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Teaching As Research

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After an extended account of two features which she considers to be the essence of teaching, Eleanor Duckworth describes how such teaching can, at the same time, be seen as a form of research. In conclusion, she proposes a vision of teachers as significant participants in theoretical and pedagogical discussions on the nature and development of human learning.

What I love to do is to teach teachers. I like to stir up their thoughts about how they learn; about how on earth anyone can help anyone else learn; and about what it means to know something. I like to help them feel that any aspect of human endeavor is accessible to them and that they can make it accessible to any person that they teach. I like to try to find ways into a subject that will catch everybody's interest; to find out what people think about things and to find ways to get them talking about what they think; to shake up things they thought they knew; to get people wrapped up in figuring something out together without needing anything from me; to help build their fascination with what everybody else thinks, and with the light that other people's thinking might shed on their own. I like to see the most productive of questions get born out of laughter, and the most frustrating of brick walls give way to an idea that has been there all along.

But there are two main reasons that I love to teach teachers in particular. One is that teachers are as interested as I am in how people learn, so the dialogue is deeply felt. The second is that I always learn from them in return, when I see the endless variations on how they use what they learn in their own teaching. This paper is about how I teach, how teachers respond to it, and what one can learn through teaching in such a way.

It was a conviction about learning that got me started teaching the way I do. As a student of Piaget, I was convinced that people must construct their own knowledge and must assimilate new experiences in ways that make sense to them. I knew that, more often than not, simply telling students what we want them to know leaves them cold.

So what is the role of teaching if knowledge must be constructed by each individual? In my view there are two aspects to teaching. The first is to put students into contact with phenomena related to the area to be studied—the real thing, not books or lectures about it—and to help them notice what is interesting; to engage them so they will continue to think and wonder about it. The second is to have

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the students try to explain the sense they are making, and, instead of explaining things to students, to try to understand their sense. These two aspects are, of course, interdependent: when people are engaged in the matter, they try to explain it and in order to explain it they seek out more phenomena that will shed light on it.

Engaging with Phenomena: The First Aspect of Teaching

Since I am teaching about teaching and learning, the phenomena with which I must engage my students must entail teaching and learning.[1] Rather than reading and hearing lectures, the students must learn and teach or watch people learn and teach, and somehow I must make these experiences interesting and different enough to intrigue them and raise new questions which they had not thought of before.

There are three major kinds of teaching and learning experiences with which I try to engage the students. Within each—circles within circles—we find both of the aspects of teaching which I mentioned above; since I am here teaching about teaching, the phenomena I present are themselves composed of the two aspects.

The first kind of experience is that of demonstrations with one or two children or adolescents. I attempt to engage the children with some problem or activity (first aspect), and I attempt to understand their explanations (second aspect). I try to show that the children have reasons for thinking what they think, and that it is possible to find out what these reasons are.

The second kind of experience consists of the students' own attempts to carry out a similar inquiry with one or two people at a time, outside class. They are instructed to present some phenomenon (for example, a particular reflection in a mirror) in a manner that engages people, and to try to understand their explanations of it.

The third kind of experience for the students in this course is to learn as a group about a particular subject other than teaching and learning: for example, about pendulums, or floating and sinking, or mathematical permutations. I try to engage the students in the subject (first aspect) and encourage them to explain how they are thinking about it (second aspect). It is this third activity, learning something together as a group, that I would like to discuss at greater length in this paper.

Work with this other subject of study, which I shall call the secondary subject, proceeds on two levels. On the one hand, I am trying to help them learn about whatever this subject is that we are studying together. On the other hand, I am trying to help them learn about teaching and learning.

As far as teaching and learning are concerned, there is a great range in my classes in what people think they know. I can, however, count on the fact that they are interested in the topic. The secondary subject, on the other hand, is one which

[1] In the course referred to in this paper, I usually have about forty-five students in a class, including experienced classroom teachers, undergraduates seeking teacher certification, and professionals from other careers who have chosen to switch into teaching. Their teaching interests cover all subject matters, dramatic arts through geography, and all ages, preschool through adult. I have done similar work with groups of urban public school teachers, and with undergraduates in a teachers' college.

no one has chosen to study, so the challenge of finding ways to engage the student is even greater. Furthermore, most of the students know very little, while a few know, or they think that they know, a great deal. It is an awkward distribution. But my focus on what they themselves *see* and how they make sense of it goes a long way toward providing a common ground. Often those who are knowledgeable know theories and formulas, rather than the complexities of phenomena we encounter in the world. Part of what I have learned to do is to find phenomena which, familiar as they are and simple as they seem, do not lend themselves to satisfactory explanations by distant theories. My other approach for the more knowledgeable class members is to count on their interest in the teaching-and-learning part of the course, to invite them to put their efforts into trying to elicit and understand someone else's explanation. I point out that it serves nobody's purpose to declare something if you are sure of it. It does serve a purpose to propose a tentative idea—because then people can help you think it through.

Of the many different secondary subjects I have used to engage teachers, the example I will use in this paper is the study of the habits of the moon.[2] The first job is to engage the students with the subject. This is just as difficult to accomplish in the case of something they have not bargained for and do not particularly care to learn about (the moon) as it is for something they believe they know about already (teaching and learning). In both cases I go about it in approximately the same way. I look for some phenomenon to draw their attention to, counting on it to do the work of engaging them. I make sure there is always something to do or to watch and to make sense of so that everybody can have something to say, even if it is only to say what they saw.

The students keep and bring to each class a separate notebook in which they make an entry every time they see the moon—when and where they see it and what it looks like. Before we start, I usually ask them when they last saw the moon, what it looked like, when they think they'll see it next and what it will look like then. Sometimes this preliminary discussion gives rise to some conflicting ideas, so some students find themselves immediately engaged. Once, for example, one person said she saw it this way ☾ the previous night and another said she saw it this way ☽. The class was about evenly divided among those who thought they both could have seen what they said they saw, those who thought at least one person must be mistaken, and those who had no idea whether it was possible or not, so we found ourselves right away with an unanswered question.

More often, there is no discord at the start, and thus no preliminary engagement. In these cases some people accept it as a rather flaky assignment that they will do because it does not seem too complicated. Some accept it solemnly because they have been asked to do it. Some resist it as an imposition and a waste of time. Some like the idea right from the start. By the first week's reporting time, at least some people have something to say—have started to get interested, and to have questions to look for the in the following week. Little by little, the assignment gets changed from one that is flaky, arbitrary, or easy, to one that is absorbing and serious (although there always remains an air of playfulness).

[2] Engaging students in moon-watching as a way into astronomy is an approach I learned from Donald Ford, a fellow staff member at the Elementary Science Study, in 1965 when he was preparing a moon-watching teacher's guide (Elementary Science Study, 1968).

The following excerpts exemplify this range of responses. They include transformations of skeptics; some initial misconceptions; sources of frustration, excitement, and pleasure; early obstacles; some questions and answers; and reflections on learning and knowing.

> I guess the major question I had going into this experiment was, Is she serious? In fact the requirement almost stopped me from taking this class—I really thought it was silly. I also thought it would be a lot of tedious work. I was wrong.
>
> I keep [my notebook] on my bedside table and every night it's there to remind me to look out the window. . . . It only takes two or three minutes to write down my observations and draw my pictures, but later, when I sit down and read several weeks' notes all together, I can spend 15–20 minutes just generating questions and checking answers. I get excited when the moon moves across the sky just the way I thought it would, and I'm so disbelieving when it does something unexpected that I check my notes again and again. . . .
>
> My observations formed my questions, which caused the focus of my observations to change. I'm now concentrating on the path of the moon each night, not on its color or shape, although I'm still shaky enough to always note those, too. . . . Everything . . . is expanding—my questions and observations are getting broader. . . .
>
> My biggest problem in this class [is] forgetting about being a teacher and relearning how to be a learner. This [notebook] is a big help. I can make hypotheses, and they can be *wrong*—that's OK. . . . I can share observations and theories and be proud when someone says, "Ah, that's good. Tell me how it turns out." I can move at my own pace and ask my own questions. I like it.
>
> * * *
>
> My knowledge of the moon has become internalized. It is not what someone is trying to "teach" me. Rather, it is an area of interest I choose to explore. . . . That change has not occurred suddenly. The following excerpts from my journal may help to illustrate that transformation:
>
> 9/25 Moonwatching is proving difficult. I am never in the same place at the same time and in any event, I can't see it from my house. Irritating.
>
> 9/29 I'm finally succeeding at my moonwatching. I was looking too early in the evening and in the wrong direction. . . . Now that I've found it, I can watch it. [Little did I realize that once found is not always found!]
>
> 10/7 Even though being able to watch the moon is the most difficult part, I know I've already learned some things. (1) It isn't always the same color. (2) It goes from ☾ to ☽. (3) It rises and sets at different times. (4) It comes up in different places.
>
> 10/8 Learning about the moon is . . . like I have a bunch of unconnected facts—a puzzle. It's fun to think about it without being punished.
>
> 10/20 I have found the moon again. Yea!! It shines mostly during the day right now. Before this, even though I saw it sometimes during the day, I really thought it only shone at night.
>
> 10/22 I thought the moon had changed tilt and now I know it does. . . .
>
> 10/26 I am having a wonderful time learning about the moon. I can't believe how much it changes in just two days. . . .

The evolution from student to learner occurred over time as a change of perspective. In September, I saw the moon and its habits as external pieces of knowledge which were somehow requirements of the course. I now see them as orienting devices, a way of looking at learning.

* * *

At the beginning I didn't want to watch the moon. I felt that being required to do so was an imposition without any sense. Why did I have to watch the moon? Why did I have to write about it? I felt that in doing so I was being conducted to a new relationship with nature, that I was being told to relate with nature in a predetermined way. . . . During the first weeks of classes, I looked at the moon without allowing myself to get too much involved. I was trying to understand the course, trying to grasp what was really happening. Little by little things were getting clarified. But there was still one piece missing: The moon . . . I was still resisting to watch it. I wanted to understand, but I couldn't. I hadn't yet realized that in order to really learn about the moon . . . I had to watch it.

I must say that during this period, I did look at the moon more frequently than before. The discussions in class, my thought about the course, and mirrors [another subject of study] led me to an increasing curiosity: "There must be something in this moon-watching." And then I began to catch myself looking at it, thinking about it. . . .

Then, questions began to arise from this "casual watching". . . . The questions led to new questions, to new curiosities and, also, to new surprises. I'm still a beginner as a moon-watcher and I have thousands of questions: How do changes in shape occur? Why do I see it sometimes "here" and sometimes "there"? Does it move always at the same pace? Where does it go when I don't see it?

* * *

During my first observations of the moon was when I realized that my understanding of the moon had nothing to do with the theory, and that in fact I am very ignorant about the movement of it. I thought that the moon was sufficiently high and for that reason you could see it from every angle. I also thought that the moon was at the same place every night. This was my first discovery (to understand that my understanding of the moon was wrong).

* * *

October 10: *The Morning Moon*
6:00 A.M. What! The moon is where it was at 7:30 P.M. last time I saw it. It's early morning. What time did it rise? Why? Is there a connection between its waning and its rising time?

October 11–16: *The Moon Turns Around (or seems to)*
During this five-day period, I am intent upon systematically measuring the angle of the moon in the sky. I am also checking whether or not I can see it well into the morning. I record the moon on the 11th as shaped like this:

7:00 A.M. ☾

Then, between the 13th and 15th I lose it, don't see it at all.

One evening coming out of Longfellow Hall, 6:15 P.M., I see it right up Appian Way towards the Charles. As if that's not astonishing enough, I notice and record

(thank goodness) that the *direction of the horns has changed*. I commented on it in my diary, but had thought little more of it until right now.

6:15 P.M. ☽

* * *

I like a lot of things about the moon watching. I seem to connect with other things in the sky. I look up and observe the stars. I also watch the sun—especially when it sets.

I also like the idea that friends of mine are getting interested in the moon watching idea and discuss things with me. One friend called me up two weeks ago at 4:15 A.M. and told me to look at the huge moon in the western sky!

* * *

I felt that I knew a great deal about the moon (I'd thought about the moon as part of a unit in astronomy with sixth graders [I thought I had]). I knew things about orbits and distance and reflected light and was very comfortable that my familiarity with my friend the moon was an intimate one. The first class discussion clued me in to the fact that my knowledge of the moon falls far short of an understanding. My knowledge was one from a perspective way out in space looking in. It was always easy to think about these three objects in space and their interactions (sun, moon, earth). With this new perspective I had many questions without answers. . . .

Not knowing can be so much more fun than knowing. It's opened my eyes to look for understanding. I curse whatever it was that led me to believe this puzzle was solved.

The Students Explain: The Second Aspect

Having the students watch the moon corresponds to the first of the two aspects of teaching that I mentioned: it engages them in contact with phenomena. It serves this purpose at two levels. With regard to engaging with the solar system, it puts them in touch with the motions of the moon (and, it always turns out, of other heavenly bodies). With regard to engaging with teaching and learning, it puts them in touch with themselves and each other as learners, and with what I am doing as a teacher.

Similarly, the second aspect is brought into play at both of these levels. With regard to the motions of the moon, I continually ask them what they notice and what they make of it, and I encourage them to do the same with each other. The questions that we ask over and over again in class are: "What do you mean?" "Why do you think that?" "I don't quite get it." "Is that the same as what [someone else] thought they saw?" We also talk about what sense they are making of the primary subject of teaching and learning—what do they notice about this experience as learners and what do they make of that? The students also keep journals of their thoughts, their reactions, and the sense they are making of the discussions.

In some ways, it is easier to understand how this works with respect to teaching and learning than with respect to the solar system. After all, what one believes about teaching and learning is complicated, large-scale, hard to define, and close to the soul. If one stops to think about it, it is hard to imagine students learning

about teaching and learning *other than* by working out for themselves what they think. Of course, when I say "working out for themselves" I do not rule out presenting people with material for them to make sense of, as I try to describe here—I structure experiences in which they learn, try to explain what they are learning, watch others learn, try to help other people explain, and hear other people's ideas. But it is the *students* who make sense of all of this. It could not be otherwise. And they make sense by trying out their own ideas, by explaining what they think and why, and seeing how this holds up in other people's eyes, in their own eyes, and in the light of the phenomena they are trying to understand.

In other matters less close to the soul I believe that it works the same way. Whatever it is that a person believes and understands, it is *that person* who believes and understands it. Paley (1986), engaged in a very similar exercise in her teaching of three-year-olds, observed, "Why not just tell Frederick the truth: '*Of course* your mother has a birthday; everybody has a birthday.' Tempting as it might be to set the record straight, I have discovered that I can't seem to teach the children that which they don't already know" (p. 126). The best Paley can do is to accept the children's perspectives and to draw attention to some additional aspects they might think about at the same time. When older children or adults are struggling to make sense, they might be more inclined than Frederick to repeat what I have told them, but I have found that they are no more likely to have integrated it; I have not "set the record straight." Evidence to this effect comes up time and time again, whether the subject be the habits of the moon, a foreign language, fractions, photosynthesis, reading, or poetry.

Instead of explaining to the students, then, I ask them to explain to me what they think and why. I find the following results. (See Jones, 1977, and Moise, 1965, for similar views of teaching advanced mathematics.) First, in trying to make their thoughts clear for other people, students achieve greater clarity for themselves. Much of the learning is in the explaining. (Why should the teacher monopolize occasions for trying to make herself clear?) Second, the students themselves determine what it is they want to understand. It is not only the explanations which come from them, but also the questions. Third, people come to depend on themselves: they are the judges of what they know and believe. They know why they believe it, what questions they still have about it, the degree of uncertainty about it, what they want to know next about it, how it relates to what other people think. Any other "explanation" that they encounter must establish its place within what they know. Fourth, students recognize the powerful experience of having their ideas taken seriously, rather than simply screened for correspondence to what the teachers wanted. One student, an elementary school principal, speaks to these third and fourth points.

> Moon watching has been a profound experience for me. From the beginning, I was thoroughly engaged by the activity. . . . I wrote in my journal, "One of the things I love about moon-watching is this—as a non-scientific person, I have finally been afforded the opportunity to learn about a 'scientific' phenomenon without feeling dumb and unscientific because I don't know the scientific answers. Hurray . . . !"
>
> Here was a profound difference from my previous experience with science. Why? In this case, no premium was placed on "quick right answers." Instead,

> totally mistaken notions were not only accepted, but honored. . . . How could I feel dumb when whatever I was thinking was accepted with respect?
>
> Do I understand the moon now? I understand a great deal more than I did four months ago, but I feel fairly certain that some of what I "know" is probably wrong, and there's still a lot I don't begin to understand. Why doesn't that bother me? I no longer think I'm dumb if I don't know the "quick right answer". . . . What I do know about the moon is mine forever.

Fifth, students learn an enormous amount from each other:

> Class discussions have helped out a lot. Often people see the moon at different times than I do, and they can tentatively fill in some of my gaps in knowledge (the gaps won't really be filled in until *I* see things for myself). I also like to hear other people's hypotheses, because they give me other avenues and ideas to check out. I especially like it when I can't believe what someone else has seen—it makes me slow down and reevaluate my own notes and theories.

Finally, learners come to recognize knowledge as a human product, since they have produced their own knowledge and they know that they have. What is written in a book becomes viewed as somebody else's creation, a creation produced just as they produced their own. Its origin is not of another order. (By contrast, most students—adults and children—believe "knowledge" to be an absolute, which some people have caught on to, and which they, if they are smart enough, will be able to learn from someone who has caught on.) The following excerpt speaks to this point.

> I had seen the moon changing shape in regular ways, but I never thought of trying to make sense of this, to see it in connection to how the moon and sun and earth work. It's this connection that's been so exciting, this realizing that the moon that we see in our visible world can tell us about a larger world which I thought before was only to be found in classroom and libraries, that we can watch the world and begin to understand how it works. . . .
>
> It's exciting! It's opened up a way of thinking and learning about the world, a potential to slowly make sense of what I see and know and for this visible, familiar world to teach me about things I don't see or understand.

While the major burden is on the students to explain what they think, I actually do try to say much of what I myself believe on the subject of teaching and learning. I often remark on what I see in our work together and I try to say what I think about issues that students raise. (After all, I too am grateful for the occasion to learn from trying to say clearly what I think.) Yet, I have no illusions that what I say will mean the same thing to others as it does to me, nor that the students will, in general, give credence to what I say. But what I say does add to the assortment of things they have to think about.

However, in the case of the secondary subject in which they have as yet little interest and about which they have few ideas of their own (the moon, in this instance), I do not usually say what I think. My efforts are centered on enabling people to see that their own ideas are perfectly reasonable and, in fact, are the best starting points. It would be all too easy, if I were to give my account, for people to sit back, stop thinking, and assume that they understand what I am saying and

that what I say is right—not to mention the likelihood that the topic will cease to hold any interest for them if they are simply listening to what I think. I do, though, offer ideas for consideration if I can see a different point of view that no one else has mentioned. Sometimes such an idea is one that I believe in, and sometimes it is not. In either case, I do not present it as a "right" idea, but simply as another one that should be considered. (I usually introduce it by saying, "Some people say . . . . ") If discussion gets to a point where I am not at all sure what I think, then I might enter with my own tentative thoughts, acknowledged as mine.

The essential condition of having the students do the explaining is not the withholding of all the teacher's own thoughts. It is, rather, that the teacher not consider herself/himself the final arbiter of what the learner should think, nor the creator of what that learner does think. The important job for the teacher is to keep trying to find out what sense the students are making. This sometimes involves what have come to be called in my classes "monkey wrenches"—some idea or evidence that raises some question about what a learner has just said, even if that might be something I agree with. "Throwing a monkey wrench," instead of "reinforcing the right answer" (as the common wisdom of the trade goes) at first seems a perverse teaching practice. Yet it is *because* of the basic concerns of a teacher—*because* of wanting to be sure that students understand—that one remains noncommittal, resists early acceptance of a student's understanding, and searches for any soft spots that require more thinking.

There is one other important aspect to having students do the explaining. I try to have all the students share with me the responsibility of making sure they understand each other. This is tough for many people. For one thing, it is often hard to admit to oneself that one does not understand. Second, many (in fact, most) of the adults I have taught assume that if they have not understood what has been said, the shortcoming is their own. Few think that the speaker said it unclearly, and even fewer, that the speaker might not have been clear in his or her own mind.

The following excerpt indicates how significant it is even for competent adults to take this step.

> [We paid] careful attention . . . to the understanding of each other's understanding, as well as our own. . . . For the first time in my life, I heard myself say to a fellow classmate, in front of approximately fifty others, "I don't think I understand what you mean. Could you please say that again?" Never before had I experienced the self-confidence, the freedom and, perhaps, the comfort necessary to do such a thing. What is significant, however, is that such an honest statement on my part was able to lead to further explanation and exploration of the other's thoughts, thereby raising issues in his own mind to be shared with the others as he experienced them, himself. In a journal entry . . . I wrote the following:
>
> > For the first time, I was able to examine another's thoughts at work. Simultaneously, it seemed, I could examine my own. Excitement! I feel like a supercharged machine, discovering realms of my own capacities which I'd never know were there! What other worlds within worlds within me exist?
>
> Such euphoria was certainly not the norm, but what joy to experience! I felt as though my eyes and ears were operating at heights never before reached—certainly not within a classroom.

Teaching As Research

My view of teaching suggests an analogy to the work of a psychotherapist with a research interest. She is both a practitioner and a researcher. She could not possibly learn anything significant about psychodynamics if she were not genuinely engaged in the therapeutic process. It is only because she knows how to do her job as a practitioner that she is in a position to pursue her questions as researcher. I would like to propose that similarly, through teaching, one is in a position to pursue questions about the development of understanding that one could not pursue in any other way. If as a researcher one is interested in how people build their understanding, then the way to gain insight is to watch them do it, and try to make sense of it as it happens (to paraphrase Armstrong, 1980).

When I speak of "teaching," I do not necessarily mean school teaching. By "teacher" I mean someone who engages learners, who seeks to involve each person wholly—mind, sense of self, sense of humor, range of interests, interactions with other people—in learning. And, having engaged the learners, she finds her questions to be the same as those that a researcher into the nature of human learning wants to ask, What do you think and why? While the students learn, she learns, too. And it helps if, like Paley (1986), she is *curious* about her students' thoughts. How do other people really think about these matters? Which ideas build on which others and how? Which interests build on other interests? Which ideas get in the way of other ideas? What seem to be, in Hawkins's (1978) phrase, the "critical barriers" in this field? How does an idea get modified? How does a firmly-held conviction influence how a person reads an experience? What is the range of conceptions covered by a "right-sounding" work or phrase? In what circumstances is a person confused by/deaf to/helped by another person's thoughts? What factors keep interest high? How does a specific representation of one's thoughts influence how the thoughts develop further? How does a new idea lead to a new question, and vice versa? (See, for example, Armstrong, 1980; Bussis et al., 1985, Duckworth, 1986; Duckworth, in press; Duckworth, Julyan, & Rowe, 1985; Paley, 1986.)

This kind of research need not take place in a classroom. But it does require as researcher a teacher who knows ways into a subject matter well enough to engage a great variety of learners, and to keep them going as they ask and answer further questions.

After her experience in the course just described, Delaney (1986a), a high school teacher of government on leave from her classroom, did some pilot research of this kind. As she stated in the project proposal, "I am attempting to understand how two high school students [Mark and Tim] . . . make sense of the presidency. In so doing, I would like to be able to identify questions and problems that interest people and prompt them to take notice of their own understanding and to elaborate on it. I am especially interested in . . . four aspects of the presidency: the powers of the president, the restrictions on these powers, the relationship between the president and other government institutions (particularly Congress), and the relationship between the president and the electorate. These four aspects of the presidency seem to be sufficiently broad so that I might be able to glimpse how the national government is understood. Yet they are sufficiently focused so that we have specific problems and issues to explore" (p. 1). Each of her students kept a note-

book (equivalent to the moon-watching notebook) in which they recorded each day at least one observation of the president, taken from news broadcasts, papers, or magazines.

Even though she was "attempting to understand," her primary interest in the project was in being a teacher. "The most important goal of this project for me was that [they] learn to think about some aspect of the president in some new way" (Delaney, 1986a, p. 4). She did succeed in "engaging" the students, the first aspect of teaching described above. At the end of the study, she wrote, "The most amazing aspect of this project . . . has been how engaged both Mark and Tim stayed. Every time I called them [to confirm the meetings], they wanted to tell me what they thought of some event and ask what I thought." The following excerpts from one of her field reports further show how the two, research and teaching, are one. Tim was sick this day, and the following session took place with Mark alone.

> Mark rarely hesitates in stating his opinions or thoughts. If his statements seem contradictory to me and I ask him to explain, he calmly states each statement again, not bothering to reconcile the contradiction. (Delaney, 1986a, p. 20)
>
> In our last session, when I asked Mark if a person is disloyal to the country when he or she disagrees with the president, he replied: "No. You have to distinguish between two things. A president is gonna base his decision on two things: either on what the majority of the people like *or* on what he knows best. . . . If he decides to rule by his feelings on a subject on which he knows more than the public then you can't say those people are un-American. Not every American knows in-depth."
>
> Because I did not understand this explanation, I asked Mark about it again [in this session]. I read to him what he had said. He said, "Yeah, I know you didn't really understand all that. . . . " He explained: "People that do [know] as much as Reagan, they still disagree. Because on a particular subject, if they didn't agree . . . Now you got me stuck." "Good. . . . " Mark was truly stuck. He was hesitant from "particular subject" on. He does not like being stuck. When I replied "good," we both laughed. I could see him relax. (Delaney, 1986b, pp. 1-2)

Delaney chose to back off from that question for the time being, in order to put him at ease. Later she returned to it. This passage is particularly interesting in enabling us to see the kinds of decisions Delaney is making throughout this work.

> I asked him to explain once again his notions of the two ways presidents can make decisions. He said, "Well, first of all, it's not just the president. All politicians have that choice. . . . It would be good if politicians in order to get into office tell people what they want to hear, but once they're in just do what they think is best. . . . If what they're doing is right that's OK."
>
> My mind went in two different but related directions: (1) What if what the politicians do is wrong? and (2) who determines what is right and wrong, and how . . . For some time I had suspected that Mark's view of decision-making rested on an assumption that decisions could be classified into either right or wrong decision . . . [I asked him:] "How do you determine if a decision is right?" "What would benefit overall the people?" "How do you decide what would benefit the people overall?"
>
> "I'm not sure."

"Let's look at an example that we've talked about. . . . "
"Okay."
"Contra aid. In the public opinion polls, the majority of the American people seem to oppose aid to the contras. Yet the president supports it. How does he decide that the majority is wrong and he is right?"
" . . . You don't know that. The majority could be people who just don't like it. Some people know. Some don't."

From this statement I realized that Mark probably thought of the "majority" as one huge chunk—a monolithic entity holding the same views for the same reasons. . . . I suggested that we make up a poll. . . . I asked: "This 52% represents 624 individuals and this 48% represents 576 individuals. Had you thought of that?"
"Yes."
"Okay, how do you know if these 624 individuals know or do not know about the contra aid issue?"
He responded: "I could say the majority don't know or I could say the minority don't know. You would have to do a very in-depth study."

"Knowing" to Mark seems to be directly linked to "right" and "not knowing" to wrong. In this session and the last . . . he uses "right" and "knowing" interchangeably. To know is to be right. . . . I asked if it might be possible that some people in the majority be misinformed and some be informed? "It's hard to say . . . because some people just base it on what they saw in the news and not on what's real."

In this last statement we have plenty of questions for another [session]. . . . What's the difference between the news and "what's real?" Bypassing this for a moment, I decided to rephrase my question using his terminology. "Is it possible that some people in the majority base their decisions on the news and others on what's real?" Silence. Mark was thinking—*hard*. I could practically hear his brain working when he said, "Wow, I never thought of that before."
"What?"
"That a majority could have different reasons why they're on that side." (Delaney, 1986b, pp. 4–6).

Here was confirmation of her thoughts about how Mark was thinking (Delaney as researcher) and at the same time, a great new idea on his part (Delaney as teacher). The session had to come to an end shortly after this. Delaney asked Mark to watch the news "for examples of how people on the same side of an issue . . . may agree for different reasons," and for "more data on how the president decides."

Among her several comments on the session is this one, where she uses the insight gained into Mark's thinking to help her understand something that had puzzled her since the first session:

> From our last session, I had suspected that Mark's notion of decision-making rested on a belief that absolutely right and absolutely wrong decisions were possible, and that part of the president's job was to identify *the* right decision. He said in our first session, "It's wrong to change your opinion. You can't just change it like that." This seems a curious statement at first glance, and the juxtaposition of the statements seems even more curious. However, if you believe that your opinion is right then both statements and their relationship begin to make sense: If you *are* right then changing your opinion *is* wrong. (Delaney, 1986b, p. 9)

What, then, has Delaney learned as a researcher? On the face of it, it might look as if what she learned were particulars about Tim and Mark. Of course that *is* what she learned, and at one level we could say that what she learned helped her make specific decisions about how to go further with them. But there are other levels where her learning goes far beyond her work with Tim and Mark. She contributes to our knowledge of what is involved in an understanding of how the American government works, and how such understanding can evolve.

In her final report, she uses Hawkins's (1978) notion of "critical barriers" in discussing two factors she found to characterize Tim and Mark's ideas about the workings of the government. One factor was what she called "single-group nouns" —"majority," "public," and, also, "White House" (in referring vaguely to the president and/or his staff)—which the boys used, as she put it, to "communicate a single entity and obscure the diversity inherent in them." The second factor is their tendency to view the presidency in what she called "bipolar terms"—characterized by making "right" and "wrong" decisions. The first of these barriers makes it difficult, for example, to appreciate the central importance of diversity in a democracy. The second makes it difficult, for example, to appreciate why a democracy limits the powers of its leaders.

Even from this exceedingly small-scale study there seem to be countless questions for further teaching research into what is involved in order for people to come to understand the workings of a democratic government. That is one kind of contribution this approach to research makes.

Furthermore, in shedding light on the growth of understanding about a democratic government, such research also sheds light on the growth of understanding in general. Oversimplifying single-group nouns and viewing situations as bipolar are both widespread characteristics of human thinking and their study is a lively concern of psychologists (see Basseches, 1984). Just as specifics can only be understood through generalities, so generalities can only be understood through specifics: it is helpful to think of bipolar thinking as a critical barrier; at the same time, it is only possible to understand what critical barriers are when we see instances of them.

I believe there is yet another kind of knowledge to which this research contributes—namely, knowledge of curriculum possibilities. Delaney's attempts to learn how these youngsters understand government seem to me to indicate ways to *teach* youngsters about government. This almost seems like a tautology—the procedures which result in people getting involved enough to want to talk about what they think are the very procedures which result in people getting involved enough to learn. But if it is a tautology, it certainly has not been much recognized. In any event, she has also learned and written about how to approach the teaching of government in a way that I think would certainly be helpful to other classroom teachers. If we take "curriculum" to be ways of engaging students in giving thought to those matters which we think important, then she has started to develop curriculum.

School Teaching

Delaney did not carry out this research while working full-time as a school teacher. She used her capacities as a teacher, but in a less pressured situation. It is a rare

school teacher who has either the freedom or the time to think of her teaching as research, since much of her autonomy has been withdrawn in favor of the policies set by anonymous standard setters and test givers.

But even given the terrible constraints, and even if no resources are available to make known what they learn, there is some opportunity—and I think great need—for teachers to listen to their students explain what they think (for another perspective on this point, see Nussbaum & Novich, 1982).

A student in the course, who was at the same time teaching science in a middle school, did a project with small groups of students from her class (Young, 1986). The following are some of her comments about this work and her regular teaching job.

> I chose to center my field work around the topic of pulse as an avenue to understanding the . . . circulatory system (a curriculum which I was supposed to "cover"). Initially, I was doubtful about how far we could get with our investigation. I had never given pulse much thought and imagined that it offered a few tactile experiences but might not turn out leading the students on to more questions. . . . I was amazed to discover how much investigation was generated from the pulse work.
>
> My research on students' understanding of pulse is entwined with my . . . teaching. . . . The teacher is researching the student and his understanding and then trying to help that student move on to more unknown territory. My bent is to apply my small group work to my classes . . . ! This is the ultimate challenge. The task appears so immense and fragile with one or two people, that the prospect of applying the same concentration to a large group is overwhelming. I do think that it is possible though with some modifications.
>
> If nothing else . . . the teacher would be more sensitive to listening, observing and then talking with her students rather than at them. Although I did not initially link my research with what I do in room 126 at the Middle School, I now see a crucial relationship. . . . My research has become and hopefully will remain a vital element in my teaching. I realize that my understanding of myself as a learner weighs heavily on how I perceive the understanding of other learners. So, we in room 126 are all learners.

Conclusion

I am not proposing that school teachers single-handedly become published researchers in the development of human learning. Rather, I am proposing that teaching, practiced as a process of engaging learners in trying to make sense, might be the sine qua non of such research.

This kind of researcher would be a teacher in the sense of caring about some part of the world and how it works enough to want to make it accessible to others; she would be fascinated by the questions of how to engage people in it and how people make sense of it; she would have time and resources to pursue these questions to the depth of her interest, to write what she learned, and to contribute to theoretical and pedagogical discussions on the nature and development of human learning.

And then, I wonder—why should this be a separate research profession? There is no reason I can think of not to rearrange the resources available for education so that this description defines the job of a public school teacher.

So this paper ends with a romance. But then, it began with passion.

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