

# Transcript

[0:00] music

**Derek Bruff:** [0:05] This is Leading Lines. I'm Derek Bruff. How do you teach an earth science course entirely online? In this episode, we talk with Rodolfo Rego, Senior Instructor in the Department of Earth and Environment at Florida International University. He develops and teaches online courses for his department, including courses on earth science, environmental science and sustainability, and earth resources.

[0:30] Rodolfo has won teaching awards at FIU for his creative use of technology and open content. And in this interview, we talk about the challenges and opportunities of moving earth and environmental science courses online.

[0:43] As I talk with Rodolfo, I was struck by the interesting position his field is in, when it comes to online education. On the one hand, they're used to teaching students about locations from volcanoes to coral reefs to grand canyons, that those students won't visit during the semester. So why not do that online? On the other, earth science is a discipline known for its field trips and labs full of rocks, which argues for an in-person and location specific pedagogy.

[1:10] I was fascinated to hear Rodolfo talk about how he's integrated these two strands of Earth Science education in his online courses. And I think you will be too. (music)

**Derek:** [1:25] Well, Rodolfo, thanks for being on Leading Lines today. I'm looking forward to talking with you about your teaching and the ways that you use technology. Can you start and give us just a little bit of teaching context for you? What are the courses that you teach and where do you teach them? And who are the students?

**Rodolfo Rego:** [1:42] Okay, so I'm with Florida International University and the Earth and

Environment Department. And right now, I'm actually exclusively teaching online, yeah. It's a funny little joke. I teach a third of the course every two years.

**Derek:** [1:55] (laughs) Ok.

**Rodolfo:** [1:55] We have a Field Excursion course and three of us kind of co-teach it. And that's the only one that I interact on a face-to-face basis with, as far as in a classroom setting. So it is exclusively online. That wasn't always the case. I did as an adjunct, as a visiting professor, I did teach face to face, but with the push to a lot of the Distance Learning and some degree programs are going online and things like that.

[2:22] There is the need to get faculty to kind of push these courses into an online format. And that's kind of the role I've played so far.

**Derek:** [2:29] Ok.

**Rodolfo:** [2:30] So, the teaching revolves mostly around earth sciences. Environmental Science and Sustainability is one course that's pretty popular. It has a high enrollment. It satisfies several requirements. It's an entry level course, 1000 level. So it's just mostly exposing students to the topics of environmental science, climate change, energy use, things like that.

[2:51] And then there's another course called Earth Resources, and that focuses more on the distribution of resources around the globe, how geologists find them, you know, mining, engineers' practices. What kind of implications does that have for energy use in the various sectors? So that course mostly focuses on kind of where these resources are found, how they're extracted. That again satisfies what's called our Global Learning course. So that's a popular option.

[3:23] Then there's Intro to Earth Science, which is very similar to Intro to Environmental Science, it just focuses on the earth science stuff, mostly geology, a little bit of meteorology and atmospheric sciences thrown in there as well.

[3:36] And then finally, the big one is the course called Energy Flow. And that one is much more complex because it has a math-based element to it. So that one has presented probably more of a challenge than the remainder of them because there has to be a midterm

and final. Once again, these are all online.

[3:56] I've helped develop some labs, which is another big like, "yikes" kind of thing. Where, since these courses are offered face-to-face and we don't have enough seats in labs to accommodate the extra students that are signing up for these. We've had to come up with ways to do these labs online.

**Derek:** [4:15] It sounds like for several of these courses, it's going to be mostly non-majors that you're teaching.

**Rodolfo:** [4:19] Yeah, so for, well, for the, for the 1000 level, the Intro to Earth Science and the Intro to Environmental Science. Yeah, that's, you know, we do get majors in the department in some cases from students who take those courses, because that's usually where they're getting their first kind of introduction into some of these principles, why it's important, and how it relates, especially the Environmental Science one. We've tried to develop it so that students are using it in their own kind of life experiences where they're making better choices, maybe through, you know, buying things that have less packaging or how they use energy and things like that.

**Derek:** [4:57] Ok.

**Rodolfo:** [4:58] So those two courses, not necessarily, but the three others, we do get majors in there because again, it satisfies an elective requirement and a Global Learning. It's called a Global Learning requirement, as well. Now that Energy Flow that I mentioned, that is almost exclusively all our majors.

**Derek:** [5:15] Ok.

**Rodolfo:** [5:16] Because for a lot of them, it is one of the last courses that they're going to take. And I think the word is that it's heavy math. And so it kind of, you know, intimidates some of them or they just know that they're math background needs a little bit of polishing. And so they're waiting and waiting and waiting. And that one is, like I said, presents more challenges in that, in that sense.

**Derek:** [5:37] Ok. And the, the students that you're teaching, are they local students or do they tend to be distributed all over?

**Rodolfo:** [5:44] Most of them are local. You know, I do have some students. It's interesting, in one of our Environmental Science courses this semester, we had a student who was in Hong Kong and he's doing culinary studies and he's traveling abroad and stuff. So the majority of them are definitely from the area.

[6:05] In the summer that changes, believe it or not, because we have some international students who take courses and stuff like that. I mean, I don't know a number off the top of my head, but it is mostly people from this general area. But we do have some that are, enough of them to where the assignments had to be designed, to where they couldn't be location specific.

[6:24] So if we're doing a project, let's say, and I do in those online courses, we do have to go outside and look at things and, you know. So we had to design it to say we can't go to the Everglades to look at it. You have to pick a park in your area or something along those lines. So we did have enough of a presence of those students to say we can't be specific to South Florida. We had to expand it. And so once again, another challenge that we have to always-

**Derek:** [6:46] Yeah, yeah. So I'm guessing some of the students, they're taking the online course because it fits their life, their schedule better? Right?

**Rodolfo:** [6:54] Yeah, yeah.

**Derek:** [6:55] They're working. They're adults.

**Rodolfo:** [6:58] Absolutely. We have, we're not the I guess, the college where you have a small town. And the colleges there, like University of Florida, for example, which is within our state university system. You know, they're a little bit of a different entity in that sense, where the town is basically built around this big institution and stuff, whereas we have more of a transient population, I guess you would say. I believe that's what they call it, where we have working individuals who were coming in, taking classes and leaving. They have family responsibilities that the list goes on and on.

[7:28] So I think those, yes. Some of them are taking a degree program exclusively online. To where every course is being offered online. And those different departments go about that differently. But yeah, for the most part, it's the convenience of not having to sit in traffic, not

having to find parking, you know, things like that. I would say yeah.

**Derek:** [7:48] Yeah, yeah. Okay. So, I took Geology in college. I was at a residential campus, right? And one of the reasons I took Geology is because it had the best field trips. So, tell me more about how you teach an Earth Science course completely online.

**Rodolfo:** [8:06] Yeah, no, no, it is tricky. So, we entertained the idea of doing kits and stuff. So, students would have, you know, some samples to look at. But again, one thing that I find, found about online, it's kind of funny, I don't know if it's like the Super Bowl. A lot of times you get one shot to make it work and then all of a sudden things start to break down.

[8:27] So, you know, if somebody lives in an area where they can easily get mailed stuff or things like that, then that's not a problem. But we did have some instances where, you know, it took a little longer. So already they're starting off from behind. And once again, that kind of puts a little bit of anxiety right from the start. Am I going to get my kit on time? And you know that. So, we decided to try without that first.

[8:50] One of the things that we did was, we with the high definition camera, we recorded every sample we had that our face to face students would interact with. We wanted things to be consistent. That was one thing that when we were in the development phase, one of the big points of emphasis was we don't want to make the labs so much different than the lecture that students are going to word of mouth and they're going to say, you know, go to the online lab. You don't have to look at a sample, you don't have to do nothing, you know?

[9:18] And so that was the good thing about working with a team, where we had faculty members who have taught the course many years. And so, they wanted to get that same kind of format and then adapt it. Some did, some did work. So, we took all of our samples and with a high definition camera, we went ahead.

[9:40] Again, we have to use whatever is available to us. So we had a turn— I guess you'd call it a Lazy Susan, you know, but it was used, is used for this meteorology model that we have where you set a base and on top of it, and it's got these Velcro tabs on it so that it holds and then you spin it and you could add dye to it. And so, we got the base part of that and put the mineral samples on the base. And then with my hand, I would rotate them, turn them on different axis, rotate and then we would piece that together into a video file. So, they did have at least that. Then we did a 3D scan of our minerals.

**Derek:** [10:16] So let me back up just 1 second. So, is that what's called photogrammetry, where you're taking photos of the object from lots of different angles?

**Rodolfo:** [10:22] Yeah, the 3D scan definitely was, yes. So, I guess you could classify that too, but it was just videos. And so, the reason why we did both was we could...

**Derek:** [10:34] Oh, gotcha.

**Rodolfo:** [10:35] ...we would put a table with the video sample of the mineral, a table that had the picture, the mineral video, and then the 3D scan, all together. So that was one where we introduce students to mineral samples. Now we know it's not touching and feeling and doing all that kind of stuff. But we did have projects that we're going to have students kind of go that route. That was the thinking of that.

[10:57] We'll send them out into the world and hopefully they can, you know, find a park again that has things like, you know, I mean, the list goes on and on. They have things that are protecting against erosion drawings and, you know, jetties and stuff like that. So, we give them a general idea of where they should go.

**Derek:** [11:15] Gotcha. So the samples, you have photos, you have these kind of 360 videos, and then you have these 3D models...

**Rodolfo:** Right.

**Derek:** [11:22] ...that are created through the photogrammetry.

**Rodolfo:** [11:26] Yes. And the next thing that we're trying to do with that is, I don't know if you've heard of "SeekBeak." It's, it's a platform, a very innovative small business design where you get your 360 pictures and then you could integrate different, he calls them hotspots. But you can incorporate video links in there. You can incorporate picture.

[11:48] So the next project over the summer that we're doing is we're going to take a 360 picture of our lab itself. And so that has nice sets of cabinets that all the samples are in and everything. And what we were hoping to do was, you know, you can even immerse students in the lab that the face-to-face students are getting. And then when they pan around with the 360, they're clicking the links of the various minerals and then they're getting to see these 3D

ones. They're getting to see the videos and things like that. So it's almost like a virtual lab in a sense. In a sense, yeah.

**Derek:** [12:19] Yeah, I like that.

**Rodolfo:** [12:22] I mean, we do know it's not a sample. That is something that you're not the only one in any general science course, right? I mean, and especially the lab. Really in the class, you know, even in a typical lecture section, you're bringing samples in occasionally to show students, but most of it is in a lab, right?

[12:39] The field trips I'll get to in a second. We actually define a fun little work around for that. But that's the way we went ahead and started to introduce students to minerals, rocks, and things like that. There were some complications. I did get some feedback where, "My screen isn't the best quality so I couldn't tell if it was metallic luster or not." You know, that kind of stuff.

[13:02] But again, when we do in our syllabus, tell students that you will need to have certain technological specs in order to, not that you have to have a brand new screen or anything. But you know, if your computer doesn't meet these basic requirements, then you may struggle with some of it. But that was just, you know, it's funny how you have to design things for just a few little problems here and there. But we did try to make sure that that wasn't a continuing problem and it hasn't been.

**Derek:** [13:30] Okay. So, let me, a couple follow ups. So, the 360 videos and then the, the 3D scans. So, can you say more like was it challenging? It sounds like you didn't have to get specialized equipment to create these objects.

**Rodolfo:** [13:49] Well, so I guess we do have for the online sections, we do have a dedicated team, dedicated department that focuses with assisting faculty members in designing their online courses. It's called FIU online. And they have what are called instructional designers that are paired with faculty to help them put together a course based on, like I said, are you converting it from a face-to-face section and then you're adapting it? Or are you building it from scratch? You know there's, and that's the one thing with online too.

[14:20] There's not this, you know, are you going to use a, b, or c? I'll pick b and then we're good to go. A lot of times there has to be some, you know, a lot of back and forth and there's

no one size myths. And that some people find that frustrating, some people find that liberating because you're always kind of creating new content and things like that.

[14:36] So that team actually had all of the equipment necessary, in order to pull that off. So we just basically coordinated it and then we sent our samples over there. We did have to work with them to make sure, you know, the lighting issues and especially you don't want the samples to look so animation type.

**Derek:** [14:55] Yeah.

**Rodolfo:** [14:56] Because I've seen some scans that you could tell that like, you know, that's really doesn't get the point across, in that sense. So, we did have to go back and forth. The lighting doesn't look right or that looks too much like a, you know, like some sort of animated tsunami kind of thing.

**Derek:** [15:10] Right, right.

**Rodolfo:** [15:11] That students are just going to kind of figure out. So, we did have to go through a lot of that kind of stuff. But as far as the equipment, fortunately, we did have access to that.

**Derek:** [15:20] Nice, nice. And so, what types of tasks or you giving students to do with these virtual representations of your samples?

**Rodolfo:** [15:28] So once again, we tried to simulate what we were doing in the lecture where students are given trays of samples, right? And then they're going to, so it would depend on what part of the, so they first start off with minerals. So, this was the biggest challenge was, let's say we're in the lab and we have a mineral and are rocks down here made of calcite, which effervesces. I don't know if you remember from your, you drop the 10% solution of hydrochloric acid, it bubbles, right?

**Derek:** [15:52] Ok.

**Rodolfo:** [15:53] Everybody loves doing that. So, we couldn't do that type of assessment or put an assignment that would allow them to do that, even though newer simulations are making that possible, believe it or not, uh, but the cost is another factor that we have to



consider. So, when we put it together in the online section, we had to give them clues like if they were doing the simulation.

[16:18] So we said it's between this range. You know, it's used for this purpose so that they could kind of piece together what parts were given and then what pieces of information were missing. And then they would make the choice like that. So for example, in that rock sections where we would have, let's say it was more of the sedentary rocks. Then we would drop the hydrochloric acid on the rock. And if it effervesces, they could see it where we drop it on some of the other rocks that don't have that mineral and they see that it wouldn't. So, we would have to do some of that for them.

**Derek:** [16:51] Ok.

**Rodolfo:** [16:53] We would. So if, let's say something like if we looked at something called streak, right? We would actually do the streak and they could see the color of it and use the tables. So some of those things we had to do, whereas in other labs, students are doing the more hands-on things. We did come up with something for a field trip, if you're interested to hear about.

**Derek:** [17:13] Yeah. Yeah. Tell me about the field trip.

**Rodolfo:** [17:15] The field trip thing has been something that I think now we got a really good handle on it and we're going to start to introduce it to the online section. So, what I've been doing is going to particular locations around the county and setting up, and doing a live stream into some of these classrooms. So, we have lab setup where we have the big TVs up on the screen.

**Derek:** [17:36] Yeah.

**Rodolfo:** [17:37] And I, like I said, we purchased a Logitech webcam that films in 1080p. It also has microphones, so I didn't have to worry about being miced up and it connects USB. So, what that allowed me to do was use my phone as a hotspot as long as I had a strong LTE signal, right?

**Derek:** [17:57] Yeah.

**Rodolfo:** [17:58] I could then use my Apple. You know I have an XS. And I can use that as a hotspot, connect my laptop up to that, and then just like with the Zoom session, I send a link to the instructor in the lab and then we're basically going live.

**Derek:** [18:11] Wow.

**Rodolfo:** [18:12] Now, again, it's not like being there, but what was interesting is we had some faculty who have been doing this for quite a while, in the lab with the students. And the overall goal was to show them, like I said, that what's in the field is not necessarily what you see in the textbook.

**Derek:** [18:27] Ok

**Rodolfo:** [18:28] And not necessarily what you see in the lab. We have two dedicated spots that we go to. We have field guides that we've created from those two locations. And what we do, is we give the students maps and questions to answer and to ask ahead of time so that when I get there, we can actually have this. They could ask questions to me while I'm in the field and the quality is good enough to where I can actually zoom in and point to them and see some of the features.

**Derek:** [18:52] Ok.

**Rodolfo:** [18:54] So that's how we've done the field trip side so far.

**Derek:** [18:58] Nice.

**Rodolfo:**[18:59] So again, it's not being there

**Derek:** [19:00] Right.

**Rodolfo:** [19:01] But it does give them a chance to interact with somebody to ask questions and they can get that right on the spot. One of the biggest technical issues with that, believe it or not, wasn't the whole live streaming and everything. It was getting a microphone setup. So, students in the classroom didn't have to get up, walk up to the camera.

**Derek:** [19:17] Oh sure, yeah.

**Rodolfo:** [19:18] Because it's on a laptop, right.

**Derek:** [19:20] Yeah.

**Rodolfo:** [19:21] And speak into the laptop, that's been right there. I think that was one of the things where we realized, we'll get more participation if we just have students who could just sit down, raise their hand, and ask a question versus get up in front of the class, walk up to the camera and you see as it's recording, you see a person right in your face.

**Derek:** [19:36] Right, right.

**Rodolfo:** [19:39] Yeah. So that was one of the again, didn't want to do this is going to be different for online, but we wanted to get the feel of it.

**Derek:** [19:46] So for the online courses, are you imagining that you would have a synchronous session?

**Rodolfo:** [19:39] Yeah, so...

**Derek:** [19:50] That replicates this?

**Rodolfo:** [19:52] Yeah. That's one of the biggest things. And again, like we talked about before, most people are doing online courses, so they're not going to be around at the times where we would want to do stuff like that, especially in the summer here, it gets brutal. Yeah, it's brutal. So, we want to do that in the morning. Well, most people are often working and stuff...

**Derek:** [20:08] Yeah.

**Rodolfo:** [20:09] ...so we either have to do it on a Saturday, which we can, you know, I also work with the Geology Club and once again, they're students and so we can't go places during the week most of the time because they are in classes. So, we do things on the weekends, so we entertain, maybe doing it on a Saturday. So that's been the biggest challenge in the online courses. How am I going to get the students together in one

sitting and be able to pull it off? But the technical side of it, we basically got that.

**Derek:** [20:38] I'm curious, and I think a lot of professors when they think about teaching online, you've got a lot of experience in this area. There's a lot of professors who do, but there's also a lot who are, who are still kind of new to this. There is this idea that somehow you've gotta take what you're doing in person and make it work online. And sometimes it's really challenging, right? That, that kind of transfer doesn't quite work.

[21:02] But I think there's also an opportunity to do things online that may be hard to do in person. And I'm curious to know, are there aspects of teaching online where you're like, "Thank goodness, I'm online because now I can do this, or this gets a lot easier, or the students can now participate in a different way."

**Rodolfo:** [21:18] Yeah, there, there are definitely things, I think in the participation realm that the online section, in my experience, has definitely allowed students who normally wouldn't want to stand up in front of a course. When I was teaching, I tried to do a lot of in-class assignments and you're right, there's a handful that are comfortable and, you know, everybody else kind of just kind of sits back and if you put them in a group, they'll contribute, but they're not as confident or whatever the case may be.

[21:52] And the online gives them the ability to basically open up. And what's interesting is we tried to do some, give students the option where when we were doing discussions and this Environmental Science course, and I said, if you don't like writing, right, right, which is terrible because that's the way things are, right? You could actually do a video post if you want. And I had very few takers.

**Derek:** [22:13] No?

**Rodolfo:** [22:15] Yeah, and I thought complete opposite. I go, you know, this generation loves being, whether it's through social media or taking video. They have all of these wonderful tools. To age myself, but I remember, you know, going to a family vacation and taking videos and you had this huge recorder there you know, so right? So, I could see why that would be well, forget it, but now it's, you know, it's almost, it's in your pocket and you could do these. But they were still, and I think reluctant...

**Derek:** [22:43] Yeah.

**Rodolfo:** [22:45] ...because they had the same fear. It almost translates across to where my face is still going to be visible and seen and stuff.

**Derek:** [22:51] Right, right.

**Rodolfo:** [22:52] So we do have requirements and discussions. That not only do you have to post a discussion, but you also have to go into other students' and interact with him. So, you get a lot of interaction, which I think in the face to face courses you could do that as well. But you constantly always had to, I always had to jump into every group and go, "Okay, let's get you going." And then go back to that other group. "What happened? You guys were doing great. Let's participate again." I think it's just, you know, you have to be more, your participation has to be just as much in some cases, if not more.

[23:25] Whereas online they don't mind, you know, posting to a discussion. They're using references, they're citing information, they're confident in their posts. And then the usually the responses are geared towards, well, I didn't think about that perspective. You know, I'll go back, I'll take a look. So, it seems more conversational than assignment driven, assessment driven, testing and stuff like that.

**Derek:** [23:46] Sure. Yeah, that's great.

**Rodolfo:** [23:49] You know, let's say you have a personality and maybe you're animated or, you know, sometimes students maybe appreciate that so that, you know, you're kind of keeping them on their toes. That's difficult to translate to online. And I think that's where some faculty don't want to then say, well, now that I have to bring that type of energy into an online forum, it, believe it or not, it takes more work. And I think that's a misconception. Most people think, "oh, you're teaching online?" Because I'm in Florida, I'm in South Florida. You're gonna be in Key West all the time...

**Derek:** [24:26] (laughs)

**Rodolfo:** [24:27] ...with margaritas and listening to Jimmy Buffet while we're working. No, it's more in a lot of cases because again, if I want to bring that personality, and bring that type of energy into an online classroom, then I have to rely on video technology. You could see in the background I have a couple little. Those are not only are they kind of goofy, you know, these little...

**Derek:** [24:48] Backdrops?

**Rodolfo:** [24:50] I went on Amazon, yeah, and I ordered these backdrops from birthday parties and stuff. But there's clear windows back here. So, every time I'm interacting with a student, you see shadows constantly, moving by and stuff like that. So, I have my own little studio set up in my office just to again, bring that energy into the classroom. Every semester, I'm invested in the semester.

[25:10] We just didn't develop the course. I didn't record in our high production studio and I've gained weight. I've lost weight and I've cut my hair different, I've shaved. So, it brings that at least this professor is interested every semester to create these videos, post them up in announcements, and that's the way you could interject your energies into there. So, these little quirky things, you know, football stuff and maps of old treasure and different backdrops. I have three or four of them, so I switch them out. And so, but that takes work. It takes a lot of work.

[25:44] And if you're not comfortable in front of a camera, well then you're gonna have to do a script. I'd like to do things, certain things off the cuff. Whereas in some of the studio work that we have to do, which again is FIU online. You know, we need to put together a script and we need to put together maybe a presentation that has these slides are going to go one minute, to one minute and 20, and we're going to put it so it has to be much more scripted and planned. And again, that takes time, whereas I'm not saying that in face-to-face, you're not taking time to do your lecture, preps and everything like that. But once you get in there, you know, you're basically just doing what you normally do and you're animated or you're energetic, and that's just how you are.

[26:26] Whereas online, you have to really find the best way to bring that in. And in some cases, it's not just one thing. So, like I said, I can tell you I got every time I go somewhere that's interesting, I'll take a little picture of me there with an FIU, shirt or something. Because when I then bring a new canvas course online, I want my little emoji, right, to be different because I have students who take my course one semester and they'll take another course next semester. And again, try to develop a course that isn't the same. Trying to bring content that's a little bit different.

[26:57] Try to kind of deal with all of those little, like I said, these things that are going to go well, "he's invested," and I think that's one thing that's important. They don't want to see a

driver's license type course where the videos have been put together and you can tell it's been running for a couple of years. And well, "they gotta update this," and everything. I want students just like I would in a face-to-face setting.

**Derek:** [27:16] Sure.

**Rodolfo:** [27:17] "Good morning, class." So that's kind of my "good morning." The summer starts on Monday, summer semester. And so, I'll basically do a video in the morning. Remember, summer semester is a very fast-paced, welcome aboard, et cetera.

**Derek:** [27:29] And so yeah, well, you know, if there's some geology in the news, you can talk about that, right. Like it's very timely. And I do think, yeah, I talked to faculty and administrators who are thinking like, yeah, we'll record these really nice videos in this, you know, well equipped production studio. And then we'll have the course. And then we can just offer it again and again and again.

[27:47] But, but often what that's missing is the instructor presence, is a social presence, is a feeling of community, and that's so important for student learning. I think some of these online courses, sometimes you have well-motivated students, right? They're taking a MOOC or some other kind of free course because they want to, right? And, but those are exceptional students, right? Most students are like, well, I gotta get my, my global credit in, right? And so like this isn't my thing, but I'm going to try.

[28:19] And so all those things that you do to create a sense of community, to establish rapport. Those are really critical I think for those students. I want to circle back to one aspect you've mentioned earlier. So, you said that the courses aren't localized in the sense that you can't assume everyone's in the same kind of geographic area. And so, you're having them go out and look for things, wherever they might be. And I'm kind of curious because that's, that's actually different than a face-to-face class where, you know, my 30 students are all here in Nashville, right? So, I'm wondering, do you, do you have students go out into the field wherever they are and take pictures or capture things that they then back to the class to kind of share with other students? That seems like it would be really potentially interesting.

**Rodolfo:** [29:05] We have them go to Google Earth first and find a shopping center and a park that occupy about the same size.

**Derek:** [29:07] Ok.

**Rodolfo:** [29:18] Because we want them to figure, we want them to understand how we would take an open ground, an area that has open ground, natural drainage, things like that, and how that space when you convert it into an urban, you know, just the shopping center, that the amount of, so we also have them calculate the amount of area that's asphalt, the amount of area that's green space, the amount of area that's building. Where energy's used, what kind of, how does water, if it's pavement, how does water get back into the subsurface? Because we rely on recharge from rainfall. And then they compare and contrast those two sites.

[29:49] And so in that exercise, they could go to any shopping center. They could go, they can be in anywhere, any country. There's always somewhere where something's been paved and asphalted. And there's always natural areas. So, in that case they're seeing how much areas devoted like I said to drainage, to things like that. So that's one where they go out no matter where they are.

[30:12] For the Earth Resources course, and this was yeah, it was a trip to like a hardware store, Home Depot, Lowes, and we allow them to do that online, although I recommended that they go face to face because I wanted them to actually experience the going in. And like you said, looking and seeing all of these resources that we talked about all semester are hidden in these products everywhere.

**Derek:** [30:40] Yeah.

**Rodolfo:** [30:42] And then what we do is we have them find, so we'll list the metals. Basically it's more for the metals and the fertilizers and stone resources and things like that. We have them find out where the largest mine is located, who imports it the most. And again, it's a global learning based course

**Derek:** [31:01] Wow.

**Rodolfo:** [31:03] So it really brings it home that these things are found in your everyday life, whether you believe it or not. And that's something where I didn't require them to go in the actual physical space. But a lot of students do, a lot of students do.



**Derek:** [31:16] Sure.

**Rodolfo:** [31:17] So that was one where we were taught, required them to go outside. Now the others are more field trips that are again, Google Earth type field trips.

**Derek:** [31:24] Sure.

**Rodolfo:** [31:25] Where they do narrated tour. And in the intro to Earth Science Class, we actually have them do a narrated Google Earth Tour. And then so we tell them, you know, pick a topic in the table of contents or within a course. Most of them pick volcanoes, glaciers, and shorelines.

**Derek** [31:39]: Yeah.

**Rodolfo:** [31:40] That's where, that's where most of them and they actually fly to these particular places. We'll give them topics that they should be discussing. And what's nice about it, Google Earth has a great set of instructions for how to do one of those. Because I'm sure you, you know, how many students actually read the syllabus from start to finish?

**Derek:** [32:00] (laughs) Right.

**Rodolfo:** [32:01] How are they going to read the complete set of instructions that I've provided? And I mean, we've gone into detail.

**Derek:** [32:06] Sure.

**Rodolfo:** [32:07] We've actually had to do video tutorials and everything to show students how to do it.

**Derek:** [32:10] Do you have for any of these, do you have the students share their work with each other or these assignments that they submit to you?

**Rodolfo:** [32:16] Most of them are submitted to me. The sharing usually comes in with the discussion. But I have thought about, we have we have in that Energy Flow course. And they're so excited, they don't have to do calculations. It's a funny name. It's called the BITEs program, buildings, industry, technology, and energy.

[32:34] So what's really nice about it is those sectors, they have the annual energy outlook from the Energy Information Administration put together an energy outlook from 2011 to 2050. And what they do is they have that as their baseline. And then you can tell students to change it based on current trends. So you could say, you know, fuel standards for cars by the year 2050 should be so many miles per gallon. And then they set the lever and lower that. And then what it'll do is it'll create another output and show you how much CO2 will be generated, how much energy per sector will be generated based on that.

[33:11] And it really gives them a nice idea about how each sector dominates certain energy resources. I did think that putting that as a group kind of project to where they can say, again, one thing that is lost a little bit is that at the end, when they do the evaluation of all five scenarios, that they're leaving out some key pieces of information. And I think them working together would be able to really, because some pick it up and some don't. But group work is always a challenge...

**Derek:** [33:42] Oh yeah.

**Rodolfo:** [33:44] ...in face-to-face as well as online.

**Derek:** [33:45] Yeah, yeah. Well, you mentioned the virtual field trips as something that's coming up. Are there other things you're looking forward to experimenting with over the next couple of years?

**Rodolfo:** [33:56] Yeah, so we're. We are with that "SeekBeak" which is something that we're, we're probably going to use a little more frequently. That's where the 360 immersion and putting in some content within the 360 platform itself. You know, it's really nice to be able to kind of go to the Grand Canyon, let's say, with the VR glasses. And that's one thing that we did invest in, some Google Cardboard. Virtual reality glasses.

**Derek:** [34:26] Ok.

**Rodolfo:** [34:27] Again, I know it's not like being there.

**Derek:** [34:28] Right.

**Rodolfo:** [34:30] But what's really nice about this, and this is what we want to expand, is

students get to use their phones. So, they download the Google Street View app. And that's all the 360 pictures that people have taken around the world. And if you have a pair 360 virtual reality glasses, you can then put your phone inside of it.

**Derek:** [34:38] Oh, sure. And you can do the 360.

**Rodolfo:** [34:50] But the problem is you want to have, in a lot of cases, we're trying to develop our own content.

**Derek:** [34:56] Yeah.

**Rodolfo:** [34:57] Alright, so I've already gone around again, if you go to our website, you'll see that I've already put a, put a bunch of 360 pictures around from and especially people love the Keys. So, one of our highest clicked photos definitely comes from the Keys. And, and so not only do we use that in the face-to-face classes, how do we get that and convert it into once again, online? And that's what, I don't know if this is the standard or not, so to speak, but we do try to develop it using the face-to-face students that are actually physically immersed in it. So, we can iron out as much as we can.

**Derek:** [35:28] Sure.

**Rodolfo:** [35:31] And really the online, I think is more of the scheduling. You know, that's what the challenge is. If you want to go asynchronous and this is what we do. And on your own, you know, no problem. But when you want to get everybody together, yeah, it's a little more challenging and so we're going to try that this summer online. That's one of the things we're going to try. We're gonna do, another one of those live streams, and I'm going to send out a survey beforehand to see. I'm going to give them.

[35:54] I can't give them every time slot, but we're gonna give them at least three time slots and see which one would students be able to attend, and then maybe we could pull it off that way. So that's one thing we're gonna do this summer, try to immerse a lot, I mean, incorporate a lot of this into the online section. So those students can also benefit from it.

**Derek:** [36:10] Sure.

**Rodolfo:** [36:12] And it would be great to have face-to-face students and the online students together.

**Derek:** [36:17] Sure. Same livestream, yeah.

**Rodolfo:** [36:21] Yeah, so we'll see but one of the things is, like I said, finding all of the technology that allows us to do this at a reasonable price, as well.

**Derek:** [36:34] Is there anything else you'd like to see in the future of educational technology, things maybe that don't exist now that you wish would be available for you like five years from now?

**Rodolfo:** [36:44] So I've gone to a few of these conferences and the simulations are, are pretty interesting. That's one thing that I think a lot of chemistry, biology, they're using those simulations and just the costs are so high. So, I think that's one thing. If costs can come down on that, and they could get it to where you can make your own simulate immerse immersion type of thing. I think that would be great.

[37:07] One thing that's been thrown around, which is interesting, but as always, it's going to make more work for me, but whatever, is the whole idea, I forget exactly what it's called. But you know how kind of movies now are where, "if you want to see me jump across this canyon, push, A."

**Derek:** [37:23] Oh, sure. There's a new Netflix show.

**Rodolfo:** [37:27] Yeah, push B.

**Derek:** [37:28] Yeah, yeah.

**Rodolfo:** [37:29] So with some of the students that struggle, especially with beginning concepts and stuff, we could maybe design a course, you know, with that kind of framework.

**Derek:** [37:35] Oh, sure.

**Rodolfo:** [37:38] And it's again, more for this Energy Flow, based course where we get some students in there who have math background and they like the subject matter. And they like

again, the discussions that I create in those course. We're changing habits. Poor Mikey's not taking as long of a shower as he used to because we showed Mom how much that's costing them when it comes to heating the water, et cetera, and so on.

**Derek:** [38:00] Yeah, yeah.

**Rodolfo:** [38:01] So there's some, every semester that are different. I'll get a handful of students who have a math background and I'll get some that have kind of that intermediate and then some that are very basic. It'd be nice to be able to shuffle them into certain parts of the course,

**Derek:** [38:15] Oh sure, yeah.

**Rodolfo:** [38:16] As they go along. And, you know, so that's something that's been talked about. And I think the, as the cameras especially get cheaper, and now the GoPro's can do 360. And that's one of the things that we did early on was we purchased a GoPro so that everybody get out there and take as much footage as you can. But that's now it's old, you know what I mean? Now it's one of the oldest GoPro's that are out there.

**Derek:** [38:43] (laughs) Right, yeah, yeah.

**Rodolfo:** [38:44] So it's not taking the same quality. And Google Earth kind of threw me a little curve ball. Google Street View, sorry.

**Derek:** [38:45] Ok.

**Rodolfo:** [38:49] Where they up the quality of their images. And you can't use your phone anymore to publish to their forum.

**Derek:** [38:54] Oh.

**Rodolfo:** [38:55] You can still use your phone to take the pictures.

**Derek:** [38:57] Gotcha.

**Rodolfo:** [38:58] And so if you want to sign into your own account and show people your

own pictures, that's great. But if you want to publish it to their maps, you have to have at least 4K quality.

**Derek:** [39:05] Wow.

**Rodolfo:** [39:05] So it's not a problem for us because we have the 360 camera itself. But at one time I was doing it all just with the iPhone6.

**Derek:** [39:11] Oh, sure. Yeah, yeah, yeah. Yeah.

**Rodolfo:** [39:13] So, you know, that's kind of the thing that always, at the same time, it's frustrating. But once you get the new piece of equipment and once you see the limitations you were working with before and how you can now. You know, I come from that generation where was always great to have those limitations cause you had to think creatively to overcome. And I'm not saying they don't think creatively now.

**Derek:** [39:38] Right, right.

**Rodolfo:** [39:39] Not at all. But I remember having to come up with some very unique problem-solving skills in order to get certain electronics to work back in those days, you know, that kind of stuff.

**Derek:** [39:49] Well, and I think it's interesting that you've got this really mix of kind of high tech, low tech going on in your, in your teaching. Where like when you can do it the hi-tech way, that's great. But it's not always practical to do it the hi-tech way. And so, you know, like you say, you want to go out and get your own street view photos. But, now that's turned in from a low tech job to a high-tech job. And so I think, I mean, I'm often thinking about how to help faculty do more themselves, right?

[40:19] And that requires kind of navigating that continuum and finding the right sweet spot where I've got the resources and I can do the thing that I want to do. Which leads me to my last question. We, we, we ask all of our, our guests on Leading Lines this question. We talk a lot about digital educational technology on our podcast. What is one of your favorite analog educational technologies?

**Rodolfo:** [40:45] Analog. (laughs) Oh, man, so you mean, are you talking back in the day

or one that I use now or?

**Derek:** [40:53] Either way. Either way.

**Rodolfo:** [40:54] Either way. You know, it actually. Ok. So “back in my day, right, speech’ we have, we used to have what, we still do it and I’ll tell you what we’re doing with them. These models, these old school plastic models that you could tell somebody hand painted, they had these very specific. And you can tell the molds, they must have worked just countless hours on these molds. And they’re very intricate. They have pieces that come off of each other. Those were fantastic.

**Derek:** [41:26] This might show kind of the layers of the earth or something?

**Rodolfo:** [41:27] Exactly, exactly. One we have is of a car system which has caves and disappearing streams. And over the top, you could see the landscape. And then you pull the top off this model, and you got all the cage system that stalactites, stalagmites and everything.

**Derek:** [41:37] Yeah.

**Rodolfo:** [41:39] And so we used to use those constantly, stream tables, models and things like that. And so we’re now getting those scanned.

**Derek:** [41:49] Oh yeah.

**Rodolfo:** [41:50] Believe it or not.

**Derek:** [41:51] Yeah, ok.

**Rodolfo:** [41:52] So that students can same thing, but they can control when the top comes off and they can move it around. So those were my favorite things.

**Derek:** [41:57] (laughs)

**Rodolfo:** [41:59] Again, it’s more of the handling kind of thing.

**Derek:** [42:01] Sure.

**Rodolfo:** [42:02] And I know that's probably the worst thing I could've said.

**Derek:** [42:04] No, no, no.

**Rodolfo:** [42:05] But those models, you know, you could tell there was, it was almost an artistic endeavor that somebody had to go through in order to put that together. So I don't want to see those just basically end up in the waste bin. So we are going to adapt those. Plus, they have some really great visual aids.

**Derek:** [42:20] Awesome. Well, thank you so much for talking with me today, Rodolfo. This has been really great.

**Rodolfo:** [42:24] Thank you very much for having me. It was fantastic.

**Derek:** [42:29] That was Rodolfo Rego, Senior Instructor in the Department of Earth and Environment at Florida International University. I really enjoyed talking to a faculty member who is actively engaged in building and teaching online courses. He's got great help from FIU online, but he's also rolling up his sleeves and figuring out new technologies and teaching strategies to meet his students where they are.

[42:52] If you'd like to see some of the annotated maps and 360-degree photos and videos that Rodolfo mentioned in his interview, check our show notes for a link to his department website. To find our show notes as well as past episodes with full transcripts, visit our website, [leadinglinespod.com](https://leadinglinespod.com). We're on Twitter and Facebook too. Just search for Leading Lines podcast. We'd love to hear from you.

[43:11] Leading Lines is produced by the Vanderbilt Center for Teaching, The Jean and Alexander Heard libraries, and the Associate Provost for education development in technologies. This episode was edited by Rhett McDaniel. Look for new episodes the first, and third Monday of each month. I'm your host, Derek. Bruff. Thanks for listening. (music)



