Coming to our Senses: Thinking with Things in the Classroom

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I teach at a typical state university, and I would like to invite you to step into my classroom and look around. Your first impression will be of beige. Beige desks with tablet arms, all facing the tan wood professor's table at the front of the room. Beige vinyl flooring, off-white walls, empty but for two stretches of whiteboard. Even the digital projector fastened to the ceiling is tan against the off-white acoustical tile. There are green trees outside the window, but the beige blinds are usually down so that professors can use the projector without competition from daylight.

I'm not sure when I started thinking of my classroom as a sensory deprivation chamber. Was it the day, more than a decade ago, when I brought a box of Lego to my Sustainable Development class and asked my students to model a more environmentally friendly, anti-sprawl community? Was it the semester of leave I spent as a visiting social scientist, studying and participating in studio education at a leading school of architecture, where I rediscovered the power of hands-on making (Kuhn, 2001)? Perhaps it was later, when after years of speaking and writing about the strengths of studio education in disciplines with no studio tradition, my university supported me in creating a multidisciplinary studio-style classroom where my colleagues and I could teach? In any case, the day when, after three semesters of teaching in the studio, my Sustainable Development class was assigned to Olsen 412, the fairly typical undergraduate classroom I've described above, was the day I began to feel that my students and I were unwitting participants in a grand but diabolical experiment: "We know that after an extended time

in a sensory deprivation chamber people stop being able to think properly. Let's see if this will happen to our brightest young people!"

You may be thinking that it should not matter that the classroom is empty. I'm the professor, and it's my job to vivify the room and engage the students with my virtuoso performance. All eyes should be on me, all ears open, all fingers still except for taking notes. I should *want* an empty room: no distractions! And I shouldn't want any student activity to slow me down—isn't it best to cover the most material? But I've found that my students are far more engaged, alert, and able to absorb information when they are active learners in a classroom rich with tangible materials, and that coverage without understanding is a waste of everyone's time.

After my first successful use of Lego in that undergraduate classroom long ago, I tried Lego again in my graduate interdisciplinary social science seminar. (I should say, in the interest of full disclosure, that one of the ways in which the first Lego exercise was a success was that it revealed that my students had not understood the reading *or* the film on sustainable communities.) I asked my graduate students to use the building toys I provided to model an important concept from their discipline. One student formed Silly Putty into a rectangular solid, then squeezed one dimension to demonstrate a truism of project management: you can have your new product on time, on budget, or with all features, but if you compress one of these dimensions, at least one other will expand—so if you want to stay within your budget, for example, you may have to wait longer before the product is ready to ship. Another student built a physical model of the digital "header" of a data packet being routed on the Internet. I built a decision tree out of Tinkertoys, and I'm still thinking fruitfully about that diagram all these years later.

At the next class, the students burst out, "Where is the Lego?" I had not planned anything involving Lego for that day, and told them I was concerned that if they were building with Lego they would not be listening. But two students, one of whom was a particularly strong student and mature working professional, objected strenuously. They insisted that engaging their hands in simple tasks would help them to listen *better*. I have since heard this from many students, and from knitters among my colleagues.

Scholars studying embodied cognition have taught us that we think not just with our brains but with our entire bodies, with our senses, and with our environments. It

follows—and the sensory deprivation chamber is only the most extreme example—that a learning environment without "things to think with" is potentially disabling, even for the typical adult learner. Forty years ago, Rudolf Arnheim, Harvard professor of the psychology of art, made a persuasive case in *Visual Thinking* that thought and perception are deeply interconnected, not two independent stages of the human process of seeing (Arnheim, 1969).

If we were to take a student—or any adult—and represent their body with each body part in proportion to the area of the brain's *sensory* cortex dedicated to perception in that body part, we would get this grotesque but instructive little homunculus. The ears, nose, and mouth are disproportionately large, supporting the senses of hearing, smell, and taste (vision has its own cortex, which is why the eyes are not huge). But in this figure, largest of all by far are the hands. This is not just about the sense of touch, because touch is felt all over the body, although generally less acutely than in the hands. It's about one of the most important ways in which we come to know things: by interacting with our environment through manipulation. As Lakoff and Johnson have persuasively argued, metaphors like "grasping an idea" are not simply figures of speech, but reflect something fundamental about how we humans make sense of our world (Lakoff and Johnson, 1980).

A colleague—a physical therapy professor who teaches disability studies—tells me that one of the definitions of disability is a lack of fit between a person and their environment. Because our society leans so heavily on, for example, the sense of sight, a blind person might be considered "disabled," but in a society that does not rely on the visual they would not. Looking at the picture of the person with the gigantic hands, I have to conclude that Olsen 412 (and other conventional college classrooms throughout the land) are disabling to our students, whose makeup is so beautifully optimized for manipulative exploration and learning. In a lecture hall, or even a seminar room, what are those hands given to do? Write a few notes, maybe copy a diagram or two. No wonder our students text and doodle.

If you are with me so far, you might be willing to take the next step and agree with master educational theorist John Dewey that ALL learning is *experiential* learning (Dewey, 1938). From sitting in a lecture hall we might learn, for example, that we hate to

sit and listen to lectures. Even in the lecture hall we are having experiences, positive or negative.

Now let me invite you into my new classroom, the studio learning space we call the "Lab for Interdisciplinary Design." I teach here whenever I can. You might notice the large table in the center of the room, composed of smaller tables, so that my students and I can sit around and have a single discussion. We can also pull the tables apart and have several smaller discussions, or work on in-class exercises and projects in small groups. There are shelves full of Lego, Tinkertoys, sticky notes, craft materials, Magnetic Poetry, and a big roll of white butcher paper so that groups can make quick posters, diagrams, or collages to display and discuss.

We also have lab benches around the periphery of the room, with Internet-linked computers, glue guns, hand tools, and soldering irons. (What can I say? I'm a social scientist who has become convinced that one of the best ways to promote students' sense of agency in the 21st century is to teach them to solder.) On the shelves and windowsills are student projects from previous semesters—models of energy-saving houses, concept prototypes of interactive devices (such as the one that reads product barcodes and displays a report on the degree of environmental and social responsibility of the manufacturer), and small handmade posters showing redesigns of our classroom to make it conform to "universal design" principles.


The tools, the materials, the furniture, and the projects all announce "this is a space for being active, for making, and indeed for *meaning* making." As Richard Sennett puts it in *The Craftsman*, "all skills, even the most abstract, begin as bodily practices." (2008, p. 10) Sennett's motto, "Making is Thinking," motivates this space. The Lab promotes student inquiry by giving learners a rich ecosystem of things to inquire *about* as well as tools to use to support their inquiry. At last my colleagues from across the disciplines and I have a place where we as teachers can truly be "the guide on the side" rather than "the sage on the stage." We are free to play this role because our students have available to them so many ways to develop and to express their understanding, and to make it visible to us. (A graduate student in Community Psychology said, "This is like the Room of Requirement in Harry Potter," where the things you most need at the moment are present and available.)

The Lab's 'thinking with things' approach is built on the premise that active, hands on, multi-sensory learning helps students to make *sense* of what they are being taught. Unlike the lecture in Dewey's canonical lecture hall, we enlist students' hands, bodies, and environment. As Alison, a gifted personal trainer at my neighborhood gym, said: "I wish they had taught physics in the weight room. Then I might have understood it better." Even Piaget, who brilliantly documented the child's journey toward abstract thinking, did not believe that once we become abstract thinkers in one domain we think abstractly in all domains (Piaget, 1977). When learning something new, even adults benefit from starting from the immediate and the specific, using embodied learning as a springboard to abstract understanding. That's why I'm glad my students and I now have a place of refuge from the sensory deprivation chamber.

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