GeoDesign Education: Where We Are and Where We Are Going

Thomas Fisher of the University of Minnesota provides an overview of geodesign educational programs and moderates a panel of educators who discuss the challenges and opportunities they face in integrating geodesign into their curriculums.

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Video Transcription

00:01 We want to tell you about where education is and where it's going, and before I introduce our speakers, I just want to say...

00:06 ...a few words about where this is going in a kind of more general sense.

00:12 Bill Miller's working paper, which I highly recommend, talks about geodesign being no big deal.

00:16 Well, I want to make the argument it is a very big deal, and Jack said today that ArcGIS Online is a new medium.

00:23 I totally agree. And I think, borrowing from McLuhan, the medium here is the message.

00:29 We all have been using GIS. It's a very powerful tool. Like many good tools though, it has largely enabled us to do what...

00:37 ...we already know how to do better, faster, and cheaper.

00:40 I want to make the argument that geodesign is a change in kind, and not just degree, from GIS.

00:47 That it is a fundamentally new way of thinking about this that I think you'll see from our presenters as having revolutionary...

00:54 ...implications for education. Why is that? I think because education, like the physical environment itself, has been...

01:03 ...developed in, to use Paul's term, disjointed incrementalism. That we have essentially fragmented habitat, exploited...

01:12 ...resources, divided communities, because of the way in which we see the world, and the way in which we think about it.

01:20 And so, I want to make the case in three, four minutes, that geodesign is a radically synthetic tool, synthesizing tool...

01:28 ...and that it will change the way we do design, the way we think about science, and the way we educate.
So let me just give you a few examples of what I mean by that. GIS science in general is very good at conveying information.

Education is very good at having big lecture halls and having faculty convey information. Not very good at conveying values.

Design, on the other hand, is a very value-laden activity, but has not been very data rich. Has not been very informed.

What geodesign does is it brings the fact/value divide that has existed since David Hume and has certainly...

...been an underpinning of a lot of the modern universities. It brings those two together in a very powerful way.

As we heard from Carl, science works from this sort of planetary scale down. Design works from the site scale up.

Geodesign is, I think, a tool that will enable us to work at both scales simultaneously. Very powerful.

So the idea ultimately I think, is so that we can make site decisions and know planetary impacts.

I think that's where we're going, and that will be profound.

Science is very good, and humanities are really good, at telling us what was, and what is. Design talks about what could be.

Those things have been kept very separate in universities. Geodesign brings them together.

This is just also changing our ethics. Science has very good, at helping us understand consequences.

Design is very much a discipline focused on having good intentions.

Has generally been pretty poor in understanding the consequences of design decision.

Geodesign enables those two ethical positions. Focused on intentions and focused on consequences brings them together.

It's also changing our roles as professionals. We have basically been educating specialists in fields for at least most of this century.

Designers are the last generalist profession. And geodesign enables us, to use Carl's terms, to not only have soloists...

...but to have conductors, and to have them working together in an orchestrated way.

And then finally, to build on something that Bill Miller talks about in his working paper, it is changing the way we reason.

That science is inductive. Design is abductive and geodesign is a going back and forth between induction and abduction.
Moving laterally, as well as deep. And this is changing the way in which we will be educating.

Universities have been, of course, also spatially distributed in ways to keep all of these disciplines separate, as we all know...

...and has fragmented knowledge. And I think one of the reasons why geodesign is having, and will have...

...and continue to have such a powerful impact on education, is that universities are completely unsustainable...

...and they are getting to the point where they're unaffordable and they cannot keep going the way they are going.

So universities themselves have become a geodesign problem, and a geodesign opportunity.

And I think some of what we'll hear today is really to make that point. So, I just wanted to give you a very...

...one slide here. Last year, I talked in my Lightning Talk about this spatial infrastructure we were setting up at...

...the University of Minnesota, and also the notion of the challenge-based curriculum.

I just wanted to report back to show you the profound effect that geodesign is having.

One of the things we're finding is geodesign is becoming pervasive.

It's being used, not only in the geography department, and in the department of landscape architecture, it's being used in...

...our education college to teach creativity to kids in K–12 education. It's being used in agriculture to redesign the food system.

It's being used in our government school to redesign government. And so, geodesign is becoming pervasive...

...and it's incredible how many things we're discovering almost every day.

The other thing is that it is leading and driving this challenge-oriented way of thinking about universities.

We've discovered that applied economics is using it to basically ask the question, How will...

...nine billion people fit on the planet? And so, these are economists using geodesign.

We have an institute in the environment that has a Natural Capital project...

...which is looking at how we can continue to develop using the natural capital of the planet. And so, this notion of education...

...moving toward a kind of key-shape orientation where students would major in a discipline and minor in a challenge...
...is I think, one of the ways in which geodesign is going to sort of force and encourage a restructuring of education, and...

... we're starting to see that now. And then, a couple final points.

I think another thing that is going to happen as a result of this is, as we're seeing with ArcGIS Online, as we're...

...seeing with some of the online degree programs that are arising in places like Penn State, and USC, is it will...

...increasingly drive a kind of virtuality to education. I think we'll challenge universities to say, Why come to a campus?

I think it's going to also encourage a lot of collaboration. Cartels is another term that Carl's used among universities around...

...challenges. And so, I think that actually the kind of gathering we have here is an example of the way in which...

...education will increasingly be structured, where there will be many disciplines from many institutions...

...gathering around important questions.

And then finally, I think that one of the things we're seeing as we look at what's happening in these other...

disciplines, is they're also starting to be quite interested in the studio model of education, is they're recognizing that...

...studio is, has always been, this kind of marginalized activity at universities, is this immersive, conversationally based...

...oriented, storytelling oriented game-like way of learning and teaching, and I think we will see that being pervasive.

And that is really why I wanted the group of speakers today to tell you about what they're doing largely in...

...studio and applying geodesign. And as you will see, it's theoretical and applied. It's both about facts and values.

It's about both what is, and what could be. And I think we're about to have a treat to see some of the best work going on...

...anywhere in the country among our speakers. So let me introduce our first speaker, Karen Hanna, who many of you...

...know is former dean at Cal Poly Pomona, and is now in the department of landscape architecture.

She's a landscape architect. A well known author of two books, GIS in Site Design and...
Thank you. Ah, okay, technology works. Okay, I’m going to talk today about this project, which is a 606...

...project. And our 606 studio takes the third year of our graduate program.

And for 30 years we've been doing these projects. John Lyle started these projects. And for the last 15 years...

...we've been using GIS in them, and the GIS and geospatial technologies are getting more and more complex.

I have to recognize the student team that did this project, Jake, Megan, Eric and Sina.

This project is an LID project, a low impact development project. And it takes place in San Antonio, Texas.

The...it's sponsored by the Lady Bird Johnson Wildflower Center, and the San Antonio River Authority.

And the purpose of this project is not just to look at LID principles, but to serve as a baseline that could become...

...a guidebook for a statewide manual on LID. So everybody knows that LID is mostly about storm water management...

...and there're two big parts of LID. One is design, and Doug Olsen talked quite a bit about this yesterday.

And the other half is the BMPs, the best management practices, and there have been numerous references to...

...BMPs in the last several presentations. So these are the principles, and I won't read through them.

One of the things that we require in 606 is that the students must work at the regional scale, the local scale, and the site scale.

So they have to do analysis at all three scales. And so, that it's become, we believe it's become geodesign...

...because it's at all three scales.

So here is the San Antonio River watershed, right there. And this part of Texas is called flash flood alley because of the...

...weather patterns cause lots and lots of flooding.

And so, LID is an issue that's very important for most of Texas.

This section through the watershed shows, you know, the upper watershed, the prairie, and the plains.
The plains area is where the city of San Antonio is. And during this project we were very fortunate because we were able to use a hydrology expert from the University of Texas at Austin, which is very close by. Somebody who's very familiar with the flood actions that take place in this area. And so, very traditional GIS analysis... looking at different soil types, impervious area, the areas that have been built on. And then they came up with a complete nine factors. Now I agree with Carl, you don't have to collect all the data in... the world, you need to determine what the issues are and determine how much data you need to answer those questions. They were fortunate because they were able to go there and have two rounds of public meetings and meetings with... all their stakeholders. And so they found out what the values were of the local population. So, you know, they included aquifer recharge areas, riparian areas, population density, and so forth. And then, you know, pretty straightforward analysis map. And from that, they selected four areas where they... could do different types of site designs that demonstrated LID principles. And so, this is high in the watershed, a greenfield site with a retention basin and coverage, woodland coverage. Traditional design, 220 homes. An LID design, 230 apartments plus 90 homes. They did not look at the market... comparability of these, but they were able to preserve a lot of this canopy, which slows down the water, put in... a new stream, preserve these retention ponds, and add recreational facilities. And then, of course, show some graphics of what that would look like. And then downtown, of course, they had... a much denser area. This is an example of an existing residential area where there wasn't much opportunity to do LID... design and apply those principles, but they could put BMPs. And so, I'll show you just a couple of little examples of BMPs. Here's an existing residential site where they've put a rain garden in the front and a cistern in the back. And so here, whoops, there's the section and here's the proposed section. This was a vacant lot that they turned...
...into a park because their public meeting said that they needed more recreation in this area.

And so, a little park with a biofiltration area, a recreation area, and a parking area.

And that's the section, and there's a visual simulation of it. And then, as in all of our projects, we require them...

...to extrapolate what they've discovered, and then figure out what the net gain would be. So here's the predevelopment runoff.

Here's the existing situation, and this is after they've installed these LID principles in each area.

Thank you very much.

Our next speaker is Jim Querry, who's the GIS director for the city of Philadelphia and an adjunct faculty member in...

...landscape architecture at Philadelphia University.

He's registered, and has 25 years of experience applying GIS in design situations. So, Jim.

Thank you. So I'm here representing Philadelphia University, a small university in Philadelphia.

An enrollment of about 4,000. And quick disclosure. I'm a part-timer there, representing the university.

And the university is developing a geodesign program, a geodesign master's program.

We expect it to be kicking off about a year from now. We're not sure if it's going to be an MSLA, geodesign, or master...

...of science in geodesign. We're figuring that out with the help of an advisory board.

Let me jump right into the projects here. We...so Philadelphia University has an architecture program, landscape...

...architecture program. We have a master's degree in sustainable design, construction management, interior and...

...visualization, interior design and visualization. So all of that is in the College of Architecture in the built environment.

The university is very innovative. They pride themselves on project-based programs.

Project-based coursework and collaboration among departments, so transdisciplinary, interdisciplinary collaboration.

And they're very tied into the community, obviously. So we draw heavily from Philadelphia in the region for...

...faculty, part-time faculty who are practitioners, as well as projects and clients.
We try to keep our projects client-based, so even in the intro class...so I've been teaching for seven years, an...

...intro course, an advanced course. This is an example of something we did a few years ago in determining...

...a suitable location for a cell phone lot at Philadelphia International Airport.

So we would take the students out, we'd do a site assessment, meet with the airport, understand their program...

...requirements and then start to get into...and I'm not saying this is geodesign, I'm saying this is our foray into geodesign.

So this is how we're using GIS in design, in Philadelphia University. So, let's see if I have this correct.

Ah, okay. So one of the things we're trying to do is help students visualize the impact of what they're doing in two dimension now.

They're used to working in two dimensions. We're wanting them to be able to extend that and see what the results of their...

...designs and what they're proposing. See the results of, and the impact of their design.

So this is, as I said, an early example. This is something we just finished this semester.

This was the advanced class, and a group of students right here, there are five of them, this...the idea of this was to find suitable...

...sites for green roofs in the densest part of Philadelphia that is in the combined sewer overflow areas.

So, two-thirds of the city has combined storm and sanitary systems. So that means we're treating storm water and...

...we don't want to treat storm water if we don't have to.

So we want to find where in those densest areas we can target to build these green roofs.

So at the core of this was, I mean it was, it was a pretty standard process we went through.

And at the core of it was the model. The students developed the model. They developed a tool.

Something we're envisioning in the geodesign program is that they're not only going to, as part of that program...

...experience this kind of a process, but they're going to experience developing these tools and then sharing...

...these tools out with their colleagues, or contemporaries. So this was, just a quick example of how we're...

...again, how we're using GIS now. As far as the proposed geodesign program, we're at a
point where it is about to be submitted...

19:32 ...to the state for approval. Our target audience are recent graduates, undergraduate graduates in the allied professions.

19:42 So landscape architecture, architecture, planning, urban planning. The other...the thing that we're trying to...

19:53 ...emphasize is, in this, is that we want this to be a service-based learning experience for the students.

20:01 We want them to have real projects, real clients, and we also want it to be interdisciplinary.

20:07 So we're involving architecture. We're involving interiors. We're involving sustainable design in the core curriculum...

20:16 ...and then we're having...right now, it's envisioned that we will have two immersive studios.

20:23 And at the end of it, we're proposing that the program also incorporate a lot of innovative technology. So 3D automated...

20:41 ...content generation, data collection using lidar from various forms, whether it's spatial robotics, aerial, or mobile...

20:51 ...mapping, and that's pretty much it. We're...the program, as I said, is we're proposing to kick off about a year...

21:00 ...from now, assuming everything goes as planned, and we're looking forward to it.

21:08 Thanks, Jim.

21:09 Thank you.

21:12 Our next speaker is Janet Silbernagel, from University of Wisconsin Madison, landscape architect, works on...

21:20 ...regional conservation strategy, so Janet.

21:23 Great. Thank you. So I'm going to talk about a course in our bachelor's of science and landscape architecture...

21:32 ...program regional design course. One that I've been involved with for a number of years, which I love, and am...

21:40 ...also can be very frustrated by, and I'll tell you why. I have a couple of key goals for regional design.

21:49 This comes from some of the learning objectives. Two main words that I try to bring to this regional design studio...

22:00 ...are synthesis and spatial form, and I'll add to that, strategies, too.

22:06 But, so this is an upper-level landscape architecture studio. They're culminating, they're about to culminate their degree.
So I expect, we expect them to come into this studio and be able to synthesize all the realms of knowledge that they've gained over their coursework over the...and design studios over the past several years.

At this point they ought to be able to do that well.

Secondly, spatial form is an obvious point here, but in terms of distinguishing regional design from a more policy-oriented...regional planning, I talk to the students about that this is a form giving, it's spatially oriented.

That you learn to read, interpret, and imagine patterns for the landscape. We come from the heritage of Phil Lewis, who...envisioned patterns, big patterns across big landscapes and regions. And he did that in very visual and textural ways.

And so we want to carry that on. Regional design is really form giving.

And then third is the strategies.

It's about developing, thinking strategically about the places to build, conserve, protect, et cetera, on a regional scale.

So, back to Chengdu. An example from the studio project in 2008, I had been able to, I was coincidentally in Chengdu...

...the September after the Sichuan earthquake, and knowing that I was coming back to teach the regional design course.

So I was fortunate to have some Chinese colleagues who I was with in Chengdu, who were willing to take me up into...

...the earthquake-affected region, and then share some of the data that, mapping data that they'd been working...

...on that I could bring back to the class.

And even more fortunate that I had a teaching assistant from China who could help translate data as it came back and forth.

So an example just of one of the outputs from the course. Of course, panda habitat is an important part of...

...Chengdu is here, this is a...it's at the base of the Tibetan plateau, so this is the plains, these are the mountains...

...Wolong Nature Preserve and much of this landscape is habitat for the giant panda.

So that's an important criteria, but also rebuilding urban centers and infrastructure.

This one, this example of student work is just interesting to me in that they were beginning to
think about scenarios...

24:59 ...with different strategic goals that aren't scale dependent as these suggest, but more about a short-term focus...

25:08 ...versus a real regional long-term focus. And trying to accommodate both the conservation and infrastructural needs.

25:18 So we had work that these Chinese colleagues had done on mapping giant panda habitat and the habitat that was lost...

25:26 ...and they made use of those. They did, you know, another student group product here.

25:35 They did the combined weighted overlays of infrastructure and environment. And each of those had their various layers of...

25:45 ...environmental and infrastructure layers, so the suitable panda habitat.

25:53 And so, combining those and coming up, again, with strategic form-giving solutions is what we're trying to get at.

26:01 So, more recently, now in this past fall, I'm no longer teaching the course, so a couple of instructors, Doug Hadley...

26:10 ...and James Steiner are taking a slightly different twist. They're working more with an urban regions focus and...

26:17 ...applying the book by Richard Forman on urban regions and, but again, pushing students to look at a city...

26:28 ...of their choice, and think about all the patterns and the layers of information that goes into understanding what...

26:39 ...gives a particular region its unique characteristics.

26:43 And so this is just one page of one regional analysis for Savannah, Georgia, and how...so skipping over about five pages...

26:53 ...of more analysis, but how they arrive in some strategic solutions for that particular region.

27:02 Now I forgot to mention, that what makes this frustrating is students are so reluctant to do this.

27:10 To put...I encourage them to do really broad spatial sketching, you know, to sketch out ideas and, and spatial...

27:21 ...strategies and they're very timid about doing that. And I think, one is it's just scary to work at that scale when you...

27:29 ...haven't before, but second, they don't think that this will be helpful for their portfolio.

27:35 So, of course, I know that it will be, but it's hard to convince them of that. So this is one of our biggest challenges.
Here's another example from this past year for Salt Lake. So again, layers of information that synthesizing is coming together.

The strategizing is coming together. What we are not getting to, in terms of geodesign, is the evaluation.

I think they're getting to a design endpoint, like a designer looking for the evaluation as a critique from the... professor and then something that they can put in the portfolio. So that's our sticking point right now.

Thank you, Janet.

Our next speaker is David Pitt, a professor in department of landscape architecture at the University of Minnesota...

...coeditor of Landscape Journal. He's developed a GIS-based landscape assessment process for local governments, so, David.

Thank you, John. I want to talk rather than about specific projects, I want to talk about a conceptual way of thinking...

...about geodesign that several of us at the University of Minnesota and elsewhere, Michigan State and University...

...of British Columbia, are using. And the only thing I want to talk about with this slide is, is that among the three...

...universities in two countries, they're, in addition to landscape architecture, urban planning, agroecology...

...hydrology, geography, ecological modeling, and social psychology.

So we really are trying to integrate multiple ways of knowing and multiple understandings of landscape process.

The major components of the process with which we are working essentially are three.

First is the notion of spatial information. Multiple information sets pertaining to a design scenario development and evaluation...

...focusing on participant perspectives, but also on landscape pattern and process, and particularly on performance of...

...landscape. Both landscape prior to whatever intervention happens, as well as a landscape that happens after intervention.

Secondly is the notion of communicating this information. Communication of scenario information among participants.

And thirdly is use of iterative and transdisciplinary action processes among multiple stakeholders in terms of...
how they actually use this information. And then there are several feedback loops that we're working with, that wind up...

producing sort of a cyclical process of information, communication, and decision-making process in the social...

...construction and evaluation of design outcomes.

From a standpoint of transdisciplinary action processes, the way I like to define transdisciplinary is Dan Stokols'

...perspective that basically talks about the interaction of multiple disciplines, the interaction of experts and...

...lay audiences with a common commitment to the construction and evaluation of new information, and...

...in this case, alternative future visions.

That process is facilitated toward tolerance and integration and multiple world views.

A consensus-based approach for handling the conflicts between those world views leads to a sense of social learning, shared...

...understandings, which then produces a collaborative decision-making processes toward design outcomes.

Multiple information sets that we're talking about have to do with a stakeholder experiential perspectives with a...

...systemic integrative and spatial temporal understandings of landscape performance having to do with such...

...things as water quality, biodiversity, auto emissions, affordable housing. Of course, we use the A word there.

And then, as I said earlier, a series of feedback loops that allow the initial design outcome to be evaluated, to be cycled back...

...through communication representation and back into a design process.

And then this information being communicated in terms that are salient, credible, legitimate and...

...understandable to the stakeholders, and are communicated through multiple modes of representation and visualization...

...that have been far better illustrated than I can talk about today.

So the overall model of this notion of social construction of policy for integrative landscape planning involves...

...spatial modeling of integrative and systemic understandings, visualization and representation of that information...
32:40...pertaining to landscape performance and experience and then the construction of and evaluation through...

32:48...communicative action and social learning among multiple stakeholder groups of design strategies which then are...

32:57...fed back into spatial modeling, fed back through the communication and process. And so, it's kind of an iterative process.

33:08 The...why transdisciplinary geodesign? Number of reasons. The landscape metrics derived from comprehensive...

33:17...the information leads to adaptively develop performance-based scenarios.

33:24 The communication process leads to more stable decisions that are more likely to be owned.

33:31 Results in better informed design decision making that is more stable over time.

33:36 So we get more sustainable landscapes with greater longevity.

33:41 I have a series of slides here that I'm not really going to show because they simply illustrate how we are operationalizing...

33:49...this process with interaction among our different stakeholder groups. The process of individual iteration analysis...

34:00...communication, action, reflection leading back to analysis communication. 

34:07 And then multiple iterations across time leading eventually then, to the production of a design outcome...

34:17...and a whole series of acyclical processes going on. Skip over that and thank you very much.

34:26 Thank you.

34:30 Our next speaker is Tom Paradis, who's the chair of the Department of Geography, Planning and Recreation...

34:35...at Northern Arizona University. And they are just about to start a new bachelor's degree in geographical science...

34:41...and community planning. So, Tom, you're up.

34:48 Alright. Okay, everyone. What I'd like to do today is share with you an overview, kind of what you might call...

34:58...the view from 30,000 feet. A new curriculum for a bachelor's of science degree at NAU in Flagstaff.

35:05 And this, just by way of a general introduction, was a process that, as Dave DiBiase reminded us yesterday, can...

35:16...probably take 18 months to two years, something like that, to complete, if not more.
And so, we went through that process of a pretty extensive curriculum mapping approach to curriculum design.

And I'm going to show you briefly what came out of that today, and the degree that we actually launched this last fall.

And if you want more details about the actual courses and the sequence of the program and so forth, Shannon...

...was nice enough to allow me to put these things out on the table where the other books are outside so you can...

...grab one of those on your way out if you choose.

And this actually, I was interested in sharing. We call these rack cards at NAU because, I guess they fit in a rack, and...

...we hand these out to students for all the disciplines, all the majors, as appropriate, to share with...

...students what some of the degree programs are. And so I thought this was kind of a neat way.

And we designed our own, of course. We are now in the promotional phase of this new major.

So I think I'll leave it to you to decide, you know, in what ways is this a geodesign program.

In what ways, and I'll show you some ways in which we are moving forward with some ideas for implementation...

...of geodesign. We've got a few things though, that we think we're doing constitute a geodesign approach.

So, again, the view from 30,000 feet basically without all the coursework to go through in five minutes here.

We're looking at a degree that's 43 to 44 credit hours and we called it geographic science and community planning.

I think this is one of the longest-named majors on campus, and this was an issue for us in terms of compromise...

...but we were concerned about calling it geodesign as of last year, since we still felt, as a faculty, that it was...

...still a relatively new concept and would students really understand this?

At least then we have a shot at them understanding geography and planning.

So once they're into this program, we start introducing geodesign concepts with them.

So some of the highlights here. It is an experiential learning approach.

We have six credits now devoted to experiential learning, getting them outside of the
And this includes possible internships, especially for those going into planning, as well as potential study... abroad and things like that. The senior capstone is a university requirement, which I'm a big fan of, and we... have two capstone courses. One of which you'll see very briefly in a moment.

Writing across the curriculum.

We're making sure that our students, in the best way we can, can write within the disciplines, both... geography and planning. Can move back and forth within that.

And so, every semester, well, I should say every year at least, they have a writing requirement, including...

...a junior-level writing requirement in the major.

The introductory courses, we actually revised a few courses based on the learning outcomes we were interested...

...in having the students learn from the beginning. And those are the three introductory courses which the majors...

...take, and they're all also liberal studies courses in our general education program.

So that is often how they discover our majors. And two optional emphases. We have 18 credits each.

If for those students wanting to get careers in the geospatial sciences, or as a community planner, or community...

development person, they can take those emphases and still retain those career paths through this degree.

So kind of a breadth to a depth scenario. And then this is a scaffolded curriculum design.

And, you know, not much time to talk about that today, but the idea is that the students are looking at skills development...

...throughout the sequence, throughout the courses, so that each course is not an individual silo.

The faculty are talking to each other as much as we can so that we know what's happening in each course moving...

...along so that hopefully the students, we will be able to depend on skills coming into one class from another by...

...the time they reach the capstone. So, I mean that's the ideal situation. Talk to me more
about reality sometimes.

39:28 So, the fundamentals of geodesign. Why we think we're headed towards this geodesign approach.

39:35 And again, we have some specific areas we'd like to improve on as some of the other presenters mentioned, as well.

39:41 But we see this as an interdisciplinary degree. We already have the geographers, the planners, the GIS folks...

39:47 ...within our department and we're taking advantage of that. So that is one of the strongest aspects of this.

39:56 That we all talk to each other. We actually like being around each other and we created this combined degree to do all of this.

40:05 To allow students to experience what is happening now with GIS and geography and then helping to design the future.

40:12 That's kind of the idea. Local and global sustainability. This is one of the general themes of the major, whether they...

40:18 ...go into geography or planning, or combinations of that, and GIS and emerging technologies.

40:24 This is a strong suit in the department. This is not one of my strong suits. I'm just helping lead the effort on this.

40:30 We have several very competent professors in GIS-type technologies and so we think we can really build that in...

40:42 ...to make an effective curriculum. The capstone project in about 30 seconds' worth.

40:48 Professor Dawn Hawley teaches this, and the last time she taught it was this past semester and this is the type of thing...

40:57 ...right now that incorporates GIS, Google Earth, Google SketchUp, those sorts of tools, and we only discovered...

41:05 ...Google SketchUp a few years ago.

41:07 And she is really adamant in combining more of the GIS and Google SketchUp, pulling it in and out of those...

41:13 ...mediums like you've seen here at the summit. And so, we're moving towards that direction.

41:18 But this is an actual site plan which the students conducted a 3D image of a, of the sites along US Route 66 in Flagstaff.

41:28 And so they're working with a city project. The city actually gave them this design.

41:32 They're working with the faculty and the students, and the students actually presented this.

41:38 It actually has a small book that comes with it that the students created.
So this is just a snapshot, but they actually were required to present this to the city and obtain ideas and feedback from them.

So this is something that happens every year in one of the two capstones.

Well, on the academic side, I couldn't resist this, and I take a full confession for this one. I wanted to see how Carl's geodesign framework fit into our major that we were designing. And so myself and another faculty member, we sat down and thought, well, where do our courses fit?

And this is an actual interesting way that I thought to map out our courses onto the geodesign framework to see where these things fit. And I think an important lesson here is, you know, this is just an academic exercise at this point.

Important lesson is that not all courses need to be teaching everything in geodesign. You can have courses out here on the periphery as long as they're pointing to other things and helping train the...

...students in different areas, you can come back to that.

And geodesign is more of a synthesis, as we saw in one of our last presentations. So it was an interesting exercise that some of you may want to go through sometime. And some quick takeaway tips. My big suggestion is kind of like what we looked at.

What are you already doing? What do you have in place? What faculty do you have who are working together well?

What kind of contacts do you have around the university to turn into opportunity?

So turning adversity into opportunity. This started as a mandate for us to actually combine programs. We lost faculty members due to budget cuts, retirements, and so forth. It was like we were doing too much.

How do you combine things? So we turned that into this opportunity. Patience is a virtue.

This takes a long time, and you're not going to do all of the geodesign things you want to do overnight, in the...

...next half year, in the next two years. And then finally, applied learning is vital.

We've seen all of these examples today of applied activities--what some call learner-centered education, outcomes-based...

...approaches and all of that jargon from higher education.
But it's vital to have our students learn deeply as they move through the curriculum. And I think that's it.

Here's some further information if you want it.

Okay.

Our final speaker is Boykin Witherspoon, who's the geospatial research manager at the Water Resources Institute...

...at Cal State San Bernardino. He's also taught at Washington, Oklahoma, Cal Poly and worked for a while at Esri. So, Boykin.

Oh, thanks. This is the question that Tom asked us to address, and so I'm going to focus on one of the challenges.

I also want to let you know that what I'm going to talk about is specific to landscape architecture and teaching...

...in landscape architecture.

And I realize there's a lot of other disciplines here, but I'm talking specifically about teaching landscape architecture.

So when I got that question from Tom, I started thinking, you know, what do I need to answer that question?

And one of the things I thought I needed was, well what did we used to do to help define what are the new challenges?

In 1987 at LSU, go Tigers, it's a good year to be a fan, Jon Emerson and Wayne Womack taught what they...

...called the landscape design method.

Now they did not invent this, but that's what they taught. And it was, you did inventory, analysis, concept, and design.

And this was linear. The idea was, if you knew those first three, then you just make decisions.

And it seemed to work pretty well. If I tried to iterate, Jon would come around with a ruler and rap me and...

...say I have analysis paralysis. So it seemed to work pretty well, but what was really interesting that I learned from...

...them also, was that the formation and use of a concept is critical in differentiating the profession of landscape...

...architecture from the other development professions.

The fact that we design with a concept is one of the things that sets us apart. It's what makes us special.
Which translated means, this is why people will pay you. This is what's unique about your profession.

And then also, the profession of landscape architecture outside of academics has built a 100-year-plus business model...

...and billing structure to their paying clients based on a method like this.

And I talked about that at the Esri User Conference, but that's another challenge that we face, is congruency with that.

So, what's different? In the geodesign method, one of the big differences is the inventory has gotten really, really big.

The inventory that I was taught, you walked out on the site with a piece of paper and you sketched the site and you used...

...your newly found plant ID knowledge and you drew an arc of where the sun supposedly went, and that was inventory.

So the inventory is much, much bigger now, and that's very, very different. Especially when you think about the...

...billing structure to clients. But then the other real big difference here is the design analysis has been combined...

...and is simultaneous that you get feedback as you're designing. You don't have to finish the design.

So those are very, very different. So, and that's where I began to realize the challenges.

So I have not seen the word concept used in geodesign yet. Now I did hear Bill Miller mention the word ethic as...

...something that's potentially missing. I actually believe the concept in our traditional design method is equivalent...

...to the ethic, and I do believe it's missing from geodesign.

So when we tack the word design onto the word geo and say we're going to teach it to landscape architects, shouldn't...

...we be teaching something different than a civil engineer? You know, eventually we can collaborate, but there's...

...something that makes landscape architecture unique, or why will people come pay for our degree, or pay for our services?

And so it's what makes us necessary. It's what's always made us necessary, is our solutions incorporate concepts.

Now this is my opinion, and I do have a degree in fine art, so I do consider myself an artist also, but it's the difference...
...between optimizing solutions based on a rule set, or being an artist.

And again, that's what makes landscape architecture unique.

So, I had to have a graphic. From the perspective of a landscape architecture, and this is how I explain the missing ethic, or...

concept, is what if design is a car, and you lift up the hood and it's not a Hemi driving that, it's a concept.

And so now we've tacked the word geo onto design and we've got a bigger car, which is probably good, but the...

...engine seems to have fallen out a ways back, and we're moving forward with nothing under the hood.

No ethic, no concept. And nothing under the hood, again in my opinion, means we're just optimizing solutions, we're not...

designing in the landscape architecture sense, anything.

So ignore the top part, I'll come back to that in a second. But in my opinion, what geodesign is really doing is...

...offering designers the prospect of avoidance. Avoidance of anything not good.

And one of the difference is, it does it real time as you're drawing. So that's what I think it does.

So could geodesign promote the avoidance of that which is not good by using a traditional design concept...

to gauge what is good and not good? Can we put that ethic, that concept, into the analysis engine?

And that's what I'm trying to show at the top. That's what I'm working on right now, is how do you shoehorn that concept...

...back into all that scientific analysis and feedback, because the science and all of that tells you good or bad, but it...

...does not tell you the whole story of good or bad based on what my profession believes.

So I think our challenge, this is our challenge, and the challenge is nothing less to stay relevant as a profession as this...

...technology changes. And what, again, what we're working on is, can we make the simultaneous analysis in geodesign...

...be driven in at least part, by a concept. Thank you very much.

Good. I think we'll have our speakers come up and have a brief conversation. And let's see, I think...is John Wilson still in...
...the audience? He wanted to join us too. If you want to join...they...USC, as you know from booths outside, has a...

...new program, and I think that maybe my first question to all of you is, what do you consider to be, and come on...

down John, what do you consider to be sort of the core skills of geodesign that sets it apart from the other disciplines that...

...you know, we have traditionally thought of at landscape architecture, geography, what have you?

Now Boykin, you just made the argument that it's missing something, but what do you think are...

what would be, what would you would define as the core set of skills? Anyone want to jump in?

Yes, go ahead, Karen.

Well, I think the core set of skills is based on what your original discipline is, because I don't think geodesign is limited...

to designers. You know, as we have seen, design is getting more and more interdisciplinary.

And so the core set is whatever set of skills you need for your home discipline, and then in addition, the geospatial skills.

And the, you know, we're doing more and more dashboards. We need to understand the logic and a bit of the math...

...that goes with that.

So you would argue that essentially it's a part of existing disciplines with a set of, sort of additional skills built into that.

Right.

Does everyone agree? Others? Janet?

Well, I thought what Boykin was hitting on with concept kind of paralleled what I was trying to say with spatial form.

Is that it gives, you know, it's that artistic touch, in a way, that is spatial, and that doesn't have to be unique to landscape architecture.

I think any of the disciplines involved in geodesign project could develop that kind of concept, form-giving concept.

I guess I would add also, that in the end, I don't think we can forget about the fact that people are experiencing the places...

...that we're making. Whether they're large regional landscapes, or whether they're sites, or whether they're communities...
...you know, these places are being experienced, and I think there perhaps is a tendency in some contexts, to lose sight of that.

And to just, you know, put boxes out there and put palms out there, and that's design.

Yeah, right. Tom.

I could add onto that too, the idea of...is my mike on?

Not yet.

Okay.

Now it is.

There it is.

There you go. You're on.

Thanks. I'd add on to that concept also, that students really need to stay in touch or get in touch with the local community...

...as you said, with any design project, or even research project that they're doing.

If it's a combination of research and design, either throughout a curriculum, or in a course, they need to connect...

...with, as Carl calls it, The people and the place.

And that is something that we really can't lose sight of as a skill, is that public participation side of it.

Yeah...yup. You know, the three of you in the center are developing new programs, right? New either in...

...currently, or about to, right? Philadelphia, USC, and Northern Arizona.

What have been some of the challenges that you've encountered in getting acceptance of geodesign and...

...getting these programs under way that we could all learn from? Any one of the three of you? John, maybe since you're new...

...and we haven't had a chance to speak yet, I'll call on you.

Can everybody hear me, since I'm not miked.

Oh, okay. I'm a soccer coach, so my voice can go a long way.

Okay.

I think you have to understand your audience and talk to the audience, so the answer to the previous question would...
...have varied depending on who I was talking to. So if architects and landscape architects...

Should I...There we go. Thanks, Shannon. Good idea.

Start over.

...geodesign brings...

Thanks.

...more data, perhaps more science, to the design enterprise. For planners it offers a vehicle to plan from the...

...bottom up, rather from the top down. And for geographers and others that are heavily vested in GIS, it turns...

...your attention from thinking about the past and how we got to the present, to what the future might be.

And for me, if that's not enough all by itself, the next thing is, well, the status quo. If we just do business as we've...

...done for the past hundred years, do you think the planet will be in good shape in another century? And the answer's no.

So maybe we should change it up. So that's enough.

Okay, good. Jim or Tom, any thoughts about it?

I think there's a lot of competition right now and...within the university for programs and for you to step up to the challenge of...

...explaining, of proving, why yours is interesting, why yours is valuable to the university, and more so to students and practitioners.

I think that's a tough thing to sell. And it takes a lot of work. And on the logistics side, just finding space, finding the...

...right kind of environment within the university to bring all of these disciplines together and have them...

...interact in a way that is going to meet your goal.

Yeah. Tom, and then Karen.

I think one thing, real quick. I think my mike went off.

Hello.

There you go.

Yeah, you're on.

Okay. One of the challenges I foresee immediately in our new program is to actually
encourage the students who...

56:09 ...traditionally want to study planning and those who want to study geography, or GIS, to talk to each other.

56:14 And that is the idea of combining some of these courses and materials, so the planners are learning how to do research...

56:20 ...and where research and knowledge comes from, and the geographers are learning the skills of design and planning...

56:25 ...and community participation, which geographers like me were never a part of before.

56:30 So it's the student mix which I think we're going to...and I think it's definitely surmountable, but as a faculty we need to make...

56:38 ...it clear to students why they're doing what they're doing.

56:41 Yes, Karen, did you want to...

56:42 A group of us who are the geodesign consortium put together a survey, and we sent it out to 178 programs of landscape...

56:52 ...architecture and planning, and the responses that we've received, one of the questions is, What do you see...

56:59 ...as the biggest challenge? And the number one challenge that we've been...we've gotten back through our feedback is...

57:08 ...a lack of understanding of the potential for geodesign among universities, among departments, and among administrators.

57:19 Yes, Boykin.

57:20 Another part of that survey exposed that there is a general consensus that the need and demand across all departments for...

57:29 ...GIS and geodesign will increase.

57:32 Right. So, on that, part of this session is really about where geodesign is going. So what do you see in five years...

57:40 ...ten years from now, and what do we need to do differently in order to get there? Any thoughts about the future?

57:51 I'll jump in...

57:52 Okay.

57:53 ...and say that I think a lot of it is going to depend on how quickly some of the more innovative tools evolve.

58:02 And, I mean, a lot of the things that we're challenged with right now are, as I said earlier, helping students see the...
...impact of their decisions, their designs. And so, if you take something as simple as a grading plan, how do you...

...see what that looks like, or, you know, it's a bit of a disappointment that we're not able to do that right now.

I mean, we're not able to...we don't have something that is CityEngine-like that responds to those kinds of engineering rules...

...and when you move something you know the impact of moving it immediately, and it's based on all of those principles...

...of safety and things that you have to do, but as a designer, you really don't want to be worrying about.

Right.

So things evolving, like CityEngine and other tools that are going to make it easier and sort of embed a lot of that...

...stuff that we don't want to have to worry about. Let us worry about the design.

Yup, good. Yes, Karen?

In practice we see a lot more integration and, in fact, in the design disciplines we see integrated practice.

And I think that one of the things that has to happen and one of the things that will happen is that the silos...

...will start to break apart in universities. And once that happens, then, you know, the door will be open for geodesign...

...across the university.

Right. David?

Sort of a subtext that I sort of picked up from the presentations at the meetings last two days, on the one...

...hand, there's all this gee-whiz magical mystery tour stuff, you know, that's really, really cool, you know, and it...

...does all these really, really great things, and on the other hand, there's people that actually have to make decisions.

And, you know, whether you're talking about a cyclical process of making decisions, or a linear process of making...

...decisions, somebody eventually has to make decisions. And I guess where I would hope that geodesign is going is...

...that the magical mystery tour will become even more accessible to the people that actually have to make the decisions...
…and that there will be capacity for those decisions to be evaluated, reevaluated in a very cyclical process.

Yeah, great, Janet?

I’m going to follow up on Karen’s.

Okay.

I think geodesign could be itself a silo breaker, or, you know, facilitate that and I’m thinking now a lot about…

…the GIS course I have coming up, which is interdisciplinary, cross departments.

And really thinking about bringing geodesign concepts into that as a way of facilitating conversation and ideas...

…among students from different programs.

And the other thing that...along with that, that I think we need to be thinking about for moving it forward is really...

…moving now to encouraging use of the web-based GIS to facilitate collaborative geodesign and collaborative GIS.

Good. Is there a question from the audience?

Yes, David?

[Inaudible question from the audience.]

...to assure the mobility of students and faculty and ideas within that region, who is going assure that critical...

...intellectual habitat is preserved? Who's going to assure that a waste treatment facility is appropriately sited so that...

...bad ideas can be discarded with minimum impact on the rest of the region? In short, my question is, is the design of...

...the geodesign education enterprise going to happen by design, or by happenstance?

Good question. Who...David?

I just want to say that...Janet mentioned silo breaking and geodesign as being silo breaking, and I know that at Minnesota, we...

...had a bit of a silo-breaking experience. The university decided to create something called Institute on Environment.

And Institute on Environment was a multidisciplinary set of folks that got together and are gradually becoming at least...

...interdisciplinary, and I truly believe that...I think geodesign is really a transdisciplinary
perspective of integrating the…

1:03:35 ...capacity to think spatially with the capacity to collaborate and make collaborative decisions with the ability to...

1:03:47 ...communicate...

1:03:48 Right.

1:03:49 ...and represent.

1:03:50 And sort of following your question, David. You're...seem to me you're suggesting that we do that across institutions...

1:03:54 ...not just across disciplines, right? Thinking regionally. Others want to take on that? Tom, and then Karen.

1:04:02 I think right now, one of the biggest challenges and opportunities is the cross-disciplinary aspect because of the silos that...

1:04:07 ...most of us are in. And so, when you're looking at regional scales, or, you know, between the local and regional, and...

1:04:16 ...even larger than that, perhaps, you might find opportunities to pull in other disciplines.

1:04:23 And I think it's probably a mistake to...I'm not sure anyone's thinking about this, but to say, Well, which scale fits best...

1:04:31 ...into a geodesign framework. We've seen examples at this summit and last year's summit alone where you're...

1:04:37 ...taking geodesign at the building and floor level, and then you're extrapolating out to entire regions, watersheds...

1:04:44 ...and cities and metropolitan areas. So with the scales alone, you're dealing with a lot of different disciplines...

1:04:51 Right.

1:04:52 ...from the architecture and construction management areas, at the other end of the continuum, to your regional...

1:04:56 ...planning, you know, disciplines for design, and everything in the middle.

1:05:01 Yeah, great. Yeah, Karen?

1:05:03 I think with the budget situations that many universities are facing, there are some really crazy things going on right now...

1:05:10 ...and there are some decisions being made. Some of them are thoughtful and some are not thoughtful.

1:05:17 And in order to make this not an accidental progress, I think things like Bill Miller’s white paper are very important, you...
...know, if we had a white paper about the curriculum for geodesign that, you know, people who are forming...

...new programs could refer to and share with their administrators, you know, it may not be so haphazard.

Good. Another question. There's two of you right next to each other.

Is this on?

Yes, go ahead.

Do I need to stand up?

Ah...

Okay. I come from the professional side of things, so I'm not an educator by any means, but I have done a lot of...

...education, and two...this is a two-part question. So the first is, when professionals ask you, you know, there's a certain...

...level of competency that we need to achieve in landscape architecture, and civil engineering, and GIS...

...we haven't even regionally, or you know, US-wide achieved a certain level of competency requirement...

...for landscape architecture. And GIS, GIS professionals are still in the process of developing their registration...

...requirements and licensing. When you create a geodesign professional, what are you creating that in a professional...

...world, makes you that expert? It's sort of...I totally understand the value and the technology, and I love the...

...concept, I'm just trying to understand...

What's the expertise?

...registration-wise professionally, where is that job? Where is that definition in the goal to get one at the end of your education?

John?

There's two answers. So one would be to ask whether we need more specialists. Perhaps we need more generalists.

So that would turn the argument on its head. The second is, you know, I'm actually developing...I'm the lead person...

...trying to develop a program that would create a bachelor's degree.
And so, there are lots of people here that think the appropriate level is the master's.

And so, one of the reasons we're focused on the bachelor's degree, is that we already have existing master's degrees...

...in landscape architecture, and geographic information science, and planning, and what we think we could do is...

...to have a progressive degree where you get a bachelor's and a master's in five years that are those combinations, or...

...some other combination, like environmental science.

And if you did the kinds of geodesign interdisciplinary bridge-building things as an undergraduate, then they...

...would be a framework that you could build on with the things that you found most interesting.

And I have the expectation that those people will go out maybe within the existing sort of licensing and certification...

...structures, and the real test is whether they emerge as leaders. You know, and maybe not in 5 years, but in...

...17 years, if you have another meeting like this, would I have a bunch of graduates standing down...

...here with best examples, best case studies, best new tools? To me, that would be the judgment about whether...

...I was successful, or not.

Anyone else? David?

I was just going to say that I think perhaps a way to think about that, and it's a very valid issue, but perhaps the...

...way to think about that is that geodesign becomes a certification, as opposed to a licensure, and it becomes...

...a certification that multiple licensures can address. And in that context, then, it sort of forces some commonality...

...in some kind of a certificate curriculum, but it allows it to be applied to architecture. It allows it to be applied to GIS.

It allows it to be applied to geography. It allows it to be applied to planning, to landscape architecture...

...as a sort of a post-professional certification process.

Let's see, Boykin?
I think you asked your question wrong. I think the question is, who will pay for that service?

And I think that's what we need to define is, we need to begin to look at our existing billing structures, who are...

...our current clients, what's going to have to change in their expectations of the services that we provide?

And so, I think that's one of the other challenges that I alluded to, is in our professional business models...

...we need to make sure that we're not doing something that no one wants to pay for.

Bill, maybe our last question. Is that okay? Good. You get the last word.

Last question.

Do you want to stand up?

Oh sure.

There you go.

Okay.

Am I on?

Okay, good. What if I said that geodesign, with respect to your professions, was not a certification program or degree...

...program, but it was like iteration. Design is an iterative process. What if I said geodesign was similar to iteration...

...in the sense that it's part of the process of designing, not a particular degree program, or a certification program, how...

...would you answer that?

Yeah, Tom.

I think a short answer to start, from my perspective is, Bill you're right on the money there.

That education is an iterative process, and I realize this is jargon in higher education at this point, but what we're looking...

...at in higher ed is the idea of preparing students to learn beyond our formal curricula.

Students have been shown to actually learn best outside the formal curricula, which leads to the experiential learning and...

...all of that. So the idea is that learning is an iterative process. So is this. Do our students need to learn a specific set of...

...skills, I mean skills in terms of GIS software, and so forth. Specific software packages.
Maybe they can learn one or two and learn to think with those, because it's the thinking process, I think, is most significant.

Having the students be able to get through that process of education, and then continue their own education beyond that...

...because that's what going to happen. You know, we call it lifelong learning.

But no longer are we expecting students to actually learn all of the content, all of the material that we think they should learn...

...in four years, or in a master's, or PhD program. It's going to go beyond that.

Yeah. Go ahead, Jim.

I think that there's an opportunity for geodesign to be a specialty in education, but maybe not in a profession.

And so, I think there's a real need now to move ahead in...I mean, technology is moving so quickly and to try to keep...

...up with that and build that. I don't know that it's reasonable to build all of that into an undergraduate program, but...

...maybe a graduate program. And that the professions need to drive that. They need to drive that need, but I don't see it...

...being necessarily a specialization, even in the professional world. But in education, I think there's a great opportunity for it.

Good. Any final? Well, thank you all. You did a great job. Thanks. Join me in thanking our panelists, and good questions too. Thank you.