diSessa, Andrea: Changing Minds: Computers, Learning, and Literacy

Intuitive knowledge is important, productive, and (eventually) leveragable. The first part of this paper talks about the structure of people's intuitions about the world, using an abstraction called *p-prims* (phenomenological primitives[1]). These are visual and kinesthetic rules, or more accurately, heuristics about how the world works.

The second part of the paper talks about "activities", in particular the fabric that seemingly irrelevant and spurious activities shares with "genuine learning." This part of the paper seems to be drawing on material covered elsewhere, and is largely anecdotal. I think that this part of the paper is emphasizing the importance of personalizing the learning experience, which will forge an intuition about a foreign concept simply by interacting with the concept.

Questions/Comments:

- "Ohm's law is easy to learn, I believe, because people see it naturally as a simple example of Ohm's p-prim." Ohm's law is easy to learn? Wasn't Ohm's law the only physics McDermott's study tested?

- I find that the discussion toward the end of the paper about the dinosaur pictures is relevant to the electronics constructionist activity discussed on Thursday. Even though some activities may not be directly educational, they help to connect students to the subject—and in these cases to science in general—so that they will be motivated and excited to learn about it on their own.

- It is interesting how p-prims are introduced: she begins with a few examples and discussion, so that when we see the full-length definition, we have some context in which to put the words. She mentions that continuity of activity must be balanced with "that familiar old admonition to sequence ideas properly." Also, as I begin to learn model theory, I'm starting with the compactness theorem and the Lowënheim-Skolem theorem rather than starting with the basic precise set-theoretic definitions, so that the reasons for defining things the way that they are

[1] p24s as they would say in the i18n biz

will be more obvious; i.e. I am jumping around in the book. How important is the sequence of ideas? More specifically, why do we always think we must define terms before we use them?

Redish: Chapter 2

(The rest of) this chapter was about "bridging", cartoons, and another take on goals of physics education. Bridging—taking intuitions and building them into a correct understanding—although given little time, was the most fascinating topic of this chapter. That could be because of my exposure to the tutorials which are largely conflict-model. If a new model is to be built, a process that takes time (as noted in the chapter), bridging seems to be the fastest way to do that, so we can perhaps assess how it is working in the same semester. This chapter also covered cartooning—taking a physical situation and ignoring (or assuming/approximating away) the irrelevant details, and focusing on the important ones. This is a *skill* that is seldom traditionally taught, but usually assumed to be present.

Questions:

- "Some may think they have trouble with one or more of our representations and actively avoid thinking about them." So, say there is a concept test in class that provides information using a such a representation; what does the student do to answer the question?

- "Students often see ... the drawing of a graph as the solution to a problem ... instead of a tool to help them understand and solve a more complex problem." In my proof-based courses, I am often given statements which have tough proofs (which by themselves would evade my solution), together with a paragraph beginning with "*Hint:*". The hint describes perhaps a lemma I could prove first, a function to consider, even a representation I could draw. Such problems usually take me an hour to complete[2], even though the solution ends up only being a paragraph or so. Are using questions like this practical in an introductory course (or would they tend to discourage more than help)? If so, they may be a good way to teach the importance of representations as tools.

[2]Usually after having read the problem and passively mulling about it while walking home.