be pointed in the right direction.”

“Maybe this is outside of the scope of this project, but I want to do [weird crazy idea] and I’m wondering how I might go about achieving it.”

“I tried [things you tried] and I seem to be getting [errors that you saw]. Am I on the right track?”

We are in this field because we like solving problems. It's what attracts us to mapping. Old, hard problems with new, interesting applications.

Our job is to instill that excitement and curiosity in the folks that we teach and equip them with the tools to keep learning and growing and building in the direction of their interest.

The more ways they have to do this, the better.

If I were to sum up this talk in two slides, it would be:

Invest in the weird, crazy complexity of your students' ideas and juxtapose it on the weird, crazy **complexity** of geospatial technology. Instead of being the expert at the front of the room, make **everyone a beginner** and **everyone a teacher**.

Focus on critical thinking, problem solving, and asking good questions. This is how you can help your students succeed.

Thanks!

- My name is Lyzi Diamond
- You can find me on Twitter at @lyzidiamond or you can email me at lyzi@mapbox.com
- These slides live at lyzidiamond.com/nacis-2016
- No, that's not a real mustache