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All of my work is commentary on Stephen Brown

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In the late 1980s I was working on a research project involving Jewish and Muslim schools in mathematics and science education. Our main focus in each school was an inquiry into how we could make the curriculum more of a 'Jewish' or 'Muslim' experience in each case. The plan was to eventually share the different approaches and perspectives in a joint experiment in cross-cultural communication.

In the Jewish day-school we explored traditionally 'Jewish' forms of pedagogy and how they might be the basis for mathematics teaching and learning. One promising format was modeled after Talmud study. We would place a mathematics question at the center of a piece of paper. A group of students would write each of their responses in small boxes surrounding the central question. Next, around their initial responses, they would jointly compose comparisons of their initial responses and write them in a space that was near their original 'commentary' on the question. After a whole-class sharing of their 'talmud' pages, they would go back to their original pages and add thoughts that they picked up from others in the room or new considerations based on the class discussion. What we found was that the students' reflections on problem solving and posing, and on strategies of thinking mathematically, were tremendously enriched. This seemed to be a very promising technique for teaching mathematics.

Soon afterward, I made a discovery that has occurred over and over again in my experience: Having come up with an idea, I discovered that Stephen I. Brown had already 'been there.' In fact, his precedence was so persistent that I give him the honorary Yiddish title of 'Reb.' Reb Brown too had been thinking about the Talmud and had been exploring the form as a context for mathematics education. Reb Brown's notion of a 'secular talmud' recognized the ways that this form of text mixes the explanatory with the interpretive, juxtaposing precision and accepted truths with ambiguity, metaphor, and dialogue. Much of the Talmud is very 'practical' in the sense that it is about a specific problem to be solved, even as it brings to bear upon such a problem a myriad of interpretations and issues that one would have never considered had one just thought to act without this type of reflection.

Now, about ten years later, I invite you to explore this format. I use a secular talmud to share ways that my own work has so often echoed the ideas of Stephen I. Brown. In the center of each page is a statement by Reb Brown. Surrounding each statement is commentary on his original thoughts. In the commentary on the commentary, I share thoughts of others with whom I have worked, insights from seemingly unrelated sources, and questions for future mathematics education talmud pages to come. It is in creating your own connections among the juxtaposed comments and quotes that you can construct your own new layer of meaning and interpretation. I hope in response to hear from you, so that we may co-author the next several pages of this talmud and thus set in motion generations of scholars whom we assume

are already part of our conversations. These future 'mathrebbies' will themselves re-interpret our statements in light of comments and questions that we ourselves have not yet seen, but which are already an important part of the conversation even before they have been uttered in voice, written in ink, or indelibly located in digits on a disk.

In what ways can the history of a classroom experience be conceived without 'progress' being assumed, desired, or achieved?

I am currently teaching an education course in which students are never asked to specifically 'teach' any particular skill or concept. Instead, they are asked to persistently explore what they believe their students understand and can do. Is this shift in focus anything more than an ethically specious surveillance? Perhaps we should not be so quick to document students' 'progress' or lack thereof?

Borrowing from the feminist model, the classroom of the present can be a laboratory for history. That is, students can learn to keep a record of how their thinking/feeling evolves over time. What is real then is not what history as an official document stipulates, but rather how we create it from within. It is a pretend history of sorts, but nothing could feel more real than to act as if we had created the history based upon our own lives. (Brown 2001, 197)

There's a kind of pleasure in not letting the teacher or anyone else in the room know what you are thinking – to keep it all to yourself until later, when you've figured it all out. 'Do you like to serve your work on a tray, all prettied up and garnished with flair?'

Stieg Mellin-Olsen (1987) taught about the 'problem of culture' in education. Teachers focus on the conceptual goals they have for an activity while the students focus on the activity itself. 'Here I am, facilitating an event that I am expecting will help my students think about use, and apply mathematical ideas and techniques, perhaps to help them examine their own use of mathematical strategies,' and so on. I have long-term goals that have to do with a sort of 'growing of mathematicians.' At the same time, my students are—simply—focused on the task at hand, how to do the task, what they are making or creating with the task… The teacher and the student are pretty much never talking about the same thing—unless the teacher abandons the content and makes the rhetorical gesture to speak: *with* the students, *about* and *through* the task (listen).

Astound friends and family. Have someone choose 21 cards from a deck, shuffle the 21 cards, pick one card to remember, and then return that card to the deck of 21. Shuffle the 21 cards yourself a lot, and offer your friend the chance to shuffle them some more. Now deal the cards face up into 3 piles, asking your friend to check that they can remember their card by noticing which pile it is in. After you have dealt all 21 cards, test them by having them point out which pile their card is in without saying what card it is. Say, 'If you can remember the card's pile 2 more times, I'll be able to concentrate on your brain waves and figure out your card.' Each time (3 times in all), pick up the cards, put the pile with their card in the middle, and remember not to shuffle before dealing them face-up into three piles. Now: have you figured out how to tell which card is your friend's? If you can figure out how this trick works, then you can vary it to amaze your audience forever. Change the number of piles, where you place the pile with their card (in the middle? on top? the bottom?) ... Can every number of cards work, or is there something special about 21? What other numbers of cards or piles might work for such a trick? (Appelbaum, in press)

It appears that elementary school students love to investigate magic tricks because they have a fascination with knowing 'secrets.' Sharing a secret is more fun than keeping it.

'Must we abandon all hope of purposeful schooling? If all of the meaning and interest of an activity is in the long-term, content-related goals that are in the teacher's plans, then is the only way for students to engage with the task through students inventing their own exploration?' What they invent is only remotely likely to coincide with the teacher's long-term goals. – After several weeks of studying card tricks on and off, I was able to document for myself that these students had met the district goals for multiplication and division, covering a host of number theory along the way.

The 'problem of culture,' double-fold, is evident in the act of asking student teachers to carry out inquiry-based thematic units in mathematics. As I lead my students through the phases of such a unit, and insist that they focus primarily on assessment rather than instruction, the student-teachers focus not on my long-term conceptual vision of meaningful mathematics education, but on the plain task at hand: controlling behavior in their classroom.

> It is easier to advocate rather than to put into practice a view of mathematics education that supports
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> 1) the classroom as open dialogue;
> 2) the holding of resolution in abeyance;
> 3) the potential of errors not only to diagnose misperceptions but to generate new territory;
> 4) having students record the evolution of their thinking over a protracted period of time;
> 5) integrating mathematical experiences with other fields in a more global and pervasive manner than is suggested by 'application;'
> 6) using the discipline to reflect upon understanding of self and society.
>
> (Brown, 2001, 201)

Is it pointless to try to explain our 'modernist' truth to a post-modern child? She(he) will merely parrot what she(he) knows we want to hear, only to be saying something ironic in the parody.

Lester suggested drawing a picture of 3 piles, depicted as columns. He numbered the cards as they were dealt, horizontally across the columns. Now, once the friend points out the pile, Lester knows the card was one of the 7 in *that* column, which he will be placing in the middle of the stack. So the card is one of the cards that will at that point be numbered 8 through 14 for the second round of dealing out the cards.

What is the mathematical act? Is it in the representing of the cards in a diagram? In the numbering of the cards in a sequence? In the simple act of recording and collecting data to be analyzed?

What happens to the purpose of the discussion when Qishayna argues that she can discover a *different* pattern by using two-color plastic discs to represent the cards?

My basic notion is of a vibrant social movement: Non-Euclidean Mathematics Education (Appelbaum 1998). Such pedagogy would look like traditional 'Euclidean' mathematics education 'locally'-—up close, in small pieces. But if we stepped back and took a good look at more dimensions of what is happening, we would have a new set of questions to consider.

How far removed do we have to be from school mathematics before it no longer 'looks like' mathematics? For some people, the distance is infinitesimally small. For others, the distance is unbounded.

If we examine the child's object relations with mathematics in terms of the educational encounter of teacher and student, we find that the resulting mathematical conceptions are really a function of the negotiation between the participants' personal relationships with mathematics, perhaps originating in their concepts of unity. Framed in this way as a truly psychoanalytical encounter, mathematical knowledge then includes a meta-knowledge of how one 'does' mathematics as well as how one establishes relationships with various objects of mathematics. These relationships to mathematics and one's understanding of how this influences the mathematical conclusions that are drawn become important considerations in and out of school (Appelbaum 1995; Appelbaum & Kaplan 1998).

The link between psychoanalytic theory and mathematics may not be immediately apparent, but this is perhaps only because mathematics is viewed as an academic subject field rather than as the object of a highly interactive and affective relationship. In fact, the quality of this relationship between the self and mathematics as its object is at the heart of the educational experience of both pupils and their teachers. Mathematics as an object of self rather than merely an academic discipline or a content to be learned enables a redefinition as an object through which people can therapeutically reclaim the sense of oneself as a moral acting being. For Brown, mathematics is transformed from a technique that links means and ends (a tool for 'solving it') into an activity through which one understands oneself and mathematics in new ways. In this view, the standard pole established by skill drill versus meaningful conceptual knowledge is reframed as a persistent bypassing of activity that incorporates abstractions 'out there in such a way that we can begin to gain power over it and feel that we possess it in some important sense. 'This insensitivity can be seen as a symptom of a 'splitting crisis' or the 'split off mind' referred to by D. W. Winnicott who earlier framed the issue of mathematical understanding in terms of object relations. (Appelbaum & Kaplan 1998)

Should we call for a mathematics education grounded in making observations of a phenomenon, drawing implications from these (assumed valid) observations, using the phenomenon to imagine alternatives to it, negating some of the hypotheses, and posing new problems (Brown 1973)?

No matter how accepting a teacher may try to be about 'does anyone have another way to solve this problem?' or however many multiple approaches are entertained, the logic of mathematics cannot be violated in schools. Thus, the child who seriously suggests that the answer to 43 – 17 can be 36 or 24 or 46, depending upon how you do it, will not be allowed to 'love' all those answers without bias. Rather, the child will be encouraged to explain all the ways the answers were derived and then, at best, be gently guided to accept one method as superior to the others. Brown's (1984) work provides a stark contrast in encouraging new interpretations of mathematical operations or searching for cases in which seemingly absurd procedures actually work out sensibly; Marion Walter (1996) also suggests such possibilities.

'If we persist in by-passing this activity, we desensitize ourselves to the point that we no longer taste the uniqueness among the phenomena, and though [students] may be able to gain answers to questions, they become very much insensitive to what it means for something to be a problem and have even less of an understanding of what it means to have solved something ' (Brown 1973, 271).

Together, Brown and Walter (1983, 1993) have put forth 'problem-posing' as the context of such 'play' for all ages. Nevertheless, this playfulness is not part of school mathematics as otherwise conceived, and so the object of mathematics often becomes removed from the self. The self does not internalize the rationale imposed, but just comes to accept the fact that some ways of thinking are considered acceptable and some are not. Depending upon the child's general nature and capacity to remember external facts, this kind of learning about mathematics may proceed toward a successful performance record or to one of increasing failure and misconception as defined by 'the rules of mathematics.' In school some children learn that they can now treat mathematics as some object out there, which has nothing to do with me and which makes no sense. Conversely, a more positive outcome might be that the child still treats mathematics as some object out there, which is not like that mathematics which is mine and that I love, but which I can and must master to survive in school. (Appelbaum & Kaplan 1998)

School mathematics creatively reveals its 'stench' (Appelbaum 1999): as the discipline most elaborately constructed as a process of 'truth' dominated by seeing and listening, it perpetuates in Nietzschean terms an environment of nauseating effluvia effervescent of the shady den in which such ideals are cooked up, ideals that stink to high heaven of falsehood, obliging so many students to hold their nose. Implications of the metaphor include the construction of mathematics as a search for pleasure, and as a realm for scenting out the delightful fragrance as well as the foul stench of hypocrisy. The dream is of a mathematics that therapeutically reclaims the sense of oneself as a moral acting being. The psychoanalytic splitting crisis could be understood as a persistent by-passing of activity that incorporates abstractions 'out there' in such a way that we begin to gain power over it and feel that we possess it in some important sense.

The history of critical thinking in mathematics is a story of expanding contexts. Early reformers recognized that training in skills could not lead to the behaviors they associated with someone who is a critical thinker. Mathematics education has adopted the model of enculturation into a community of critical thinkers. By participating in a democratic community of inquiry, it is imagined, students are allowed to demonstrate the critical thinking skills they posses as human beings, and to refine and examine these skills in meaningful situations. Current efforts recognize the limitations of mathematical enculturation as inadequately addressing the politics of this enculturation. Critical mathematics educators us the term 'critical competence' to subsume earlier notions of critical thinking skills and propensities. A politically concerned examination of the specific processes of participation and the role of mathematics in supporting a democratic society enhances the likelihood of critical thinking in mathematics. (Appelbaum 2003)

What if mathematics were not an exemplary model of rational or logical reasoning, but instead was itself implicated in a set of limiting practices of reasoning? How would this change the way we understand mathematical activity in our classroom? (Appelbaum 1995)

What if the following were *not c*ommon sense? Could we come up with a positive manifesto that declares what we *are* about, yet still negate these seven beliefs?

1. It is necessary to have an outside authority to judge correctness of any alleged answer to a mathematical problem
2. There is essentially one way of solving any mathematical problem.
3. One's job is to learn what the rules are and how to follow them. Deviation from them constitutes a moral sin.
4. All problems should come clearly posed or they are either incapable or unworthy of being analyzed.
5. One's job is to solve problems if possible. Posing belongs to the realm of experts.
6. In solving problems, one's focus ought to be constantly on the questions being asked.
7. The problems stand 'out there,' to be solved, and are not capable of shedding much light on the problem of understanding oneself.

(Brown 1973)

I select one narrative story about what mathematics is from a host of options. As you go through a list of classroom behaviors, grouping them into three categories, I tell you which category contained a behavior that is consistent with my narrative about mathematics. Should we assume that the purpose of this activity is to figure out which behavior of all of them is the one that I selected? What else might we ask instead?

What if we stopped trying to teach critical thinking in mathematics, and instead tried to avoid prohibiting it from occurring? How would that change our approach to classroom practice? (Appelbaum 1999).

What starts out as against something will be short-lived unless the movement figures out what it is really about rather than just against.

What if we did not try to figure out which card the person chose in the beginning of the magic trick? What else might we do? Could we invent a new trick to perform?

I met Stephen Brown several times. The first time was on the telephone, when I was searching for a graduate program in mathematics education. The second time was when I read everything he ever wrote and found that everything I myself ever wrote ended up by noting the potential of an idea of his to contribute to new questions that arose out of my investigations. The third time was in person, a short interview during a visit to Buffalo. What if the next time were of a different nature? What might that be? And what would the way that I initiate that next meeting help me to realize about myself?

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