# A Simulation/Reenactment Production Diagram
(or at least our first draft of one…)

In the week spanning April and May of 2004 Sara Diamond directed a summit meeting at the Banff New Media Institute entitled "Simulation and Other Re-enactments: Modeling the Unseen." The final days found us all with minds on fire, fueled by the rich variety and profound depth of most of the presentations. We relished the chance to burn some of our impressions and findings more deeply into our memories, and ad-hoc workshop groups were assembled to allow us to do so. I suggested trying to spatialize the process since that's my strength, weakness, and crutch in trying to understand such multifaceted systems, and several brilliant people followed me into the perfect atmosphere of the Canadian Rockies. It was a mixed caravan of chairs, whiteboard, notepads, and the tightly clutched markers we hoped would help us organize and fix our scattered thoughts for ourselves and posterity. And you, gentle reader.

We got as far as the Kiln, a sandwich shop and general store a good thirty meters from the door of the studio where we heard one anothers' presentations. I was secretary to the group, and this photo records our common understanding of the Simulation/Reenactment process, though if it is overly formulaic and lacks details you can blame my writing speed (we had but two hours) and love of practical abstraction. We had goals: capture the essence of how a simulation or reenactment is created, make it understandable, leave out no important step or reference, make it a guide that could be used for others about to embark on such a project. Here's a description of our thirty-meter start on what's likely a thirty-kilometer journey. Be kind as you read it—or better: criticize, enhance, and modify it so it can blaze a trail (how's that for tying my mixed metaphors?) for the scientists, artists, engineers, and designers who may follow us.
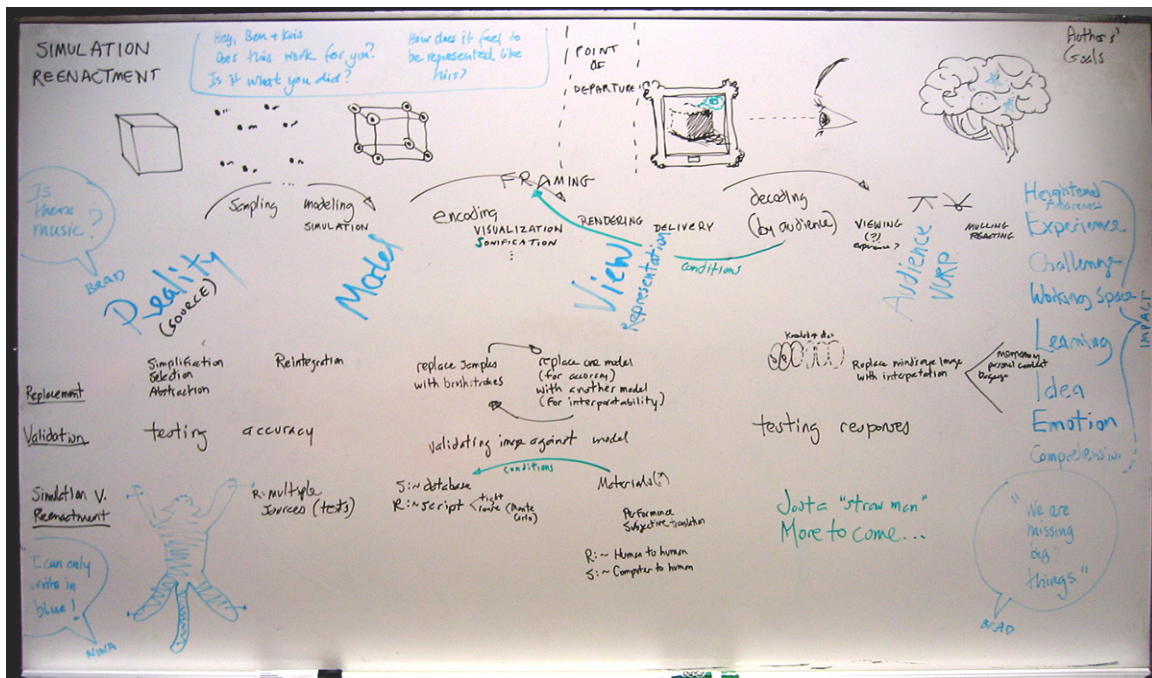

There are three main horizontal stripes to the diagram: images across the top, big blue words and arrows across the middle, and smaller words in a three-tier grid across the bottom. They're also aligned vertically in space to suggest correspondences in stages of the process. I'll start in the middle stripe, since it's perhaps the most concrete and basic; it names the classes of entities involved in the process.

What's a simulation or reenactment? It's a copy of the world. (Yes, we're taking a positivist stance to start with, but we try to cloud it with enough interpretative variability later that you can lose the capital-R "Reality" on the left side of the flow if your religion calls for it.) So what are we doing with that Reality? Just above the big-blue-word entity categories in the middle stripe hover some process words, mostly ending with "ing" and arced overhead with arrows. Gotta have arrows in any conceptual flow diagram. Here they try to expose and label the transformative processes that generate something in the adjacent category.

Thus (reading backwards) to create a Model one has to do *modeling* (a less than useful observation…), after one has done *sampling* of Reality. Our tautological use of the word *modeling* as the process needed to create a Model may have reflected my spare vocabulary, but it did provoke us to specify examples of our lofty transformative process names, and they mostly live just under those names, drawn in all capital letters. One sort of *modeling* is SIMULATION.
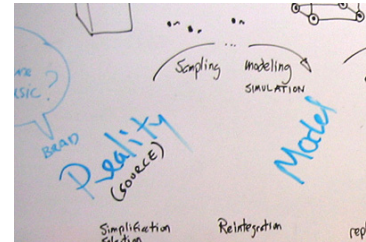
One sort of *sampling* is SENSOR-BASED DIGITIZATION, but we didn't think of it at the time. Likewise Reality is perhaps inaccurately subtitled "source" since each step along the way provides a new opportunity to inject meaning, and all the meaning embodied in the project—injected at whatever step it was—might have come from something rightfully called source material. We expected and allowed many such inaccuracies, as helpfully recorded by Nina, a welcomed subversive element from another workshop group addressing and intent upon Disruption. I mentioned "we are missing big things" and that aside was immediately made part of our presentation at the lower left corner of the board. She kindly kept her "disruptive" notes productive, in the margins, and blue—keeping at least the sense of a larger frame of reference firmly in our view as we tried to approximate the universe of simulation/reenactment process. (But is an embraced disruption truly a disruption or just a subtler tool of manipulation? Hmmm…)
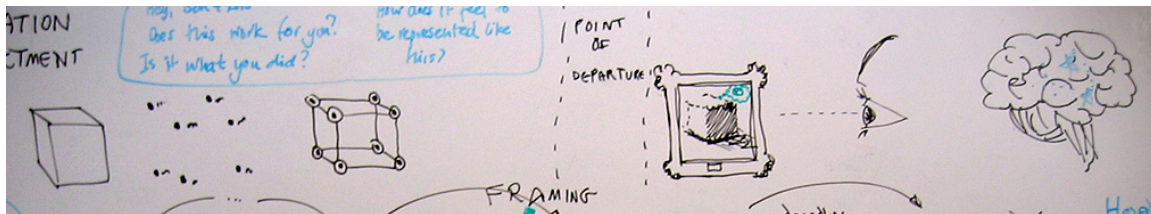
Back to our core story. We need a picture before we can frame it. A good story perhaps even *needs* pictures, according to some ("And what is the use of a book, thought Alice, without pictures or conversation?") so I scribbled some iconographic visual landmarks across the top. Reality, that solid square immutable nouminal plinth we assume exists out there somewhere, became a cube in my mind and on the whiteboard. Partially because it's the one thing I can sketch most recognizably, and partially because it's a square solid. So our simulation/reenactment pipeline became the cube's journey, starting in Reality and culminating as a fleeting (star-shaped?) spatiotemporal pattern of nerve activations in a primate brain.

From the beginning again, Reality gets *sampled*. The cube has its key features identified and recorded. (The tiny scribbles next to each dot are meant to represent a={0, 0, 0}, b={1, 0, 0} (hidden in our haste and desire to create a simplified and readable 3D image), c={1, 1, 0}, d={0, 1, 0} and so on: spatial coordinates. You get the picture.) After it's sampled it's reconnected (and b reappears as an anchor of the line relationships a-b, b-c, and b-f), thus creating the cube model illustrated by the tinker-toy schematic representation of connected points above our big-blue-word Model. Not so fast, friend; (you might say) a lot of choices go into these two steps and they can support or dramatically impede the progress of finishing a project. Well, we said not so fast ourselves and tried to capture some of these critical points of inflection in the whiteboard's bottom stripe.

The bottom stripe captures our embryonic critical reflection on the whole simulation/reenactment pipeline. It has only three frameworks with respect to which we tried to "unpack" our representations. (Love the way this critical jargon renders simple truths in Byzantine and almost undecodable language—where's Beckett when you need him?) The top framework in this stripe, Replacement, reflects a participant's realization that while we can follow an idea through the process, it's constantly being replaced by different versions of itself. A wonder we can follow it at all! In fact a sad failing of many projects may be the very fact that we can't, perhaps as a result of not consciously choosing a suitable way to accomplish each replacement. Here we "foreground" the process (okay, I'll stop…) by listing the steps of simplification, selection, and abstraction. The method used to accomplish each step must be selected mindfully, with careful attention to the nature of the subject and the purpose of the project as a whole.
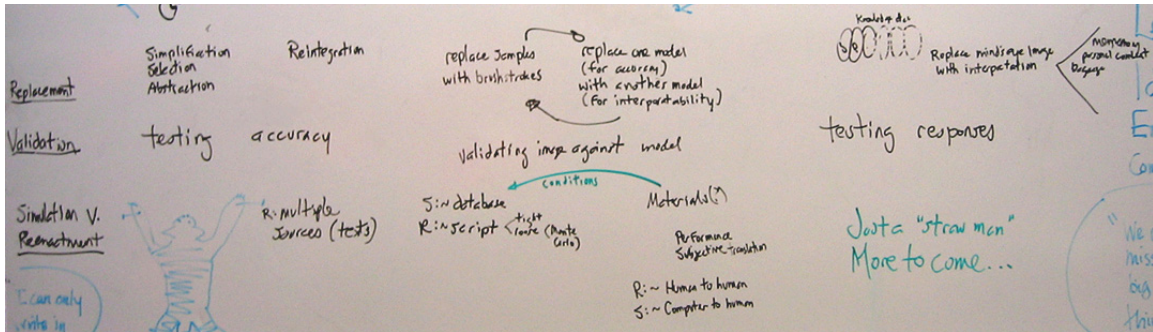
How might one select the methods of simplification, selection, and abstraction involved in sampling? What are some appropriate criteria? How can we validate our choices? Well, we only got around to providing one approach to this essential step: the admittedly science-y engineering-y sounding "validation." I plead guilty to being limited in my own jargon here, but I believe that the concept of validation can transcend science's testing for accuracy. I can imagine completely different criteria coming from an esthetic need: an "inaccuracy" which might include the type of distortion that serves expressive purpose—think of ultra-wide-angle lenses, infrared film, or Seurat's painted dots. (Though those dots may fit more appropriately at a later point in our pipeline—only Georges could have told us if he actually saw those dots or if he created them post-impression; after his eye did the sampling.)

After we've replaced reality with samples, the next replacement creates a model by re-integrating those samples. This leaves us with a sort of raw-material for our simulation or reenactment: a simplified description of the subject.

The next step is riskier—we want to encode this model in a way that will make it more readable. Ah but here we might have to throw all pretense of scientific objectivity to the wind: to usefully encode our subject we need to take into account not only the project's purpose, but the viewer's abilities—even their state of mind when looking at the finished piece. Undaunted, we tried at least to give an example or two of this encoding process: VISUALIZATION and SONIFICATION, and we refer to a third (brushstrokes) in the Replacement row below.
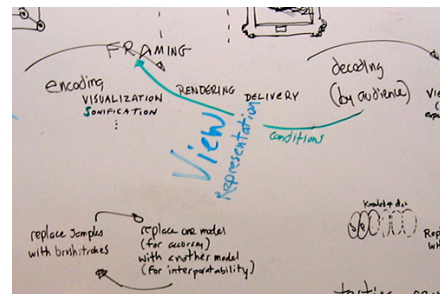
Honestly, I don't think we addressed whether RENDERING is part of encoding or after it, part of the DELIVERY process, but we thought they all fit right around here somewhere. And the physical act of FRAMING before final delivery nicely illustrates the creation of a View—our antepenultimate big-blue-word, the representation of the subject.

Our cube is intentionally represented in a sketchy/scribbly way at this point—the original reality is long gone, as are the samples and model. But a good eye might be able to pick out the fact that it's still there in spirit—the rendered cube is still thinking of the archetypical or modeled one. And the frame, with all the authority it implies, might make it worth somebody's time to actually try to decode.

Who's that "somebody" who might decode it? The big-blue-word Audience, or VURP (an encompassing but embarrassingly non-euphonious acronym standing in for Viewer, User, Reader, and Player). Excuse me. And what might they do in their decoding process? Well, while VIEWING they might be MULLING and RELATING, but zillions of higher-level processes of understanding could be listed here. We didn't have zillions of units of time or room on the whiteboard, so we resorted to this three-word list as synecdoche—indicating the whole by just mentioning parts. A process of simplification that's valid to use here since the whole blasted whiteboard is a simulation of the process of simulation, of sorts.

Simulating simulation and thinking about thinking might lose one in a vortex of self-referential recursion, so, I snuck in some life-preservers: a tiny version of my own "Knowledge Acquisition Pipeline" (marker-bearing secretary's privilege). Aha—caught! Another pipeline; kinda like this one. Yes, I do tend to like building simplified models. That other pipeline tries to abstract the workings of the human brain/mind when it's seen as a target for information visualizations—the vertical ellipses encapsulate stages of mental processing from *sensation* (e.g. light vs. dark) to *distinction* (lines) to *segmentation* (objects) to *recognition* (remembered things) to *interpretation* (signs & symbols) to *association* (letters to words to paragraphs to books), finally ending at *comprehension*. A rather dry way to slice up the brain, but useful if the abstraction is done with a purpose—and my purpose is to give designers and engineers a simplification of the incredible wealth of mental processes we deploy to create meaning; just enough to help us make more decodable images. But that's another story.
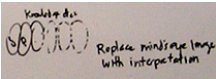
This one ends with the whole group having created an initial abstraction of the simulation/reenactment process, but wondering where the simulation and reenactment might diverge. So in our last few minutes—resisting repeated calls to *please* come home to the studio by Sara's helpers—we scribbled out a few places where the two processes are clearly not the same. We did this in the bottommost row in the bottom stripe—not because it was unimportant, but because we ran out of space (as I fear you may be running out of patience with this branching and tangential retelling of the equally non-linear story).
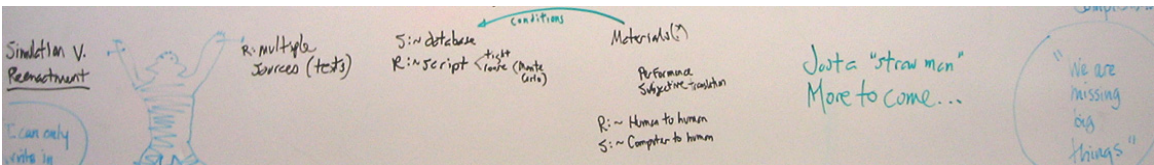
So, briefly: we thought that at the sampling stage reenactment might use several sources (subjects); e.g. the two texts used by presenters Kris Cohen and Ben Coode-Adans in their reenactment of the Everest tragedy. And during the act of encoding, simulations might use databases that are presumed to be accurate (or at least attempts are made to hew to their authority) where a reenactment's script might allow and encourage interpretation by performers. And at the viewing stage reenactment is perhaps a human-to-human endeavor at its core, while simulation might be computer-to-human, even aspire to be a direct model-to-human replacement.

This final and sparse sampling of divergences between the two disciplines—using, as it does, some of the language and categories from our little pipeline—might justify the happy hours we spent in creating it. It

seemed to be useful at the time, and if it is useful to you we'd love to hear about it. Perhaps Banff can even post critiques, applications, rebuttals and enhancements. Send them along, anyway, and maybe we'll end up with more than this straw man, who seems to me to be paused a dozen steps along our journey toward the rich intellectual peaks we glimpsed during this lovely retreat in the Banff mountains. I think I speak for all of us when I express my deep gratitude for being introduced to these people, and for the opportunity to develop these ideas try to organize them in some useful way.

Participants included (pictured, from left) Pasi Pirttiaho, Randi Robin, Julie Tolmie, Mark d'Inverno, Thomas MacCalla, Emma Westecott, Jaanis Garancs, and the somewhat blurred and squinty W. Bradford Paley, your humble transcriber. We were happy to have been joined by Nina Wakeford and Paul Wong, who shrank from our picture as their primary allegiance was to another, more insidious cause. Go look at their lovely and somewhat more lyrical results: the Disruption group.

W. Bradford Paley
New York, June 2004