BUILDING EDUCATIONAL THEORIES

1. What is to be done

You are to produce a document describing two things:

A domain-specific taxonomy of algebra objectives: Regardless of the *level* of thought required, and of the order in which objectives are to be learned, there are several *kinds* of activities we hope students will master. The goal here is to *classify* these. A good model is Bloom's Taxonomy. Note that it is, in general (and as emphasized by the authors) non-hierarchical. My son in Kindergarten is often asked to *evaluate* some things, and there are other things that I don't even expect my graduate students to *know*.

A developmental model of algebra objectives: This is the complementary problem. The goal here is something more like the timelines described by Piaget or Erickson, or the domain-specific Van Hiele model in geometry. Here, the hierarchy of the goals should be emphasized. What tasks is a very young child ready for? What are the relevant stages of development? What are some sample questions that would mark the difference of one stage and another?

In each case, your theory should distinguish enough things to be pedagogically useful, but not so many as to be incomprehensible. Bloom's taxonomy for the cognitive domain had six classes, each with about three subclasses. Van Hiele's model for geometry had five stages (0-4). When identifying the current developmental stage of a student or the type of a task, you should not have to pull out a lengthy reference manual.

Also in each case, the principle of organization should be psychological, rather than logical. It's less important, for instance, to put similar mathematics together than to put similar behaviors together.

You should give arguments to support the structure of your theories. Why do you divide stages and categories the way you do? What are the borderline cases, and why do you classify them as you do? Of course, experimental research to validate the theory on groups of real children is well beyond the scope of this assignment, but you should, by this point in your training, have some psychological insights to which you can refer.

2. Due Date

An initial version of your theories is due on August 28. At this point in the course, the justifications are likely to be very sketchy, and many points of your theory may very well change by the end of the course.

A final version is due on December 4.

3. GRADING

In addition to the usual criteria, I will assess the following content questions:
  (1) Is there both a taxonomy and a developmental model? Does the taxonomy classify types of goals, irrespective of level? Is the developmental model hierarchical (or at least directed)?
  (2) Are the stages and categories in the theories clearly identified and clearly distinguished form one another? Are the theories comprehensive of the ILS algebra standards?
  (3) Are the theories fine enough, but not too fine? Do they show the right level of detail to be pedagogically useful?
  (4) Are the theories primarily psychological, rather than logical, in their organization?