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Prior to POD my technology use was mostly PowerPoints and online simulations for teaching. Students would create PowerPoints and use online simulations.  I also used videos, if videos count as technology.

Much of the student population is at-risk, I would say.  But there are students that want to be at a small school.  They don't want to be a number, so there's a lot of one-on-one teaching because our student-to-teacher ratio is so small. I'm allowed a lot of flexibility as long as I'm addressing the standards and students are performing well.  My principal kind of encourages us to step outside the box and keep it interesting for the students.

I'm starting to implement real-world projects. I did Advanced POD, so I did a lesson using data from a local fire.  We did a three-part project where they had to map the data they collected themselves on the map.  And I was going to do that anyway, whether I took Advanced POD or not.  But taking Advanced POD helped me develop it.  And I was planning on doing an erosion lesson in the spring with the data that they collect.  So I mostly want to try to plan lessons where they get the data and put it on the map, but I'm trying to find which lessons and which books to use beforehand, before we actually go out.

I do claims and evidence all the time in my Earth science and chemistry classes.  It's something that seems so simple to teach, and yet my kids have a hard time with it sometimes. In Earth science, it's real easy to use the GIS.  There's not a lot I can do with the chemistry standards.  There's a lot I could do with inquiry but not the actual chemistry. Our state standards are really vague.  So definitely, I can use GIS and Earth science for almost every subject except astronomy.  But now I guess there are GIS maps for Mars, too.

I implemented The Earth Moves lesson from Mapping Our World in my Earth science class. I still do that and I've done it every year since I've been in POD. We do the graham cracker lab – the whole way it was set up in POD modeling plate tectonics with graham crackers and frosting. I do the same way where they have to draw the lines on the map of where they think the earthquakes and volcanoes are, and then we do it on the computer, and then we do the graham cracker.

The biggest reason I implemented the Earth Moves lesson is that it's hands-on.  Students have a visual. They make predictions before they actually find the evidence.  It just has all of that essential…you know, "make observations, make predictions."  It has the whole recipe for the entire inquiry process.

The graham cracker lab goes really well because they can manipulate it, and the materials you use have the same physical characteristics that the Earth might.  So it's really good for them to see that.  I think that's better than using the GIS.  But I don't know that one would work as well without the other.  They may go hand-in-hand.  The GIS really helps with the evidence part, and not just, "here's a map with everything on it."  It's better for them to explore it and find it themselves.

Students respond pretty well.  They enjoy it.  Some of the questions in the Earth Moves lesson, they needed help with.  But we just answered those questions as a class.  They helped each other, which is nice.

Students were definitely engaged.  I think any time you put them in front of a computer they're going to do it.  Well some don't, and I don't understand it.  And anytime you put something they can play with in front of them, they're definitely engaged. If you give them some kind of manipulative, and they're playing with it and kind of doing more than what I told them to do with it but exploring further, I consider that engaged.  Even on the computers, I can see that they'll figure out the controls and how to change the colors of the map before we even go there.  And I'll tell them "feel free to do this as long as you know how to get back to where you started."

If I were to change anything it would be to just spend a lot more computer time.  I always feel so rushed when I'm in the computer lab.  Or maybe have them do an easier lesson before we do Earth Moves where they're just answering really simple questions.  But that's usually the first lesson I give them, so they might be a little overwhelmed.

To assess student learning, I used my own summative assessment, and then I used the one from Earth Moves too.  I kind of integrated it into my own test.  One of the questions is, "if you wanted to avoid a seismic disaster, where would you most likely live?" or something similar.  I usually show them where the cities are, and they have to determine if it's safe there.  They have to give evidence as to whether or not they would want to live there, based on risk factors.

I think the Earth Moves lesson was effective for student learning of subject matter. On the assessment, with the mapping, they usually have to show where some of the different plate boundaries are and then they also have to describe the difference between those boundaries on the test.

I think adding GIS to this lesson provides an advantage, in that it gives a real world application, because before I probably would have just said, "ok here are the plate boundaries, these are the 3 types, here is where they're located on Earth."  I probably wouldn't have thought to use the city thing.  Everyone has to make a decision one day as to where to live.  And they're probably not going to base it off of plate boundaries, but it gives them a visual like, "oh yeah, I know California has a lot of earthquakes" but that's all they know.  And the same with the recent forest fire.  It's something that really happened.  We can just talk about fires or just talk about erosion, or we can talk about a real example.  And putting it on the map, too.  Especially if it's a local problem, they say, "oh, this is my house and this is where we're doing the study".

We have a full computer lab but our server is slow. I thought our system was hooked up and that everyone could grab data from the server, but then I found out I can't do that.  It's like 2 computers at a time.  Every time I do this it gets better, because I work out the kinks and know what to do next time so that it's all ready to go.

The other barrier I faced was the access to computer labs.  It's another teacher's classroom so we always have to schedule it in advance.  I can take them in at the same time but it's hard that way.  They can work in there on their own but you can't really instruct while there's another class in there.  So we usually just schedule it and then switch classrooms. Because of this, I never feel like I have enough time to finish, so I think the students feel rushed.  In the last project they did, a lot of them didn't even have

time to make a conclusion which was the whole point.  And I just said, "add it in when you're talking or presenting."  They just got too hung up on making the presentation and not giving their evidence.

My own computer lab would support me to continue teaching with GIS.  Just having that freedom where if I'm teaching something, I can say, "there's a GIS lab, let's hop on the computers and let's go" would be great.  But now it's like I have to plan so far in advance that I just don't do it, I run out of time, and just move onto the next thing.

Another is lack of interest from the students. At first I wasn't sure if it was lack of interest in GIS or just overall apathy.  But I realized my students really struggled with the *inquiry* – which was the most important aspect of the project.  As the year progressed and I did other inquiry projects, my students really struggled with them.  They complained.  My students who were always sweet, all of a sudden had bad attitudes.  The students were frustrated and they were taking it out on me, their teacher.  I felt horrible at first.  I thought that maybe I would have to adjust my teaching methods.  I then realized that although these students were bright, they have been pampered.  The students were scared to try anything in fear of getting it wrong (a common fear among excelling students?).  So, instead of doing less inquiry labs and projects, I decided do to more.  These students were lacking problem solving skills, and I was going to make sure by the end of the year, they had acquired a few.  It was rough, and sometimes still is difficult as they let their frustrations out on me.  However, I keep reminding myself that they are being challenged and will be more successful in life for it.

I keep trying to remind them why they're doing this, what could be a real application.  What they're doing now could be part of something much bigger down the road.  I try to enter them in competitions, because I've told them, "you've already collected the water chemistry data for 3 years on this creek project and you've made PowerPoints in every subject.  Just take all that information and apply for these scholarships...there are so many out there."

I don't have a lot of other support.  Just the books, the handouts and software.  If there's a computer problem, I go to the IT guy who attended POD with me, as always.

I haven't shared GIS with other teachers, but I want to.  I'd like to actually have a GIS elective here at some point, but right now our student population is shrinking.  So if it ever grows, we might have something. We might combine it with a field science class.  I also want to get the social studies teacher in on it because so many of Mapping Our World lessons are social studies.  And maybe I just need to be like, "hey do you want me to teach a GIS lesson to your class one day?"  And just do it and see what happens.

I didn't really think about geospatial technologies before POD. I just would see a map on television and not really think about how they created it.  But now, yeah, there's so much that goes into it, so much you can change.  I think it's beneficial because you can visualize and you can sort the data.  It's something useful in looking for patterns, and that's really something I wanted my students to do, like "do they see a pattern in the data they collected?"  And sometimes they don't, and they get really distraught, and it's like "that's ok, just say there is no pattern, that's your claim."

As long as we have the software I'll continue to teach with GIS.  I try to use every available tool we have.  We're a small school, we have so little.  I've gotten a lot of our materials through grant writing.  So I try to make sure nothing goes to waste.  Students need a variety of different ways to learn, they can't just learn from the text book. I'll continue to teach with problem-based learning because students just aren't really good problem solvers.  They seem to prefer regurgitation.  So now that I've kind of realized that, every time there's a problem I just keep throwing it at them.  They just don't want to do inquiry, they want to memorize a vocabulary list.  They don't want to solve a problem, and it's a skill they'll need for life.  Not just science, but everything.

The workshops are really helpful in keeping my skills up and improving them.  Every time I've done the workshops, I learn a little bit more confident.  Some of the exercises help.  I have all the contact information so if I need help, I know who to contact.