GIS in Action at Clark Magnet High School

Charlie FItzpatrick introduces Dominique Evans-Bye, a science teacher at Clark Magnet High School in La Crescenta, California, and her student Yeprem Chavdarian, who demonstrate how students use GIS for a variety of projects ranging from marine science research to other current environmental issues.

http://video.esri.com/watch/470/gis-in-action-at-clark-magnet-high-school

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Video Transcription

00:01 Also I want to acknowledge a really special guy in my life.

00:03 His name is Charlie Fitzpatrick.

00:06 He has been in charge of the K–12 program at Esri and has changed thousands and thousands of kids' lives...

00:14 ...by working with teachers to bring geoprocessing, GIS, geography into schools.

00:20 So Charlie, could you come out here? Oh, you're already here.

00:23 I'm here.

00:24 And introduce a special teacher and a special kid this year.

00:27 You bet. Thanks, Jack.

00:33 Around the world, GIS is growing.

00:38 There are programs building in many countries, and here in the States, there are now thousands of schools...

00:45 ...hundreds of clubs, dozens of districts, and even a score of states with licenses in place or pending.

00:54 But there's a darker picture.

00:56 With funding and support slashed, and education standards shifting...

01:04 ...and teachers with salaries being tied to test scores despite directives to promote critical thinking...

01:21 I want you to think about an educator that has made a difference in your life.

01:27 This is a person who knew about many things, and most important, he or she knew how to help you build knowledge...

01:38 ...and discover key lessons about the world and about yourself.

01:43 This was not your easiest teacher but someone who knew how to feed your mind and spirit with knowledge...

01:51 ...and direction but also challenge and independence.

01:58 Teachers today must do much more with much less.

02:04 And from the highest office in the land on down, they're being asked to promote STEM...

02:11 ...which is science, technology, engineering, and mathematics.

02:16 There are many STEM teachers, and even STEM-focused schools, but surprisingly...

02:22 ...most of those have not heard of GIS nor yet learned how geographic thinking solves problems...

02:30 ...nor how to build mapping and analyzing data into their activities.

02:38 They need a hand from someone who knows how to do it, someone in their community like you.

02:47 Can you make a difference all by yourself?

02:50 Absolutely. We know it because teachers have learned how to do this and they have built this into their classes.

02:58 This year's highlight school did it.

03:01 Clark Magnet School in the Los Angeles area serves many underprivileged kids...

03:07 ...but they provide a lot of opportunity to them and expect a lot of them.

03:13 One teacher learned GIS several years ago and built a home for it.

03:19 As you catch their story, think about where you might be able to find a STEM school or a STEM teacher...

03:27 ...in your neighborhood, in your community, and help them discover GIS.

03:35 From Clark Magnet High School in La Crescenta, California, please welcome science teacher...

03:41 ...Dominique Evans-Bye and rising senior Yeprem Chavdarian.

03:54 Thank you, Charlie.

03:55 I've found that students want to make a difference.

03:58 They give their best when they have the opportunity to do something positive for their community and their environment.

04:03 A project has to be relevant to hold their interest; it's just common sense.

04:08 There are a number of competitions out there that challenge students to apply the science...

04:12 ...they may not think is so relevant to original projects that do make a difference.

04:21 And GIS is a perfect bridge between the scientific principles taught in core classes and relevant problems students can solve.

04:30 One student created a video out of materials from the last few years...

04:34 ...that showcases a little about our school and how we use GIS.

04:39 I did the voice-over for the video, but other than that, it's entirely student created. Enjoy.

04:46 [Video playing] Clark Magnet High School is located in La Crescenta, California.

04:49 Clark is a science and technology magnet within the Glendale Unified School District.

04:54 These six skills are reinforced and built upon throughout the high school experience...

04:58 ...culminating in a senior project required for graduation.

05:01 Clark has developed a robust career technical education program through a partnership...

05:06 ...with the Los Angeles County Regional Occupation Program.

05:10 All students take ROP courses at Clark.

05:13 These courses help them consider various career options and provide experience for an edge in a competitive job market.

05:20 One unique program, developed by teacher Dominique Evans-Bye, synthesizes STEM education into one GIS class...

05:27 ...Marine Science Research.

05:29 In her class, students learn the biology and ecology of the Southern California ecosystem as they learn to use ArcGIS.

05:37 They learn CAD by creating models of remotely operated vehicles, or ROVs, used in marine research.

05:43 They build their ROV designs using PVC pipe and bilge pump motors.

05:48 Using ArcGIS, students investigate how variables, such as sea surface temperature or marine protected areas...

05:54 ...affect the abundance and distribution of marine life.

05:57 Students examine contamination and bioaccumulation in the marine environment by collecting samples...

06:02 ...and performing chemical analyses.

06:05 Some students take the research further and enter their projects in competitions, such as the Lexus Eco Challenge.

06:12 This past year, one group of 11th/12th-grade students, who called themselves the Eco Savers...

06:17 ...won every category of the Lexus Eco Challenge by entering GIS projects.

06:22 Students mapped the organic and inorganic contamination in California's spiny lobster.

06:27 Arsenic turned out to be the biggest problem we have here, with some lobster having up to 43 parts per million in their tissues.

06:35 In the Air/Climate challenge, students tied in climate change affecting the frequency and severity of storms.

06:41 They used HAZUS, software from FEMA which integrates with ArcGIS...

06:45 ...to do a risk analysis of flooding in the Glendale Unified School District.

06:49 They found that all the schools within a thousand feet of flood control channels were elementary and preschools.

06:56 A number of children in Los Angeles have been swept away in flood control channels.

07:00 The Santa Monica Seafood Company donated lobster tails from east Canada, South Africa, Nicaragua, and West Australia.

07:08 The marine science students again analyzed tissue samples at IIRMES, and the Eco Savers team mapped the results.

07:15 They won the grand prize in the final challenge...

07:18 ...and were awarded over $70,000 in student scholarships and grants to their school.

07:24 State senator Carol Liu spoke at the awards assembly, presented the team with awards of recognition for their achievements.

07:32 The students didn't stop there.

07:34 They went on to document how contaminants travel from the land to the sea...

07:38 ...in the LA County Department of Public Works Streets to Sea Challenge.

07:42 Here, the students used HAZUS to generate stream networks through the study area and illustrate the direction water flows...

07:49 ...the land to the storm drains and out to sea.

07:52 Now students are partnering with Calflora to document invasive plants both at the Channel Islands and in our local foothills.

08:00 Students have hiked trails at Catalina and Santa Cruz Islands and recorded invasive plants found there.

08:07 One student used a Trimble GPS and mountain bike to map the trails in the foothills.

08:12 Student hikers will retrace the plants and document local invasives to compare with those found at the islands.

08:18 We used marine science to hook the students' interest in STEM-related fields and teach some GIS...

08:23 ...knowing those skills will translate to any college major or career. [End video]

08:29 As you saw, we did several big projects through the year.

08:32 The most analytical of these was our flood risk project.

08:36 Yeprem Chavdarian has been in my class for two years and has been an integral part of all these projects.

08:42 I'd like to have him demonstrate to you some of the work he did with HAZUS.

08:46 Thank you.

08:49 As a second-year GIS student, I've had the chance to use GIS to address current environmental issues...

08:56 ...by documenting and analyzing data in my mapping projects.

09:01 By using FEMA's HAZUS software and ArcGIS, my team was able to identify potential safety hazards in our community.

09:11 Southern California in general gets very little rainfall.

09:14 When it does rain hard, our flood control channels are designed to take water quickly away.

09:24 We wanted to assess the flood risk to schools in the Glendale Unified School District so used HAZUS to do a level 2 analysis.

09:35 Here you can see the LA Basin as well as the Channel Islands.

09:39 Our school is located in northern Los Angeles, shown by the green pin on the map.

09:46 We used HAZUS to define our study area, which was our district.

09:59 We also used HAZUS to generate a DEM and then developed a stream network.

10:06 We chose to focus on the main channel that flows through our district.

10:17 In the past, this area saw flooding until the channel was cemented in as a part of local flood control.

10:24 We did a risk analysis, using HAZUS, showing the area that can pose a threat during a 500-year flood event.

10:31 We adjusted the parameters to account for a cement-lined flood channel.

10:38 The flood control does what it was designed to do, and analysis shows there is little damage or loss due to flooding in this area.

10:49 We adjusted the parameters to account for a cement-lined flood channel.

10:54 The problem was that children are often drawn to watch swift-moving water.

11:02 There were not any schools that were in flood-prone areas, but a number of schools look near the flood zones...

11:07 ...so we'll do a selection by location.

11:15 So here I'm going to target the schools layer.

11:26 I'm going to apply a search distance of a thousand feet.

11:30 Okay. So we've selected schools within a thousand feet of flood-prone areas.

11:35 Hmmm, didn't work.

11:44 Most of the schools found within a thousand feet are elementary or middle schools.

11:50 We used this information to begin a swift water awareness campaign aimed toward children and parents.

12:01 The geoprocessing took a lot of time to run, so my partners would start the analysis...

12:06 ...it would run over lunch, and the other two members in the next class would finish the analysis.

12:11 The challenge was that we had to finish our project in one day...

12:14 ...because the school computers have a deep freeze program that erases all of our data...

12:19 ...when the computers are shut down at the end of the day.

12:27 We ran one analysis overnight, and the CAD class the next day lost our whole project.

12:38 We also used what we learned about HAZUS to inform the public safety diver community...

12:43 ...on how a risk analysis with HAZUS could help document the need for funding...

12:48 ...in order to properly equip and train a water rescue team to respond to flood emergencies.

12:54 Next year, we want to continue working with HAZUS to do a risk analysis...

12:57 ...and loss estimation for earthquakes in our community.

13:03 Yeprem is changing to a regional display, which joins our HAZUS analysis to the Tales of Tails project...

13:10 ...where students assess contamination in lobster.

13:21 The streams that run through our district go down the LA River straight out to the sea...

13:25 ...bringing with them any contaminants that may be on land.

13:28 This map shows the level of arsenic in tissues of California spiny lobster off our coast and the

Channel Islands.

13:35 Projects similar to the ones my students did using GIS could be done in your community.

13:41 That's where you come in.

13:43 You can help them learn, share your experience, mentor them.

13:47 Your kids can be doing this too. Thank you.

13:56 That's great. Congratulations. Great.

14:07 He's ready to take your jobs.

14:10 Anyway, thank you.

14:14 Thank you.

14:15 Thank you for doing what you're doing, and thank you for being a star.

14:19 Don't you think he deserves one more round of applause?

14:22 My god. Alright. Thank you.

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