[Will You Learn With Me?](#)

January 13th, 2009

At the end of 2008, the self-imposed but already postponed target date for uploading **Reasonable Algebraic Functions**, came and went for all the usual reasons and then some. One reason was that I kept being interrupted in my mighty effort to meet the deadline by all sorts of considerations about "Develomental Mathematics" in particular and about teaching/learning in general. While this didn't help with meeting the deadline, I didn't feel I was wasting any time. All things pertaining to teaching are, indeed, rather enthralling if perplexing.

1. Consider a child, say, 5 or 6 years old. Say he expresses interest in the violin; you will likely get in search of a violin teacher to give him lessons, say an hour once or even twice a week. The child, though, will be expected to do a lot of practicing at home and the lesson will probably consist of the teacher listening to the child's playing his exercises and "critiquing". Then, the teacher will give the next assignment, annotating the partition with fingering, giving such and such indications on how to play it, maybe demonstrating how to hold one's hand. And that will be it. Back home, the child will keep on practicing, perhaps with some prodding on your part. And, things will take their course. Maybe, the child will give up, maybe he will decide that he has other, more pressing interests, maybe the child will continue to become a "gifted amateur", or maybe even a professional musician or perhaps only … a violin teacher.
    Now consider the child's twin sister. Say she is "good at figuring numbers and puzzles"; you will likely congratulate her on her good grades at school and that will likely be the end of that and not only because you are a male chauvinist: even if you thought of getting in search of a mathematics teacher, it is rather unlikely that you would find one. But suppose, somehow, that you were able to find someone—say your sister is a research mathematician and she is willing to help out with her niece. The question now is: what is your sister going to do? Help her niece with her math homework? Her niece is not likely to need her. Start her niece on, say, a precalculus textbook. The goddesses help her: See SimWobpa. So, then, what?
2. The teaching-learning couple is really mostly a societal matter. First, there is the influence of the parents. That is not to say that I concur with, say:

    I see the problem as a parental and student one and NOT a school problem. K-8 math generally is very successful. The students learn all the basic math they need to continue into the algebra sequence and some even start algebra in 7th or 8th grade. National testing and local testing here in Massachusetts verify this. Then something happens when kids hit high school. Students start to become disinterested in school in general and math in particular and they are not encouraged at home by their

parents to continue in math. I think we all realize that if one does not keep up with math we tend to forget it. This is true of anything we learn but more pertinent to the study of math. I have student who continue in my elementary to intermediate algebra sequence over a summer and show signs of forgetting what they just learned. When parents cannot get their kids to do well in school they criticize the school system rather than their own children and themselves. If they can't get their kids to pay attention in school how are the schools going to get them to?"
Ted Panitz, Cape Cod Community College, [mathspin] Teaching arithmetic to college students, August 8, 2008 10:46:06 AM EDT

because a lot could be said about the causes of the students' loss of interest. For one, it may well be that it is only when they come of age that they see for what it is what their teachers are trying to feed them.
But what you might call the atmosphere at home *does* matter.
But what the teachers *are* is what society wants them to be, as implemented by the Schools of Education. So, if anyone is to blame, it should be the distinguished "educologists" who train the teachers. But then how did said educologists reach the position they are in. Why were they permitted to get there and stay there?

3.   And then there is the interference of, to put it as politely as possible, people for whom "making" money is a glorious end in itself: Given the shallowness and disconnectedness of today's (high-priced) mathematics textbooks, students in general, and developmental students in particular, have no idea that one can learn from reading. But the fact that today's textbooks are atomized has two very specific reasons: **a)** short easy pieces can be memorized and retained until the exam—which proves the efficiency of the textbook … and of the instructor who is thereby complicit and, **b)** once any cross reference, explicit or implicit, has been expurgated, the textbook can be "cafeteria-ed" to "suit the particular needs of your institution": You want this topic before that topic? No problem! It is not for us to judge if it makes sense from any point of view. We are here only to satisfy the customer and *you* are the customer since you are the one to choose the textbooks. As for those who actually pay for the books …
One may still wonder, though, why teachers, at least at the college level, are getting along with it.

4.   And what of "machine learning"?

In 1922 Thomas Edison predicted that "the motion picture is destined to revolutionize our educational system and … in a few years it will supplant largely, if not entirely, the use of textbooks. " Twenty-three years later, in 1945, William Levenson, the director of the Cleveland public school's radio station, claimed that "the time may come when a portable radio receiver will be as common in the classroom as is the blackboard." Forty years after that, the noted psychologist B. F. Skinner,

referring to the first days of his "teaching machines," in the late 1950s and early 1960s, wrote, "I was soon saying that, with the help of teaching machines and programmed instruction, students could learn twice as much in the same time and with the same effort as in a standard classroom.

Oppenheimer, T. (1997, July). The Computer Delusion. The Atlantic Monthly. 45-62.

Now it is web homework, etc When will we the teachers learn?

5. The latter question is actually rather an interesting one, especially in mathematics. The fact is that there *has* been a dumbing down of America. The question is by whom and how it was done. The instigators are not necessarily those pointed at by Charlotte Thomson Iserbyt's *the deliberate dumbing down of america* or by Allan Bloom's *The Closing of the American Mind* but dumbing down *has* occurred. And those who went about implementing it or, at least, were on the front lines, i.e. the teachers at all levels, may not have realized what the consequences would be. And, even if the dumbing down may not have been deliberately engineered, it certainly was facilitated by us, whichever way it happened and for whatever reasons.

    So the question is how we the mathematics teachers were not able to see where all that was happening with, say "Why Johnny can't add", was going to get us and, a lot more importantly, the students as a whole and now the republic almost as a whole: As the Daily Mirror of Thursday, November 4, 2004 headline screamed:

How can 59,017,382 people be so DUMB?

Along these lines, by the way, one may note that the election of Obama seemed to be the result of some deep down reaction of the people. At the very least, it seemed to be the result of a popular desire for a more reasonable organization of society. One way or the other, consciously or not, many people didn't seem to believe that

6. (~Z) [The market] is not a zero sum game.

It even seems that there was some questioning along the lines of "Where did the money go". Just a little bit and just for a short while, though, as it was quickly made to seem … unseemly. But the future has yet to speak.

7. Mathematics education has been confronting the problem of how to bring mathematics to the "great unwashed masses" for at least thirty years but with no discernible success or even progress. In fact, the only conspicuous thing is that mathematics textbooks during that time have devolved to exposition by way of "template examples" and that the subject matter has been atomized into "topics" presented independently to facilitate memorization while, typically, instructors deplore that their students cannot remember the simplest things past the test.

Of course, it is not difficult to show how the stress generated by memorization on the scale required by, say, a year of mathematics must necessarily have that result. However, the operating, if tacit, assumption is that "developmental" students are incapable of learning on the basis of logic, the only alternative to memorization. And by an unfortunate, even if possibly unavoidable, coincidence, not only has research in mathematical learning also largely dealt with isolated topics but, even more unfortunately, it too has essentially equated learning with memorizing.

8. And how much "research" has been done, if any? The short of it is that while there is of course a lot of research on the educational front, there isn't much that is really operational. For instance, do you know of any study that compares various "teaching techniques"? Do you know of any study that tries to estimate the "exponential effect" in learning. For that matter, most research, even if perforce, deals with the learning of some, at most few, items. So, essentially, learning is identified with learning by heart. At best, learning is identified with familiarizing oneself with the stuff.
    I know of no research that, given a b*ody of knowledge*, tries to identify which of the various Hamiltonian paths, or approximations thereof, is optimal. Or even to compare them. Or even to specify the Hamiltonian paths in the form, say, of tables of contents. To give just an example: Why do we have to take for granted—and, please don't argue —that fractions must be dealt with before integers? Isn't that dumb?
    Of course, I would appreciate being proven wrong by being sent any reference to even only a discussion of the pros and cons of the matter. Or by being responded to here.

And now, back to **Reasonable Algebraic Functions**:

First I have to get enough stuff ready for the first third of the semester in the class in which I am using the"bundle" (In order not to confuse LaTeX people, I gave up on the term "package" which is already used there.) But I am almost done.

Second, the site which was built around **Reasonable Basis Algebra** has to be rebuilt. Unfortunately, this is not something I can do alone. But help is on the way.

Once the site has been redone, though, I will upload right away the first third of the **RAF** bundle.

By the way, one of the things that threw me off schedule was designing a system that will handle both the Homeworks and the Review/Exams from a single QuestionBase so as to ensure consistency and to permit a much wider and easier choice among the "checkable items" that can be used in either a Homework or an Exam. As a matter of fact, writing this is a break from the crashing bore that transferring the stuff from the two old questions bases to the new single QuestionBase is.

Leave a Reply

You must be [logged in](#) to post a comment.