1. SEMI-STRUCTURED INTERVIEW GUIDELINES

1.1. Aim

Understand how tangible interfaces for geospatial modeling change how users model.

1.2. Interview goals

— Map participants' analog, hand modeling processes
— Map participants' digital modeling processes
— Map participants' augmented modeling processes
— Map participants' tangible modeling processes with the difference analytic
— Map participants' tangible modeling processes with the water flow analytic

1.3. *Topic:* Modeling process

— Please describe your modeling process with each technology
— Did you work additively or subtractively? A mix?
— Did you work in a linear or iterative, exploratory process?
— How did this technology aid you? What did it let you to do?
— Did this technology constrain you in any way?

1.4. *Topic:* Intuition

— How intuitive was it?
— Could you model what you intended?
— Did you have to think about how to modeling? Or could you just act?

1.5. *Topic:* Metacognition

— We asked you to sculpt a model of the study landscape. Please describe your thought process while sculpting.
— Did you strategize about how to model? If so what was your modeling strategy?
— Did your modeling strategy evolve as you worked?

1.6. Topic: perception and experience

— How did it feel to sculpt a 3D model with this technology?
— Was it stressful? Was it fun?
— Did the technology change how you perceived distance, depth, form, or volume?

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2. INTERVIEW NOTES

2.1. Interview I

Digital modeling. Understanding how Rhino works – i.e. the underlying mathematical representation, NURBS – is very important. Once you understand that is a tension field then you understand how to shape it, how to make it do what you want.

Tangible modeling. We all already understand how sand works. We understand sand, but not necessarily these analytics – the difference analytic or the water flow simulation.

2.2. Interview II

Digital modeling. Working in Vue is like modeling in wax. Working with multiple tools in Vue gave me more control, more options than Rhino's gumball did. It is easier than Rhino. Even though it is easy it is still very important to learn the tools. I was exploring what the tools could do.

Analog, hand modeling. I worked additively, then subtractively, smoothing. The sculpting tool gave sharpness – the sharp edge let me smooth in a way my fingers couldn't. It felt like drawing or laying concrete. Feeling is important – I could feel subtle changes in topography.

Projection augmented modeling. I worked additively. I sculpted with my fingers rather than the wooden modeling tool. The projection helped to orient me by defining features like the shoreline.

Tangible modeling. The water flow analytic reminds of me of playing in creeks and grading streams as a kid.

2.3. Interview III

Digital modeling. Digital modeling has a long learning curve. It was not intuitive. I was quite anxious. The interaction was quite abstract, quite indirect – I was moving points to change the surface. Working with the surface was like draping a fabric.

Analog, hand modeling. My sense of touch took away the mystery of topography. I could sculpt like reading braille. I could feel the shape with my fingers. It was intuitive and calming.

Projection augmented modeling. With the projected maps draped over the sand there were layers of systems, strata overlaid.

Tangible modeling. The difference analytic was the best. I tried to make it match. I was constantly rebuilding to make it match. The water flow analytic was useful for thinking about form, about what form does – why water flows where it does. Seeing the flow takes away the mystery of topography. Our students tend to have a linear design process. Because Tangible Landscape gives immediate results it encourages an iterative process.

2.4. Interview IV

Digital modeling. My strategy was to model the outside borders first. Then the interior.

Analog, hand modeling. I have done lots of sculpture so I knew how to feel the shape of the model. And the desk lamp cast shadows so I could visually perceive depth.

Projection augmented modeling. The contours were just a guide. My general strategy was additive. I felt with my hands to try to match the contours. If I saw concavity in the contours then I felt the sand and sculpted that concavity. Finding the relative height, however, was challenging – it was subtle. Most people don't understand contours. They have to be taught.

2.5. Interview IV

Tangible modeling. Tangible Landscape let me tinker. I could rapidly create, making new iterations. I could try something, see and feel it – directly experience it – and try again. Reinvent it. Tinkering like this is a learning process. Learning through doing. Tangible Landscape lowers the stakes so that you're not too invested. You're ready to fail. So you can intuitively explore, while reflecting on what you've done, what you're doing.