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### Movements of Mind: *The Matrix*, Metaphors, and Re-Imagining Education

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**Movements of Mind: *The Matrix*, Metaphors, and Re-imagining Education**  
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“Free your mind.” This exhortation becomes a refrain in the Wachowski brothers’ film, *The Matrix* (Silver, 1999), a visual study of movements of mind. Set sometime around the year 2199, the movie follows Morpheus, the leader of an underground resistance movement, as he guides the young hero, Neo, to a startling recognition: that what he believes to be reality at the end of the 20<sup>th</sup> century is in fact a computer-generated dream-world called the Matrix. This “prison for [the] mind,” as Morpheus describes it, was created not only to contain and control human beings but also to turn them into a source of energy to power the very construct that contains and controls them. Conceptualized and built by a singular artificial intelligence, the Matrix renders a particular version of reality both indiscernible as a construct and ineluctable as an experience for those who “live” unconsciously within it. The majority never learn that, although they believe they are living in the modern world, they in fact exist only in fields of pods, their minds engaged in a neural-interactive simulation, their bodies used as batteries to power the machines that masterminded the construct.

Through its use of two interrelated metaphors—reality is a computer program, and this specific computer program, the Matrix, is a system of social control—the film *The Matrix* paints a particularly nightmarish picture of human existence. The people who live within the Matrix are deluded, exploited, kept under control by an oppressive system, used as fuel to support someone else’s notion of life. Critics of the dominant models of formal education in the United States have characterized schools and schooling in similar terms—as forms of social control that keep students captive to dominant interests, notions, and practices (see Berman, 1984; Burbules, 1986; Franklin, 2000; Giroux, 1985; Greene, 1983; Popkewitz, 1988; Schlechty & Burke, 1980; Schutz, 2003; Thomas, 1985). It is for this reason that I evoke this popular film to analyze dominant metaphors for formal education in the United States and to argue for a profound rethinking of the educational “metaphors we live by” (Lakoff & Johnson, 1980).

*The Matrix* is an allegory, and thus by definition its themes and characters are concentrated and larger than life. Drawn from Greek mythology, Christianity, Orwellian notions of surveillance, ongoing debates about the dangers and possibilities of technology in general and artificial intelligence in particular, and pedagogy, the themes and characters evoke and weave together multiple realms of human theory and practice. Like any representation offered to us by popular culture, the film reflects a particular or possible version of our modern world, and we can either attempt to look away from this amplified reflection or take it up as a heuristic device. In the following discussion I focus on the last of the realms of human theory and practice I list above—pedagogy—and use the governing metaphors and characters in *The Matrix* to illuminate and examine both the ways of thinking about and enacting formal education that we have consciously and unconsciously embraced and to point to possible alternatives. This article represents an effort to enact what I am calling for: an interaction with metaphors presented by popular culture and a choice to take them on in an active and critical way.

The metaphors that have dominated notions and practices of formal schooling in the United States are education as production and education as cure. As I will discuss in detail, these metaphors are based on claims of improving the human condition, and yet their underlying premises—that students are quantifiable products to be packaged or diseased beings in need of remedy—are as deadly as the premise of *The Matrix*: despite and even in the name of their claims, they disable and control those within their constructs. The disabling premise of the Matrix is counterbalanced, however, by the powerful model of education that Morpheus and Neo enact in the film. Morpheus takes Neo on as an apprentice because he perceives that Neo, despite the context in which he has existed, has experienced the precursor to critical thought, a capacity essential to learning: “an *unsettlement*” in understanding, a perception that things don’t match or add up, and an impulse toward “overcoming [that] disturbance” (Dewey, 1916, p. 326). Morpheus believes that Neo’s capacity for critical thought invests him with the potential to free not only his own mind but also to help free all humankind from the prison of the Matrix.

To help Neo substantiate his unsettlement of mind, Morpheus leads him through a series of “training programs”—computer-generated simulations designed to let Neo experience and learn for himself the essential lesson that the terms of his existence, the rules of the world he believes to be hard and fast, “Rules like gravity,” are in fact like the rules of a computer program. As Morpheus explains, “Some [of these rules] can be bent, others can be broken”

(Silver, 1999). What Neo must learn is that the most basic principles and characteristics of the Matrix, those things he took for granted and did not question, are in fact not only open to question but also to rejection and replacement. Striking the always precarious balance between pushing and supporting, challenging and reassuring, Morpheus enacts a pedagogy meant to put Neo in control of his own learning.

As a teacher, Morpheus has knowledge that Neo does not, but part of what he knows is that Neo will ultimately know and be able to do something that Morpheus himself cannot. Morpheus knows that Neo can free humankind from the Matrix, but he doesn't know how, just that Neo needs to believe in and create himself anew to do it. Throughout the movie, Morpheus reiterates this phrase: "I can only show you the door; you're the one who has to walk through it" (Silver, 1999). With yet another metaphor, Morpheus models a way of teaching and supports Neo in a way of learning that sharply contrast the premises of the construct that makes the Matrix a reality for those who unconsciously live within it. It provides us as well with the terms of a challenge that we as educators must strive to meet on two levels: we must "free our minds" to seek other metaphors for education, and, specifically, we must seek or create metaphors to support students in freeing their own minds.

The challenge to "free your mind" is, of course, not possible to achieve in any final and absolute sense. Our minds can never be entirely free; it is the nature of human experience, as we know it thus far, that we always see, in any given moment, from a particular perspective, from within a particular frame of mind. But we can shift perspectives, we can undertake movements of mind from one frame to another, we can engage in a method of exploration and analysis that can work as metaphor itself works: to "reorient consciousness" and "help us move from a kind of confinement to something wider" (Greene, 2000). We can deliberately choose other ways of thinking, naming, and being, even as the dominant models of schooling and many of the people who function within them are trying to keep us contained and controlled.

This conscious and deliberate making of choices with minds that are free from the constraints of a single construct might perhaps replace production and cure as the goals of education. I see the discussion offer here as one of many efforts, my own and others', to explore the power of metaphor to heighten awareness of existing ways of thinking and acting and to prompt educators to think and act differently. The most basic arguments made are that, by finding ways to free the mind enough to see anew, it is possible to improve the "realities" of

education, and that, because metaphor is so central a feature of human thought, a critical analysis of and through metaphor should be central to this attempt.

### **Why Metaphor?**

There is something particular about the intersection of the human mind and the physical universe in which we live that makes metaphor an obvious, perhaps ineluctable, vehicle for carrying human meaning (Fernandez, 1971; see also Quine, 1963, pp. 83ff). Studies at the intersection of neurobiology, linguistics, philosophy, and other fields (see Lakoff, 2002, and Lakoff & Johnson, 1999) reinforce what theorists across the fields of education, philosophy, anthropology, and linguistics have argued for many years: that making and remaking reality with our minds is the way human beings make sense of the world, and that much of this sense-making is accomplished through metaphor. As the “primary source of all our concepts” (Sfard, 1998, p. 4), metaphors “govern our everyday thoughts and actions in both conscious and unconscious ways” (Lakoff & Johnson, 1980, p. 3). By “asserting something to be what it is plainly known not to be” (Ortony, 1979, p. 21; see also Black, 1962 and Aristotle, 1457b), a metaphor allows people to see something *as* something else because it is not, in fact, that other thing (Schön, 1979). Through a kind of paradoxical process, a metaphor expresses to us “significant and surprising truths” (Scheffler, 1991, p. 45; see also Oliver, 1994; Ortony, 1979) or “provides us with new perspectives” (Turner, 1974, p. 31; see also Black, 1962, and Petrie, 1970). In the space of imagination a metaphor opens up—a liminal space, an “in-between place which bridges the indicative (what is) and the subjunctive (what can or will be)” (Turner, 1980, p. 159)—the mind moves itself from one “place” of understanding to another.

Richardson reminds us that the process of sense-making in which we continually engage not only “unfolds within a metaphoric structure” but is also always “value constituting” (1997, p. 45)—it is “making sense in a particular way, privileging one ordering of ‘facts’ over others” (Morgan, 1986, p. 12). Every metaphor assumes or generates a lexicon, a vocabulary, a way of naming within the conceptual framework of the metaphor, which embodies and reflects certain underlying values, and which has the potential, if taken as totalizing, to eclipse other ways of thinking and behaving. Because metaphors not only foreground certain qualities but also obscure or eliminate others, they can lead people to assume or accept that one particular way of thinking is the only way to think and one set of particular practices the only possible set. Thus rethinking

metaphors is essential to their function as expansive rather than constrictive modes of thought. A brief preview of one of the metaphors I explore in detail in a subsequent section of this discussion will illustrate what I mean.

Education is production. This overarching metaphor generates a whole set of associated metaphors that name the structures of and participants in education: schools are factories, teachers are factory workers or managers, students are products. The lexicon of this metaphorical system foregrounds things mechanical, efficient, repetitive, standard, and passive and all but eliminates things imaginative, creative, various, divergent, and active. When the dominant notion of education is the manufacturing of students, there is no possibility of students' self-creation. Rather, students are commodities produced by others, prepared to enter and compete for purchase in what Sfard (1998) describes as an increasingly materialistic world.

People are "born into metaphorical meaning systems" (Bullough & Gitlin, 2001, p. 49), just as characters in *The Matrix* are born into that construct. Therefore, identifying and exploring the metaphors by which we live can give us access to "the taken-for-granted assumptions that characterize differing cultural and institutional contexts as well as self" (Bullough & Gitlin, 2001, p. 49). So, for example, were we to question the assumptions behind the metaphor, education is production, we might ask: Is efficiency more important than quality or engagement? What happens to the imagination of a factory worker? What are the implications for a society of privileging competition among individual products over, say, contribution to community?

When we begin to ask such questions we see that the metaphors that convey our meanings are "fabrications" (Nowotny, 1962, p. 89)—they are "mappings of the mind" (Lakoff, 2002)—and thus although they may seem obvious and 'natural,' they are actually "a prime means of seeing into the life not of things but of the creative human consciousness, framer of its own world" (Nowotny, 1962, p. 89). As "products of the human mind," metaphors are "open to appraisal and criticism, adoption, rejection, or modification" (Fentemacher & Soltis, 1992, p. 4), but that does not mean that people do normally or even usually engage in these critical processes. When one embraces a single, definitive metaphor, consciously or unconsciously, and does not recognize or acknowledge the premises underlying it, then the metaphor can be more deluding than illuminating. As a basic mechanism behind any conceptualization, metaphors make our abstract thinking possible, yet many of them "keep human imagination within the confines of our former experience and conceptions" (Sfard, 1998, p. 5).

If, however, the terms of a metaphor have the power to “‘engender’ thought in their coactivity” (Turner, 1974, p. 29), and if metaphors can open up spaces of imagination and action as well as close them down (Greene, 2000; Morgan, 1986), then making conscious and explicit the metaphors that shape thinking and practice in education is not just a theoretical exercise; it is a matter of uncovering the assumptions that underlie our interpretations so that we can more deliberately direct our actions (Cook-Sather, 2001a and 2001b; Fernandez, 1971). Our persistence in conceptualizing education as production has caused us to recreate structures of schooling that are mechanical, confine teachers to unending and repetitive work, and set students on a conveyor belt toward more of the same. Little wonder that proposed educational reforms reoccur in successive generations: we have not yet succeeded in freeing our minds sufficiently to embrace or imagine other metaphors to live, teach, and learn by. We must uncover our assumptions and redirect our actions if we want education to be about something other than this. The very process of uncovering and redirecting defines, in fact, what the work of education should be: those of us who call ourselves teachers must find, create, and embrace metaphors that cast us but also, and more importantly, students as active creators not only of their education but also, like Neo, of themselves.

### **Discerning “Realities”**

My study of educational metaphors has yielded a wide and striking variety (see Appendix I), but, because they have proven the most powerful and enduring, I focus on two “root metaphors” that have shaped dominant notions and practices of education in the United States since early in its history. A root metaphor is common-sense fact whose structure, when understood, can appear to explain a variety of related phenomena (Pepper, 1942, pp. 38-39; see also Ortony, 1979). As the word “root” suggests, such a common-sense fact exists “under ground”; it is out of sight, but it nevertheless constitutes the most basic support system for what branches above the surface. Because it is not necessarily visible, a root metaphor must be dug up to be discerned.

The two root metaphors I explore—education as production and education as cure—have coexisted in the field of education at least since the industrial revolution in the United States, although the latter metaphor has been in evidence since shortly after the founding of the nation. Each assumes and generates a lexicon, a vocabulary, a way of naming within the conceptual

framework of the metaphor, which embodies and reflects certain underlying values. The various metaphors that theorists have discerned as manifestations of the root metaphors of education as production and education as cure focus on schools and teachers. Although these two metaphors have powerful implications for the student's role in formal schooling, they are not based in education theory, nor do they foreground that role. It is in the role of the student that I am most interested, and it is with a mind toward shifting our focus to students that I review the dominant educational metaphors in the United States and propose that we need alternative ways of conceptualizing the role of students in their own education.

### Education as Production

The notion of production takes a particularly literal and graphic form in *The Matrix*: human beings are efficiently grown and recycled so that they can produce energy to power the machines that sustain the Matrix construct. Embodying a much earlier version of a “cult of efficiency” (Callahan, 1962) that was born of the industrial revolution in the United States, the conceptual framework that the metaphor of education as production provides includes reference to the roles, lexicon, and the actions and interactions of the 19<sup>th</sup> century business of production—the manager, the factory worker, “the sorting machine” (Spring, 1976). Critics coined the metaphor, a school is a factory (see Bullough, 1988; Schlechty, 1991), to illuminate how, during the early 19<sup>th</sup> century, urban schools in particular “came to be viewed as institutions to be managed and a set of educational experiences to be organized” (Schlechty, 1991, p. 21). Within these institutions, “school leaders, like the industrial leaders they looked to as models and guides, sought the Holy Grail of scientific management” (Schlechty, 1991, p. 21). By the 1850's public discussion about educational policy illustrated the “complete acceptance of the industrial model by educators” (Schlechty, 1991, p. 21). The graded school that was conceptualized at that time “was to be one of the chief tools used in the process of manufacturing good Americans” (Schultz, 1973, p. 131).

Within this manufacturing process, curriculum is “an assembly line down which students go” (Schlechty, 1991, p. 42) and students are “products to be molded, tested against common standards, and inspected carefully before being passed on to the next workbench for further processing” (Schlechty, 1991, p. 21). Such a concept of school led to “reductionistic, ‘parts-catalog’ approaches to teaching and learning” (Zehm, 1999, p. 43). This “bureaucratic model”

(Kliebard cited in Pinar, 1978) is characterized by, among other things, its “allegiance to behaviourism and what Macdonald has termed a ‘technological rationality’” (Pinar, 1978, p. 205). Obsessed with efficiency and scientific management, both educators and the general public not only embraced but also idealized production as the model for education. The metaphor “pervaded the larger culture” (Perrone, 2000, p. 30) and continues to do so, as evidenced by the increasingly frequent imposition on students of standardized tests (Kohn, 2000).

Within the conceptual framework of education as production, teachers can be cast as workers, as machines themselves, or as managers. When a teacher is a factory worker, she is “not very skilled, not very insightful, and, within the context of ‘real’ professions such as law and medicine, not very bright” (Schlechty, 1991, p. 23). Furthermore,

. . .the control structures of the school are the control structures of the factory: tight supervision and product inspection. Curriculum design and the quest for teacher-proof materials dominate the thinking of many center office functionaries, but the curriculum guides must be made simple for teachers as well as students. Above all, the curriculum must be articulated with the tests that will be used to inspect the students who are the products of the controlled and rational process. (Schlechty, 1991, p. 23)

An underlying premise here is that there is limited utility for teachers to fashion the curriculum; like workers in a factory, they are best off following directions. Classic examples of control structures for teachers aimed at efficient production are packaged curricula, readers, and textbooks organized into tightly sequenced units and accompanied by teachers’ guides—forms of highly structured, step by step instructions that actively discourage creativity, critical thinking, or any kind of deviation from the standard set forth in the manuals.

Within this construct of education as production teachers can also be cast as mechanical themselves. One teacher describes himself as “a well-ordered machine,” explaining: “My job seems to be like an engine that is well taken care of. Everything works the way it is supposed to work. There is a set rhythm and reason to why things work in the way they do” (Efron & Joseph, 2001, p. 78). This machine works within “a time frame in which you have a set of goals and objectives that need to be accomplished. You take a student from this point to that point” (Efron & Joseph, 2001, p. 78). As Efron & Joseph suggest, this teacher is “a technician” who keeps the “factory—the educational machine—operating” (2001, p. 78).

Finally, when the teacher is the mastermind that oversees the work of production, the teacher is an executive. Here the teacher is the manager of a system, located not “inside” the

process of teaching and learning but rather “outside,” a position from which he or she “regulates the content and the activities on the learner” (Fenstermacher & Soltis, 1992, p. 16). This model casts teachers as “highly skilled technocrats: professionals in the sense that engineers, accountants, and architects are professionals” (Schlechty, 1991, p. 23). Within the conceptual framework of this metaphor, the teacher appears to be “the manager of a kind of production line, where students enter the factory as raw material and are somehow ‘assembled’ as persons” (Fenstermacher & Soltis, 1992, p. 16).

The root metaphor of education as production and the multiple branches that spring from it—school as factory, curriculum as assembly line, teacher as factory worker, machine, or executive, and students as products—create a version of reality that is scarcely more humane than the construct of the Matrix. Rice sharply critiqued the factory model of schools at the time of its emergence: “The school has been converted into the most dehumanizing institution that I have ever laid eyes upon, each child being treated as if he possessed a memory and the faculty of speech, but no individuality, no sensibilities, no soul” (1893a, p. 31). Although the root metaphor of education as production includes three different metaphors for teachers, each of which accords teachers a different degree and kind of authority, all three cast students in basically the same role: they are marched through drills and hurried through worksheets that test them on discrete, disconnected, and deadly boring bits of information; they are taken ““from this point to that point”” (Efron & Joseph, 2001, p. 78); they are ““‘assembled’ as persons” (Fenstermacher & Soltis, 1992, p. 16). Within this metaphorical framework and the practices it engenders there is no place or incentive to “attend to whether or not learning is meaningful or satisfying for the students” (Greene in Efron & Joseph, 2001 p. 79). And as Dewey queries, “What avail is it to win prescribed amounts of information...if in the process the individual loses his own soul?” (1938, p. 49).

The experience of students, even at privileged and ostensibly “good” schools, is indeed one of being shuffled along a conveyor belt. One student describes his life:

6 o’clock in the morning my alarm goes off and I go to school all day long, and then I go to work for five hours, I don’t get home until eight o’clock, and then I do four hours of homework, and then I wanna just sit back and just do nothing, and I can’t, I gotta hurry up and fall asleep but I’m so wired from the day that I can’t fall asleep and before I know it, the alarm, and I gotta do it all again, and the next day...(Transcript of Discussion among High School Students, September 25, 2002).

Pope (2001) suggests that “we are creating a generation of stressed out, materialistic, and miseducated students,” and this student’s description of his life offers some evidence for the truth of this assertion. If students are trained to enact highly scripted, grueling, pre-set motions that are going to lead them to prescribed ends, they are little more than the automatons in *The Matrix*.

By making arguments for the betterment of the economic state of the country and the maintenance of the United States as the primary world power, proponents of education as production actually effect a worsening of the human state. Students enact the production metaphor themselves: studying to compete and complete rather than explore and examine, and wearing themselves out in the process. Any innovative thinking or behavior, although it might invigorate students, would hinder production. Thus, such a metaphor, under the pretext of advocating advancement, argues for and effects ways of keeping the social structure the same. As within the Matrix, education as production carried to its extreme sacrifices the human spirit and soul for the efficiency of scientific management and mass production.

### Education as Cure

The root metaphor of education as production eclipsed the human with the mechanical; the root metaphor of education as cure reasserts the human. But just as production in the educational realm was seen as inefficient, this second root metaphor is premised on another perceived problem that needs remedy. The characters and themes of *The Matrix* once again serve to illuminate these issues in education. Discussing at one point the construction of the Matrix, one of its gatekeepers, Agent Smith, explains how an earlier iteration of the Matrix construct failed because the programmers had created “a perfect human world, where none suffered” (Silver, 1999). Agent Smith suggests that the reason the first Matrix failed was because human beings define their reality through misery and suffering; therefore, they rejected a “reality” in which everyone was healthy and happy. He goes further to suggest that people are the cause of their own and others’ suffering—“human beings are a disease”—and in the face of this illness, the artificial intelligence that has created the Matrix is “the cure” (Silver, 1999).

The centrality of sickness, as a constituent and also an obsession, is clearly manifest in this second root metaphor for education in the United States. Schlechty (1991) suggests that the

notion of the school as a hospital was an outgrowth of “the perception that the legitimate purpose of schools is to redress the pain and suffering imposed on children by the urban industrial society” (Schlechty, 1991, p. 25). But the reaction against industrialization was not the first manifestation of the root metaphor of education as cure. The original ill that schools were established to remedy was one that colonists brought with them to the “new world” and is strikingly close to Agent Smith’s assessment of human beings as a species: children’s innately sinful and evil nature. In colonial America children were thought to be “‘born into sin and creatures of Hell, Death, and Wrath and therefore corrupt natures” (Mather in Allison, 1995, p. 9). Characterized as “‘depraved, unregenerate, and damned,”” children “had to be broken so they could be taught ‘humility and tractableness”” (Robinson in Allison, 1995, p. 9). Among the first laws passed in the United States requiring the establishment of schools was the *Old Deluder Satan Act* passed in 1647 in Massachusetts (Allison, 1995; Spring, 1994). The purpose of the law was to ensure that young people learned how to read the Bible and thereby be “treated” for their innate ills and immunized against future depravity.

Words such as “illness” and “remedy” need not appear in this discourse for the root metaphor, or what Schön (1979) calls the generative metaphor, to underlie the story. Throughout United States history the root metaphor of education as cure has taken different forms:

... some nineteenth century supporters of education argued that crime could be eliminated in a society only through the proper education of children... In the twentieth century this impulse continued and expanded as schools adopted programs designed to end drug abuse and alcoholism, reduce traffic accidents, and improve community health... (Spring, 1978, p. 3)

If education is a cure, the job of educational institutions, personnel, and processes is to assess perceived illnesses or deficiencies and implement a regimen to remedy them. Within this metaphorical framework, the curriculum becomes a prescription, with the ideal prescription being highly individualized—administered to each student depending on his or her needs and deficiencies (Schlechty, 1991) and capitalizing on his or her strengths. These deficiencies and needs are assessed and treated through diagnostic testing, the use of scientific instruments, and “intervention strategies (treatments) based on research and derived from clinical trials” (Schlechty, 1991, p. 26). This metaphor privileges faith in rigorous medical practice, and it assumes and asserts that such practice is the answer to persisting problems in the United States.

Within the realm and lexicon of the metaphor of education as cure, two metaphors drawn from clinical practice cast the teacher as clinician. One is the idea that a teacher is a diagnostician. “[A] diagnostic teacher is one who casts oneself as an observer, scrutinizer, and assessor, as well as an engaged leader” (Solomon, 1999, p. xvi). Diagnostic teachers “seek to know students’ current understandings and misconceptions.” They aim also to “deepen their own subject-area knowledge and make judgments about what concepts are worth teaching.” Furthermore, they “assess their own beliefs and practices, selecting, designing, and redesigning appropriate pedagogical strategies and curriculum materials that make sense given students’ understandings and the concepts and skills they want to promote” (Solomon, 1999, p. xvi-xvii)—like a doctor assessing the needs of a sick patient. A diagnostic teacher assumes “a stance of critical scrutiny” (Solomon & Morocco, 1999, p. 231).

A second metaphor for teacher has its roots in progressive models of education and in the advent of various forms of psycho-analysis—where these work to humanize education: a teacher is a therapist. A teacher is “an empathetic person charged with helping individuals grow personally and reach a high level of self-actualization, understanding, and acceptance” (Fenstermacher & Soltis, 1992, p. 4). According to this model, the teacher does not impart knowledge and skill to students; rather, he or she helps students gain their own knowledge and skill (Fenstermacher & Soltis, 1992, p. 33). Teachers in the role of therapist are certainly situated in greater proximity to students and the learning process than those who are guided by industrial metaphors, but the persisting underlying assumption of illness needing remedy is troubling. The premise of illness keeps students passive and ailing (or potentially ailing) with the only remedy being the active intervention of educators. Furthermore, this metaphor can prompt some teachers to feel a conflict regarding their responsibilities. Many teachers see themselves as “providing emotional support for their students” (Fischer & Kiefer, 2001, p. 108). But some feel that “balancing their major role of educating with that of therapist or counselor” is a challenge (Fischer & Kiefer, 2001, p. 108).

The root metaphor of education as cure and the multiple branches that spring from it—the school as hospital, curriculum as prescription, the teacher as diagnostician or therapist, and the student as sick patient—create a version of reality that, although ostensibly more humane, casts students as ill and in need of remedy. The positive face of this metaphor is that education can be understood as care: caring for students and caring that they become healthy—or using their

strengths to help overcome weaknesses. But the assumption that they are unhealthy and the schools' prescribed courses or remedies constitute the only possible cure is problematic. Theoretically, the metaphors of school as hospital and education as cure elevate the student from the role of "product," which students occupy within the education as production metaphor, but it keeps the student in a dependent role: "the role of client dependent on the expert" (Schlechty, 1991, p. 26). Students are patients who accumulate records of tests and regimens of treatments. It is these records and regimens that define students and what happens to them. Nowhere is the language of this metaphor more pervasive than in special education and remedial programs—two places in school where one is most likely to find academic "casualties" (Schlechty, 1991, p. 27). The "at-risk" student who needs the "remedy" of a remedial program is cast as sick or at risk of falling out of society unless ministered to by the school and its personnel.

The recent proliferation of possible diseases with which students can be diagnosed—multiple forms of attention and physical "deficits" and "disabilities"—as well as the rise in prescription of drugs (such as Ritalin) and of programs of treatment (such as Individualized Educational Plans) clearly illustrate our culture's construction of student disability (McDermott & Varenne, 1985). If students want to receive the services and interventions of the school, they must be sick, and if they want to keep receiving attention, they must get sicker and sicker. Therefore, students' restlessness of body as well as mind, for which we generate ever-new diagnoses, suggest that the cure we offer students called education is actually intensifying their supposed illness.

Although the root metaphors of education as production and cure are premised on different lexicons and engender different notions of educational practice, they have similar effects on students. Both keep students passive, as products or patients, confined within institutions that contain and control, like factories and hospitals, and managed by teachers who are technicians or managers on the one hand or diagnosticians and therapists on the other. Heeding the lessons offered by critics who explore these metaphors, I am interested in what might happen if we were to develop metaphors for education aimed at creating a system in which those engaged in formal education were more active agents in creating their education and themselves. In the next section I evoke arguments made for having students participate actively in designing and reforming their educations, and then I turn to a brief discussion of some of the metaphors that have supported such a reconceptualization of the role of student. But since, to be

generative, metaphors must emerge from and be explored within specific contexts and relationships, the emphasis in my discussion is on freeing our minds to find and enact new metaphors. Like Neo, as he explains at the end of *The Matrix*, “I didn’t come here to tell you how this is going to end. I came here to tell you how it’s going to begin” (Silver, 1999).

### **Toward Other Movements of Mind and Other Possible Worlds**

Adhering, either consciously or unconsciously, to metaphors such as education as production or education as cure keeps the power and responsibility for education in the hands of those policy makers, theorists, and practitioners who have always dictated what forms education should take and how education should be reformed. Yet as Corbett & Wilson (1995) have argued, we need in our educational approaches and reforms to make a difference with, not for, students, because there is something amiss about a system that does not consult the constituency it is intended to serve (Cook-Sather, 2002c). A growing body of research and practice aimed at putting more of the power and responsibility into the hands of students supports the need for “a fundamental shift of the dominant epistemology in our society and our schools to one based on trusting, listening to, and respecting the minds of all participants in schooling” (Oldfather et al., 1999, p. 313; see also Fielding, 2001; Shultz & Cook-Sather, 2001; Weis & Fine, 1993; Wilson & Corbett, 2001). If educators attend to students as knowledgeable participants in the work of conceptualizing and enacting educational processes, students are motivated to participate constructively in their education (Colsant, 1995; Oldfather et al., 1999; Sanon, Baxter, Fortune, & Opotow, 2001; Shultz & Cook-Sather, 2001). Their motivation comes in large part from their inclusion as partners in the process of educational change (Maitra, 2001); they are active creators rather than passive recipients or victims. Such collaboration with students entails making explicit with them the processes of schooling at play—surfacing education as an important, central curricular topic. It entails as well giving students some analytic tools with which to examine how they think and learn as they do and being open to the analytic tools students have to offer to us as teachers. Without such motivated participation, education is bound to fail.

Paley argues that “the first order of reality in the classroom is the student’s point of view” (quoted in Evans, 2002, p. 49), and yet more often than not, when student perspectives are sought at all, it is through “insistent imperatives of accountability rather than enduring commitments to democratic agency” (Fielding, 2001, p. 123). Unless our goals as a nation are, in

fact, to invent and reinvent various forms of social control through our educational practices, we need new metaphors to guide our ways of thinking and acting in the realm of education. There is a power to the way things are. Education must be guided by metaphors that unsettle, that expect students to seek, find, and invent what we do not yet know, that lead us not only to imagine but also to create other possible worlds.

The work of freeing the mind enough to imagine other possible worlds is difficult work. Throughout *The Matrix*, Neo's struggles to free his mind, to convince himself that the realities he perceived were but constructs, illustrate the power of ways of thinking and acting that have been deeply internalized. As Morpheus acknowledges, "the mind," particularly after it has been held captive a long time, "has trouble letting go" (Silver, 1999). Those of us who have spent our lives living within the constructs of metaphors for education such as production and cure may also have trouble freeing our minds from these ways of thinking and acting. We must try, however, or we recreate and perpetuate versions of the Matrix.

Some metaphors, with which progressive educators have struggled for years against the dominant ones, strive for more humane ways to conceptualize and practice education and thus have made a beginning that needs to be pursued. Among these are education as growth, learning as participation, and the teacher as gardener. In the tradition of Rousseau (1762) and Herbart (1901), Dewey's (1916) metaphor of education as growth proposed nurturing, child-centered education, such as that offered in Waldorf and Montessori schools and in pockets of progressivism in all school systems. Sfard (1998) offers another potentially generative metaphor: learning as participation. Within this conceptual frame, learning is "a process of becoming a member of a certain community"; it is the development of the ability "to communicate in the language of this community and act according to its particular norms" (Sfard, 1998, p. 6). A third metaphor that surfaces not only in the United States but also in China (see Paine, 1995) is the teacher as gardener. Scheffler explains that this metaphor constructs the teacher's role as one of studying and then indirectly helping the development of the child rather than shaping him "into some preconceived form" (Scheffler, 1991, p. 47). A teacher takes students as a "mixed bag of seeds" that she "has to find a way to nurture." She "wants the best for the seeds" that she plants, and to be the best teacher she can be, she learns "how to learn from the seedlings" (Pakola quoted in Allender, 2001, p. 123, p. 117, p. 118). (See Appendix I for a discussion of these and other metaphors).

These life-affirming, creative metaphors, which foreground human relationships, interdependence, communication, and various forms of evolution, stand in contrast to mechanistic and medical models that assume deficits, deficiencies, and disease. And yet none has been powerful enough to displace the dominant metaphors for education, learning, and teachers in the United States. Although even child-centered teaching can come under criticism when the notion of child works to normalize and exclude those who do not fit the “ideal” (Walker, 1998), progressive and constructivist notions of learning (Parker, 1894; Dewey, 1916; Bruner, 1977; Duckworth, 1987) offer us the most generative source from which to draw metaphors for education that cast the student as the one who actively effects her own education, not only is nurtured within others’ constructed environments. Displacing the notion that a student is “passive, isolated, and rightfully dependent on the expertise and experience of others” (see Bullough & Gitlin, 2001, for a critique of this notion), we need metaphors that conceptualize and position students as the active makers of not only their own meaning but also of themselves. The metaphor for education that I have developed and discuss elsewhere, education as translation, aims to reposition students and reconceptualize education in some of the ways I discuss above. It casts students as active agents engaged in an ongoing, interactive and reflective process of making new versions of themselves—versions that are at once duplications, revisions, and recreations, with meaning lost, preserved, and created anew with different textures, boundaries, and resonances (see Cook-Sather, 2001a and 2001b, Cook-Sather, forthcoming, and Cook-Sather, under review). And yet I do not suggest that this metaphor is the final answer. Educators must discern or create the specific metaphors that guide their beliefs and actions in their own particular contexts and with as well as in support of their own students.

Let us return one last time to *The Matrix* as it connects with the metaphors I have just discussed to clarify what education that casts students as active agents might look like. After working his way through simulation programs, consulting a wise old “oracle,” questioning and rethinking in conversation with Morpheus and others, failing several times to free his mind enough to escape the mortal threats the Matrix poses, and then slowly beginning to succeed—all under the guidance not only of Morpheus but also of other “students” striving to free themselves from the Matrix—Neo begins to believe that he understands and cares enough to let go of his old beliefs in gravity and inertia—rules that, within the construct and allegory of *The Matrix*, govern only one particular version of reality. In the last few minutes of the movie, Neo succeeds in

defying these rules and immediately thereafter has a moment of double vision, in which he sees simultaneously the “reality” within the Matrix and the code through which the construct is programmed. This moment is the most vivid visual representation of Neo’s movement of mind from one frame of reference to another, from one way of understanding reality to another, from one way of life to another. With the support of others and through his own exploration, he has indeed been able to “reorient consciousness” and “move from a kind of confinement to something wider” (Greene, 2000).

Watching Neo, we realize that what his teachers have accomplished is not only creating space for experimentation, consultation, failure, critical reflection, and renewed effort—as do educators guided by metaphors such as education as growth and learning as participation—but also from within that space they have helped Neo to realize the necessity of transforming himself. Furthermore, this neophyte turned future leader has learned—as I also discuss, regarding the metaphor of education as translation, that a neophyte in any new context must learn—that the most, perhaps only, effective transformation is one effected by the self with the guidance and support of others. We realize the relevance of this notion of education through engaging with the metaphors of the movie, not through any literal interpretation of what Neo has learned to do. If we actively take up what this popular film has to offer not as an end-point or an answer, but rather as part of a process, we make an effort to make meaning between its terms and ours. We too “reorient consciousness” and “move from a kind of confinement to something wider” (Greene, 2000).

So what metaphors can be of most help to us as teachers and learners if our goal is to foster among our students transformation of the self by the self? To discern and explore the metaphors that guide their pedagogical theories and practices, and to imagine other possibilities, teachers need opportunities to articulate and reflect on those metaphors (Efron & Joseph, 2001; Fischer & Kiefer, 2001). This is not only true for teachers but for students as well. Teachers might profitably have more conversations among themselves and with students in which a purpose is to make explicit the principles that guide teaching practice, and to generate new ways of thinking, acting, and interacting. From such conversations may emerge new educational institutions, roles, and processes. These ways must “allow us to talk about space, place, and time” (Clandinin & Connolly, 1995, p. 4); they must have “a sense of expansiveness and the

possibility of being filled with diverse people, things, and events in different relationships.” And, over time, they must change.

In the face of government legislation such as No Child Left Behind and the attendant increase in standardized testing as a measure of student knowledge and ability, as well as an unprecedented level of student apathy toward such forms of “education,” there is great value to a different way of thinking about and enacting formal education in the United States. By focusing on the process of communication between people who are engaged in formal education—a process of transforming the self through interaction with others—then the school is no longer a site of production or cure. It can no longer be the same force of social engineering. Similarly, once Neo recognizes that the Matrix is only one of many constructions of reality, it can no longer control his mind. When the school becomes a space within which students can actively compose and re-constitute themselves, the school can become a revolutionary site that can open up more diverse ways for students to understand and participate in the world. Like Neo, they can imagine other worlds, and they can imagine and re-create themselves as other selves in those other worlds.

### **Conclusion**

Morgan suggests that “[w]e live in a world that is becoming increasingly complex. By this logic, therefore, metaphors for education ought to accommodate complexity and constant change. Citing E. L Doctorow, who claimed that the development of civilization is essentially a procession of metaphors, Booth argues that “the quality of any culture will be in part measured...by the quality of the metaphors it induces or allows” (Booth, 1979, p. 62). Dewey argued that the formulation of a new philosophy in education necessitates “the introduction of a new order of conceptions leading to new modes of practice” (1938, p. 5), Nisbet further contended that revolutions in thought may be “no more than the mutational replacement, at certain critical points in history, of one foundation-metaphor by another in man’s contemplation of universe, society, and self” (1969, p. 6.). Metaphors have the power to define the ways of thinking and acting on cultural as well as individual levels, and as cultures and individuals evolve, so must the metaphors that emerge to define and create them.

With Maxine Greene, I am “interested in education here, not in schooling...in openings, in unexplored possibilities, not in the predictable or the quantifiable, not in what is thought of as

social control” (2001, p. 65). The method of analysis for which I argue in this article is more important than the actual metaphor used as a vehicle or medium for engaging in that method. Borges writes that it may be given to us “to invent metaphors that do not belong, or that do not yet belong, to accepted patterns” (Borges, 2000, p. 41). ). It is my hope that educators will not stop with one metaphor or another but rather keep moving as new metaphors open up new spaces of imagination—spaces that may well re-animate old metaphors as well as lead us into unfamiliar spaces.

In addition, it behooves educators to think carefully about the “life-sustaining or life-generating power” (Earle, 1995, p. 58) of metaphor. As Greene reminds us, “imagination is the capacity to posit alternative realities” (Greene, 2001, p. 65). It is hard enough to understand the metaphors and alternative realities in *The Matrix* even though they are all laid out for us as viewers and thus made easy to perceive. How much harder is it to try to discern and unpack metaphors that are embedded in culture and ways of thinking and acting that have not been made explicit or easy for us to understand? How much harder to still to imagine metaphors into which we might live? And yet by opening up spaces of imagination, through careful use and examination of metaphor, people can “break with what they simply assume or take for granted as given and unchangeable” (Greene, 2001, p. 65); people can free and keep freeing the mind enough to imagine and create other possible worlds.

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## References

- Allender, J. S. (2001). *Teacher self: The practice of humanistic education*. Lanham, MD: Rowman & Littlefield Publishers, Inc.
- Allison, C. B. (1995). *Present and past: Essays for teachers in the history of education*. New York: Peter Lang.
- Applebee, A. & J. Langer. (1983). Instructional scaffolding: Reading and writing as natural language activities. *Language Arts*, 60,168-175.
- Aristotle. (1457b) *Poetics* 21.
- Berlin, J. A. (1990). The teacher as researcher: Democracy, dialogue, and power. In A. D. Daiker & M. Morenberg (eds). *The writing teacher as researcher: Essays in the theory and practice of class-based research* (pp. 3-14). Portsmouth: Boynton/Cook Publishers.
- Berman, E. H. (1984). State hegemony and the schooling process. *Journal of Education* 166, 3 (Fall), 239-53.
- Bestor, A. E. (1953). *Educational wastelands: The retreat from learning in our public schools*. Urbana, IL: University of Illinois Press.
- Black, M. (1962a). *Models and metaphors: Studies in language and philosophy*. Ithaca, NY: Cornell University Press.
- Bloom, A. (1987). *The closing of the American mind: How education has failed democracy and impoverished the souls of today's students*. New York: Simon and Schuster.
- Booth, W. (1978). Metaphor as rhetoric: The problem of evaluation. In S. Sacks (ed.) *On metaphor* (pp. 29-48). Chicago: The University of Chicago Press.
- Borges, J. L. (2000). The Metaphor. In Calin-Andrei Mihailescu (ed.) *This craft of verse* (pp. 21-41). Cambridge: Harvard University Press.
- Bruner, J. (1977). *The process of education*. Cambridge: Harvard University Press.
- Bullough, R. V., Jr. (1988). *The forgotten dream of American education*. Ames, Iowa: Iowa State University Press.
- Bullough, R. V. Jr. & Gitlin. A. (2001). *Becoming a student of teaching: Methodologies for exploring self and school context*. New York: Garland Publishing, Inc.
- Burbules, N. C. (1986). A theory of power in education. *Educational Theory*, 36, 2 (Spring), 95-114.
- Burnafor, G. E. & Hobson, D. (2001). Responding to reform: Images for teaching in the new millennium. In P. B. Joseph & G. E. Burnafor (eds.) *Images of schoolteachers in America*, Second Edition (pp. 229-244). Mahwah, New Jersey: Lawrence Erlbaum Associates.
- Calkins, L. (1994). *The art of teaching writing*. Portsmouth: Heinemann.
- Callahan, R. E. (1962). *Education and the cult of efficiency: A study of the social forces that have shaped the administration of the public schools*. Chicago: University of Chicago Press.
- Carnevale, A. P. & Stone, S. C. (1995). *The American mosaic: An in-depth report on the future of diversity at work*. New York: McGraw-Hill.
- Cochran-Smith, M. & S. L. Lytle. (1993). *INSIDE/OUTSIDE: Teacher research and knowledge*. New York: Teachers College Press.
- Colsant, L. (1995). "Hey, man, why do we gotta take this...?" Learning to listen to students. In J. G. Nicholls & T. A. Thorkildsen (eds.) *Reasons for learning: Expanding the conversation on student-teacher collaboration* (pp. 62-89). New York: Teachers College Press.

- Colton, A. B. & G. M. Sparks-Langer. (1990). A conceptual framework to guide the development of teacher reflection and decision making. *Journal of Teacher Education*, January-February, 44, 1.
- Corbett, H. D., & Wilson, R. L. (1995). Make a difference with, not for, students: A plea for researchers and reformers. *Educational Researcher*, 24, 5, 12–17.
- Clandinin, D. J. & Connolly, F. M. (1995). *Secret, Sacred, and Cover Stories. Teachers' professional knowledge landscapes*. New York: Teachers College Press.
- Cook-Sather, A. (under review). *From one to another: Changing metaphors, education, and selves*. University of Pennsylvania Press.
- Cook-Sather, A. (forthcoming). Education as translation: Students transforming notions of narrative and self. *College Composition and Communication*.
- Cook-Sather, A. (2002c). Authorizing students' perspectives: Toward trust, dialogue, and change in education. *Educational Researcher*, 31, 4 (May), 3-14.
- Cook-Sather, A. (2001a). Translating themselves: Becoming a teacher through text and talk. In Christopher M. Clark (ed.) *Talking shop: Authentic conversation and teacher learning* (pp. 16-39). New York: Teachers College Press.
- Cook-Sather, A. (2001b). Between student and teacher: Teacher education as translation. *Teaching Education*, 12, 2, 177-190.
- Dewey, J. (1964). My pedagogic creed. In R. D. Archambault (ed.) *John Dewey on education*. Chicago: The University of Chicago Press.
- Dewey, J. (1938). *Experience and Education*. New York: Touchstone.
- Dewey J. (1934). *Art as experience*. New York: Minton, Balch & Company.
- Dewey, J. (1916). *Democracy and education*. New York: Macmillan.
- Duckworth, E. (1987). The virtues of not knowing. "*The having of wonderful ideas*" and other essays on teaching and learning (pp. 64-69). New York: Teachers College Press.
- Earle, R S. (1995). Teacher imagery and metaphors: Windows to teaching and learning. *Educational Technology* July/August, 52-59.
- Ehrensals, P. A. L., Crawford, R. L., Castellucci, J. A., & Allen, G. (2001). The American melting pot versus the Chinese hot pot. In J.P. Shapiro & J.A. Stefkovich (eds.) *Ethical leadership and decision making in education: Applying theoretical perspectives to complex dilemmas* (pp. 65-75). Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.
- Efron, S & Joseph, P. B. (2001). Reflections in a mirror: Metaphors of teachers in teaching. In P. M. Joseph & G. E. Burnaford (eds) *Images of schoolteachers in America*, Second Edition (pp. 75-92). Mahwah, New Jersey: Lawrence Erlbaum Associates, Publishers.
- Elbaz, F. (1987). Teachers' knowledge of teaching: Strategies for reflection. In J. Smythe (ed.) *Educating teachers: Changing the nature of pedagogical knowledge* (pp. ). Philadelphia: The Farmer Press.
- Evans, K. (2002). Fifth-grade students' perceptions of how they experience literature discussion groups. *Reading Research Quarterly*, 37, 46–49.
- Fenstermacher, G. D. & Soltis, J. F. (1992). *Approaches to teaching*. New York: Teachers College Press.
- Fernandez, J. W. (1971). Persuasions and performances: Of the beast in every body...and the metaphors of everyman. In C. Geertz (ed.) *Myth, symbol, and culture* (pp. 39-60). New York: W. W. Norton and Company.
- Fielding, M. (2001). Students as radical agents of change. *Journal of Educational Change*, 2, 2, 123-141.

- Fischer, J. & Kiefer, A. (2001). Construction and discovering images of your teaching. In P. B. Joseph & G. E. Burnaford (eds), *Images of schoolteachers in America*, Second Edition (pp. 93-114). Mahwah, New Jersey: Lawrence Erlbaum Associates, Publishers.
- Franklin, B. M. (2000). *Curriculum & consequence: Herbert M. Kliebard and the promise of schooling*. New York: Teachers College Press.
- Freire, P. (1990). *Pedagogy of the oppressed*. New York: Continuum.
- Gage, N. L. (1987). *The scientific basis for the art of teaching*. New York: Teachers College Press.
- Giroux, H. A. (1985). Critical pedagogy, cultural politics, and the discourse of experience. *Journal of Education* 167, 2, 22-41.
- Greene, M. (2001). *Variations on a blue guitar: The Lincoln center institute lectures on aesthetic education*. New York: Teachers College Press.
- Greene, M. (2000). In search of metaphor. Presented at the Annual Meeting of the American Educational Research Association. New Orleans.
- Greene, M. (1983). On the American dream: Equality, ambiguity, and the persistence of rage. *Curriculum Inquiry*, 13, 2 (Summer), 179-93.
- Heaton, R M. (2000). *Teaching mathematics to the new standards: Relearning the dance*. New York: Teachers College Press.
- Henri, R. (1923). *The art spirit*. Boulder, CO: Westview Press.
- Herbart, J. F. (1901). *Outlines of educational doctrine*, translated by A. F. Lenge. New York: Macmillan.
- Hirsch, E. D., J. Kett, & J. Trefil. (1987). *Cultural literacy: What every American needs to know*. Boston: Houghton Mifflin.
- Hynd, C. (2001). Persuasion and its role in meeting educational goals. *Theory into Practice* 40, 4, 270-277.
- Joseph, P. B. (2001). The ideal teacher: Images in early 20<sup>th</sup>-century teacher education textbooks. In P. B. Joseph & G. E. Burnaford (eds.), *Images of schoolteachers in America*, Second Edition (pp. 135-159). Mahwah, New Jersey: Lawrence Erlbaum Associates, Publishers.
- Kohn, A. (2000). *The case against standardized testing: Raising the scores, ruining the schools*. Portsmouth, NH: Heinemann.
- Ladson-Billings, G. (1994). *The dreamkeepers: Successful teachers of African American children*. San Francisco: Jossey-Bass.
- Lakoff, G. (2002). The brain, the mind, and language: Why they matter in personal life, in politics, and throughout the academic world. Invited Lecture, Bryn Mawr College, December 8.
- Lakoff, G. & Johnson, M. (1999). *Philosophy in the flesh: The embodied mind and its challenge to western thought*. New York: Basic Books.
- Lakoff, G. & Johnson, M. (1980). *Metaphors we live by*. Chicago: The University of Chicago Press.
- Maitra, D. (2001). Opening the floodgates: Giving students a voice in school reform. *Forum* 43, 2, 91-94.
- Martin, N. (1987). On the move: Teacher-researchers. In Goswami, D., & Stillman P. R. (eds.) *Reclaiming the classroom: Teacher research as an agency for change* (pp. 20-28). Portsmouth: Boynton/Cook Publishers.

- McDermott, R. & Varenne, H. (1995). Culture as disability. *Anthropology & Education Quarterly* 26, 3, 324-348.
- McLean, S. V. (1999). Becoming a teacher: The person in the process. In R. P. Lipka & T. M. Brinthaupt (eds.), *The role of self in teacher development* (pp. 55-91). New York: State University of New York Press.
- Morgan, G. (1986). *Images of organization*. Sage Publications.
- Murphy, K. (ed.) (2001). Teaching as persuasion. *Theory into Practice* 40, 4.
- Nisbet, R. A. (1969). *Social change and history: Aspects of the western theory of development*. London: Oxford University Press.
- Nowotny, W. (1962). *The language poets use*. London: Athlone Press.
- Oldfather, P., Thomas, S., Eckert, L., Garcia, F., Grannis, N., Kilgore, J., et al. (1999). The nature and outcomes of students' longitudinal research on literacy motivations and schooling. *Research in the Teaching of English*, 34, 281-320.
- Oliver, M. (1994). *A poetry handbook*. San Diego: Harcourt Brace & Company.
- Ortony, A. (1979). Metaphor: A multidisciplinary problem. In A. Ortony (ed.), *Metaphor and thought* (pp. 1-16). Ithaca, NY: Cornell University Press.
- Paine, L. (1995). Teacher education in search of a metaphor: Defining the relationship between teachers, teaching and the state in China. In Ginsburg M. B. & Lindsay, B. (eds), *The political dimension in teacher education: Comparative perspectives on policy formation, socialization and society*. The Falmer Press: London, Washington DC.
- Palinscar, A. S. (1986). The role of dialogue in providing scaffolded instruction. *Educational Psychologist* 21 [Special Issue], 73-98, edited by J. Levin and M. Pressley.
- Parker, F. (1894). *Talks on pedagogics*. New York: Kellogg.
- Pepper, S. C. (1942). *World hypotheses*. Berkeley: University of California Press.
- Perrone, V. (2000). *Lessons for new teachers*. Boston: McGrawHill.
- Petrie, H. G. (1970). Metaphor and learning. In A. Ortony (ed.), *Metaphor and thought*, (pp. 438-461). Ithaca, NY: Cornell University Press.
- Pinar, W. F. (1978). The reconceptualization of curriculum studies. *Journal of Curriculum Studies* 10, 3, 205-214.
- Pope, D. C. (2001). *Doing school: How we are creating a generation of stressed out, materialistic, and miseducated students*. New Haven, CT: Yale University Press.
- Popkewitz, T. S. (1988). Educational reform: Rhetoric, ritual, and social interest. *Educational Theory* 38, 1 (Winter), 77-93.
- Powell, A. G., Farrar, E., & Cohen, D. K. (1985). *The shopping mall high school: Winners and losers in the educational marketplace*. Boston: Houghton Mifflin.
- Quine, W. V. O. (1963). *Word and object*. Cambridge, Mass: MIT Press.
- Reiman, A. J. & L. Thies-Sprinthall. (1998). *Mentoring and supervision for teacher development*. New York: Longman-Addison Wesley Longman, Inc.
- Rice, J. M. (1893a). *The public school system of the United States*. New York: The Century Company.
- Richert, A. (1990). Teaching teachers to reflect: A consideration of programme structure. *Journal of Curriculum Studies* 22, 6, 509-527.
- Richardson, L. (1997). *Fields of play: Constructing an academic life*. New Brunswick, NJ: Rutgers University Press.
- Rousseau, J. J. (1965). Emile. In W. Boyd (ed.), *The Emile of Jean Jaques Rousseau: Selections*. New York: Teachers College Press. (Original work published in 1762).

- Rudney, G. & Guillaume, A. (1990). Reflective teaching for student teachers. *The Teacher Educator*, 25, 3, 13-20.
- Sanon, F., Baxter, M., Fortune, L., & Opotow, S. (2001). Cutting class: Perspectives of urban high school students. In J. Shultz & A. Cook-Sather (eds.), *In our own words: Students' perspectives on school* (pp. 73–91). Lanham, MD: Rowman & Littlefield.
- Scheffler, I. (1991). *In praise of the cognitive emotions and other essays in the philosophy of education*. Routledge: New York.
- Schlechty, P. C. (1991). *Schools for the 21<sup>st</sup> century: Leadership imperatives for educational reform*. Jossey-Bass: San Francisco.
- Schlechty, P. C. & Burke, W. I. (1980). Sources of social control in school: A speculative essay. *High School Journal* 63, 7 (April), 280-87.
- Schön, D. A. (1983). *The reflective practitioner: How professionals think in action*. New York: Basic Books.
- Schön, D. (1979). Generative metaphor: A perspective on problem-setting in social policy. In A. Ortony (ed.), *Metaphor and thought*, (pp. 254-283). Ithaca, NY: Cornell University Press.
- Schultz, S. K. (1973). *The culture factory: Boston public schools, 1789-1860*. New York: Oxford University Press.
- Schutz, D. (2003). Remodeling Schooling: A New Architecture for Preschool to Precollege Instruction. *Teachers College Record*, Date Published: 9/2/2002. <http://www.tcrecord.org>.
- Sfard, A. (1998). On two metaphors for learning and the dangers of choosing just one. *Educational Researcher*, 27, 2 (March), pp. 4-13.
- Shultz, J., & Cook-Sather, A. (Eds.). (2001). *In our own words: Students' perspectives on school*. Latham: Rowman & Littlefield.
- Silver, J. (Producer) & the Wachowski Brothers (Directors). (1999). *The matrix*. Burbank, CA: Warner Bros.
- Solomon, M. (ed). (1999). *The diagnostic teacher: Constructing new approaches to professional development*. New York: Teachers College Press.
- Solomon, M. & Morocco, C. C. (1999). The diagnostic teacher. In M. Solomon (ed.) *The diagnostic teacher: Constructing new approaches to professional development* (pp. 231-246). New York: Teachers College Press.
- Spring, J. (1994). *The American school, 1642-1993*. New York: McGraw Hill.
- Spring, J. (1978). *American education: An introduction to social and political aspects*. New York: Longman.
- Spring, J. (1976). *The sorting machine: National educational policy since 1945*. New York: McKay.
- Thomas, W. B. (1985). Schooling as a political instrument of social control: School response to black migrant youth in Buffalo, New York, 1917-1940. *Teachers College Record* 86, 4 (Summer), 579-92.
- Turner, V. (1980). Social dramas and stories about them. In W.J.T. Mitchell (ed.), *On narrative*. Chicago: The University of Chicago Press.
- Turner, V. (1974). Preface, *Dramas, fields, and metaphors: Symbolic action in human society* (pp. 13-19). Ithaca, NY: Cornell University Press.
- Walker, B. (1998). "Childhood" in the emergence and spread of U.S. public schools. In T. S. Popkewitz & M. Brennan (eds.), *Foucault's challenge: Discourse, knowledge, and power in education* (pp.117–143). New York: Teachers College.

- Weis, L., & Fine, M. (eds.). (1993). *Beyond silenced voices: Class, race, and gender in United States schools*. Albany, NY: State University of New York Press.
- Wilson, B. L., & Corbett, H. D. (2001). *Listening to urban kids: School reform and the teachers they want*. New York: State University of New York Press.
- Wood, D., Bruner, J. & Ross S. (1976). The role of tutoring in problem solving. *British Journal of Psychology* 66, 181-191.
- Zehm, S. J. (1999). Deciding to teach: Implications of a self-development perspective. In R. P. Lipka & T. M. Brinthaupt (eds.), *The role of self in teacher development*, (pp. 36-52). New York: State University of New York Press.
- Zehm, S. J., & J. A. Kottler. (1993). *On being a teacher: The human dimension*. Newbury Park, CA: Corwin Press.
- Zeichner, K. & D. Liston. (1987). Teaching student teachers to reflect. *Harvard Educational Review* 57, 1, 23-48.

## Appendix I: A Sampling of Metaphors for Educational Institutions, Processes, and Participants in the United States

### Metaphors for Schools

A school is a melting pot.	The term “melting pot” first appeared in 1908 as the title and theme of a play written by Isreal Zangwill, in which a great alchemist “‘melts and fuses’ America’s varied immigrant population ‘with his purging flames’” (Carnevale & Stone, 1995, p. 14). Within this metaphorical framework, the job of the school is to “educate students from many cultures through a common language, a common history, and common goals, principles, and values” (Ehrensall, Crawford, Castellucci, and Allen, 2001, p. 65). This approach assumes a “predetermined standard of desirability” (Wong cited in Ehrensall et al., 2001, p. 65) and asserts “that the American experience molds all into modern-day clones of the (mainly) white, Protestant Anglo-Saxons who founded the Republic and established cultural hegemony here” (Carnevale & Stone, 1995, p. 14-15).
Schools are educational wastelands.	Contending that schools were promoting the degeneration of the American mind, Bestor (1953) argued for the rejuvenation of United States public schools, and lamented the vanishing sense of purpose in education. He asserted that unless those concerned with education “make substantially the same assumptions there cannot be an educational <i>system</i> at all, only a hodgepodge of schools.” The “unity of purpose” Bestor sought was to find its manifestation in the body of knowledge taught — “what every American needs to know” to heal himself and contribute to a healthy body politic (Hirsch, Kett, & Trefil, 1987). This work paved the way for the writings of Alan Bloom, E.D. Hirsch, and others concerned about “the closing of the American mind” (Bloom, 1987)—what they suggest is the intellectual atrophy and decay of the collective U.S. brain.
Schools are shopping malls.	During a phase of relative prosperity and complacency in the United States, after the turbulent, alternative, and powerful movements of the 1960s and 1970s, Powell, Fararr, & Cohen wrote: “If Americans want to understand their high schools at work, they should imagine them as shopping malls” (1985, p. 8). They describe secondary education as a “consumption experience” (1985, p. 8). The consumers vary greatly: some know what they want and “efficiently make their purchases”; others “come simply to browse”; and still others do neither: “they just hang out” (Powell, Fararr, & Cohen, 1985, p. 8). Within the shopping mall high school are “specialty shops” for students with particular preferences, “product labeling” for the array of course options available, and special and “unspecial” students to select, or be selected by, those options (Powell, Fararr, & Cohen, 1985, p. 118, p. 22, p. 172). The shopping mall high school offers accommodations “to maximize holding power, graduation percentages, and customer satisfaction” (Powell, Fararr, & Cohen, 1985, p. 1).

### Metaphors for Education

Education in banking.	Freire explains this metaphor he coined: when the teacher is assumed to know all and the students nothing, education “becomes an act of depositing, in which the students are the depositories and the teacher is the depositor” (1990, p. 58). The student’s role within this model is limited to “receiving, filing, and storing the deposits” (Freire, 1990, p. 58). As passive recipients of others’ knowledge, students are, according to Freire, denied the opportunity to “be truly human” — the ability to engage in inquiry and praxis, to create, not simply receive, knowledge, which “emerges only through invention and re-invention, through the restless, impatient, continuing, hopeful inquiry men pursue in the world, with the world, and with each other” (1990, p. 58).
	Informed by thinkers such as Rosseau (1762) and Herbart (1901), this metaphor argues that

Education is growth.	students should be nurtured and let to learn in their own ways at their own pace, and, if properly nurtured, will act morally according to their own free will. Dewey (1916) built on these premises, arguing that continuity of life means continual re-adaptation of the environment to the needs of living organisms (1916, p. 2) and proposing child-centered education and rejecting the notion that children are blank slates or empty vessels to be filled (1964). Proponents of progressive education have continued to argue that we must start “where the learner is” (Bruner , 1977, p. xi) and design educational experiences, such as those in Waldorf and Montessori schools and in pockets of progressivism in all school systems, in which students can build their own knowledge (Duckworth, 1987) — in which students can grow themselves.
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### Metaphors for Learning

Learning is acquisition.	This metaphor reflects the basically materialistic culture of the Western world. Nowhere is this materialism more fully embraced than in the United States, established as it was in the wide, open space of what was considered free but was in fact acquired land rich in resources. Explicating the metaphor of learning as acquisition, Sfard explains that concepts are “basic units of knowledge that can be accumulated, gradually refined, and combined to form ever richer cognitive structures” (Sfard, 1998, p. 5). The lexicon of the acquisition metaphor includes words like “fact,” “material,” “sense,” “idea,” and “notion,” (Sfard, 1998, p. 5) and underlying these words is the impulse toward accumulation of material wealth, signaled by Sfard’s use of words such as “accumulated,” “refined,” and “richer.” The actions according to which one makes the commodities of facts and ideas one’s own include “construction,” “appropriation,” “transmission,” “attainment,” and “accumulation” (Sfard, 1998, p. 5). Within this metaphor, “[l]ike material goods, knowledge has the permanent quality that makes the privileged position of its owner equally permanent” (Sfard, 1998, p. 8).
Learning is participation.	Comparing this to the learning as acquisition metaphor, Sfard explains: “the terms that imply the existence of some permanent entities have been replaced with the noun ‘knowing,’ which indicates action” (1998, p. 6). She argues that this linguistic shift signals a profound conceptual shift: “[t]he talk about states has been replaced with attention to activities...the permanence of <u>having</u> gives way to the constant flux of <u>doing</u> ” (1998, p. 6). The vocabulary of this conceptual framework includes words such as “situatedness,” “contextuality,” “cultural embeddedness,” and “social mediation” (Sfard, 1998, p. 6). Learning is “conceived as a process of becoming a member of a certain community. This entails, above all, the ability to communicate in the language of this community and act according to its particular norms” (Sfard, 1998, p. 6). This metaphor for learning stresses “the evolving bonds between the individual and others...[it] implies that the identity of an individual, like an identity of a living organ, is a function of his or her being (or becoming) a part of a greater entity” (Sfard, 1998, p. 6).

### Metaphors for Teachers

A teacher is a scholar.	In a survey of the roles, images, and metaphors used to represent teachers and teaching in textbooks published in the United States before the 1940s, Joseph discusses a number of “ideal images,” including this one (Joseph, 2001, p. 139). The notion of the teacher as an intellectual sharply contrasts the teacher as technician or as clinician. This “open-minded scholar” must engage in the same intellectual pursuits in which he asks his students to engage, because “[s]cholarship [can] bring delight to the teacher who [grows] intellectually along with his students” (McFee, 1918, p. 16, 245 quoted in Joseph, 2001, p. 139) and also because “there must be a thinking teacher before there can be a thinking child” (Snyder & Alexander, 1932, quoted in Joseph, 2001, p. 139). The metaphor
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	<p>of the teacher as scholar positions teachers alongside other serious investigators into the nature and workings of things of the mind. It runs the risk, however, of privileging the realms of scholarship into which adults who have already been through the educational system make forays over the realms within which students still in their formal process of education explore.</p>
A teacher is a reflective practitioner.	<p>The phrase “the reflective practitioner” was coined by Schön (1983). The reflection in reflective practice is on one’s self and how one enacts in practice the theories one espouses. Advocates of fostering the development of reflective practitioners (Colton and Sparks-Langer, 1993; Richert, 1990; Rudney and Guillaume, 1990; Zeichner and Liston, 1987) argue that, in the absence of reflection, “one runs the risk of relying on routinized teaching and . . . not developing as a teacher or as a person” (Reiman &amp; Thies-Sprinthall, 1998, p. 262). The ongoing interplay of reflection and action, or what Freire (1990) calls praxis, although not generally built into the “structure of teaching” (Elbaz, 1987, p. 45), is essential to good pedagogical practice. As Zehm (1999) points out, reflection on the human dimensions of teaching is a useful tool for self-exploration as well as professional development (see also Zehm &amp; Kottler, 1993). Furthermore, not only does becoming a reflective practitioner mean developing the disposition to reflect on practice, it means “finding the words to express those reflections to others — through collaboration, building a shared language and a shared knowledge of practice” (Yinger cited in McLean, 1999, p. 68). Thus the metaphor of teacher as reflective practitioner would appear to strive for more of a balance between calling for dwelling in the world of scholarship, like the teacher as scholar, and dwelling in the world that that teacher creates in the classroom.</p>
A teacher is a researcher.	<p>Aiming to disrupt the one-way flow of educational knowledge from university-based researchers to curriculum and policy specialists to teachers (Houser, 1990, p. 56), the teacher research movement has aimed to bridge the worlds of theory and practice in another way. This movement argues that teachers can and should generate legitimate knowledge about educational practice (Cochran-Smith &amp; Lytle, 1993). Teacher researchers use the sites of their own educational practice as subjects of inquiry (Cochran-Smith and Lytle, 1993; Berlin, 1990; Martin, 1987) with the more far-reaching goal of developing, assessing, and revising theories that inform practice (Calkins, 1994). Teacher research positions “the classroom teacher as ‘practitioner-inquirer’ rather than perpetuating the exclusive claim of the university professor as the ‘scientist-theorist’ of the educational research past” (Burnaford &amp; Hobson, 2001, p. 235).</p>
A teacher is a sculptor.	<p>The child “is clay, and the teacher imposes a fixed mold on this clay, shaping it to the specification of the mold” (Scheffler, 1991, p. 47). Scheffler suggests that, “The sculptor’s statue does not grow of itself out of the rock, requiring only the artist’s nurture; the artist exercises real choice in its production, yet his initial block of marble is not wholly receptive to any idea he may wish to impose on it” (Scheffler, 1991, p. 48). This metaphor, in Scheffler’s discussion, throws into relief the power and control of the teacher but does not take into consideration those aspects of teaching and learning that are not within the teacher’s control. It casts the student as something inanimate — clay — yet something that can take shape. The consistency of the clay, of the student, the properties it brings to the creative process, help shape what is created.</p>
A teacher is an artist.	<p>The artist knows what it takes “to fashion works whose form and structure are holistic and unified” (Dewey, 1934, p. 6). An artist is someone who sees the “all-overness” of their process and who knows how, through that process, to create a new image (Burnaford &amp; Hobson, 2001, p. 232). Gage writes of teaching as a “practical art” which calls for “intuition, creativity, improvisation, and expressiveness—a process that leaves room for what is implied by rules, formulas, and algorithms” (Gage, 1978, p. 15). Art embraces both sensory and intellectual dimensions of the human mind. One teacher who sees herself as an artist states that in her classroom “the air is full of possibilities”; within such a classroom, a teacher must be comfortable with ambiguity and flexibility (Burnaford &amp;</p>

	Hobson, 2001, p. 233). Teaching, writes another teacher, “is an art full of subtle nuance” (Rachel Allender quoted in Allender, 2001, p. 125). Words such as “holistic,” “all-overness,” “intuition,” and “possibilities” highlight the indeterminate nature of this metaphor. An artist “disturbs, upsets, enlightens, and he opens ways for better understanding” (Henri, 1923, p. 15). The technique an artist uses must be “evoked by the spirit of the things she wish[es] to express” (Henri, 1923, p. 44). To create a work of art, or to inspire others to create a work of art, teachers must both be guided by their own internal and individual visions and also “go to kindred spirits — others who have wanted [to create a particular] thing—and study their ways and means, learn from their successes and failures” (Henri, 1923, p. 55).
A teacher is a coach.	Teachers as coaches share the responsibility of making sure that students achieve excellence with other members of the school community, parents, and the students themselves (Ladson-Billings, 1994, p. 23). Coaches understand, explains Ladson-Billings, that “the goal is team success” (1994, p. 24). Although they operate “behind the scenes” and “on the sidelines,” coaches are always present to “players” through their expectations (Ladson-Billings, 1994, p. 25).
A teacher is a director.	Allender explains: “I think of teaching as if I were directing a play — an improvised play in which there are no lines for the players to read or only a few at most...The script is a set of notes, and at every juncture, detailed directions on how to proceed are given. What unfolds, in contrast, is undetermined and can be surprising” (2001, p. 5). In analyzing his own teaching practice, Allender narrates instances of role-playing and rehearsing — opportunities he offers his students to explore their roles, critique their own and others’ performances, and co-construct the ultimate production of the course.
A teacher is a conductor.	“We can visualize an orchestra conductor who approaches the orchestra stand; all members of the orchestra have their eyes fixed on the conductor” (Ladson-Billings, 1994, p. 23). The members of the orchestra are the students. Teachers as conductors take responsibility for assuring that the students achieve excellence; they lead their students toward it. But as is often the case in performances of orchestras, “so powerful can the personality of the conductor be that the audience and musical critics describe the quality of the performance in terms of the conductor’s performance, even though the conductor did not play a single note” (Ladson-Billings, 1994, p. 23).
A teacher is a gardener.	Scheffler contends that “there is an obvious analogy between the groping child and the growing plant,” specifically in the sense that “in both cases the developing organism goes through phases that are relatively independent of the efforts of gardener or teacher” (Scheffler, 1991, p. 46). Scheffler argues that this metaphor constructs the teacher’s role as one of studying and then indirectly helping the development of the child rather than shaping him “into some preconceived form” (Scheffler, 1991, p. 47). Growth and development “may be helped or hindered by [the teacher’s] efforts” (Scheffler, 1991, p. 47). But growth and development is the focus, and it is based on “an inner growth principle” — the notion that something simple grows into something complex “through various preordained stages” (Turner, 1974, p. 31). A prospective teacher in an education course describes how this metaphor works for her. She writes an extended story within which she describes students as a “mixed bag of seeds” that the teacher “has to find a way to nurture.” She “wants the best for the seeds” that she plants; to be the best teacher she can be, she learns “how to learn from the seedlings”; and “watching the stems, the leaves, and the blossoms dance in the breeze, the gardener too began to dance” (Pakola quoted in Allender, 2001, p. 123, p. 117, p. 118, p. 123).
A teacher is a dentist.	The teacher who crafted this metaphor to describe her work explains that “the dentist tells you what you have to do to have good teeth, but essentially, you have to do it” (Efron & Joseph, 2001, p. 75). This teacher explains that some days in her classroom “it is as hard as pulling teeth” and that

	<p>sometimes students come in and “if they didn’t brush their teeth last night” not only can you not get near them because they have bad breath, but “you have this faint feeling as if they failed you in some way, or you failed because you did not impress upon them the importance of doing it” (Efron &amp; Joseph, 2001, p. 75). Perhaps because the teacher herself formulated and explained this metaphor, one can vividly see the way that it works within its own terms. As Schön suggests, new and potentially generative metaphors can be triggered when one is immersed in an experience of a particular phenomenon; at the same time that one is reflecting on the phenomenon one is experiencing it (Schön, 1979). There seems to be a measure of humor as well in this teacher’s explanation, and as Efron &amp; Joseph point out, this metaphor is one of struggle, of compassion, of failure and perseverance (Efron &amp; Johnson, 2001, p. 75). The deeply complicated sense that teacher and student can fail one another in education represents a recognition of one of the most powerful aspects of education: that education is — or should be — a reciprocal dynamic, a co-constructed endeavor.</p>
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### Metaphors for Teaching

Teaching is persuasion	<p>Arguing for the metaphor of teaching as persuasion, Murphy dismisses the pejorative meanings of persuasion — “influencing,” “convincing,” “manipulating,” “tempting” — to assert that “at its simplest” persuasion can be understood “as evoking a change in one’s understanding or judgment relative to a particular idea or premise” (2001, p. 224). Teaching as persuasion is premised on the notion of scaffolded instruction: “a joint venture in which students and teacher share responsibility for learning and refining strategies” (Palinscar, 1986, p. 73; see also Applebee &amp; Langer, 1983, and Woods, Bruner, &amp; Ross, 1976). Murphy argues that persuasion “rejects the idea that there can be a simple transmission of knowledge from teacher to student, or [sic] the assumption that all students will accept whatever information is introduced into the learning environment fully or in part” (p. 224). I suggest, though, that persuasion is a fundamentally conservative metaphor of transmission and maintenance of the status quo. As Hynd writes, “Educators are concerned that students use...knowledge to gain influential positions in society (knowledge is power) in order to contribute to citizenship, safety, and productivity” (2001, p. 273). This is true of conservative educators, but liberal or radical educators are more interested in self actualization, challenging the status quo, and developing thinking skills, which Hynd goes on to acknowledge aren’t so well suited to this metaphor. Underlying the arguments presented in this collection of articles is the implication that students don’t have the capacity, or can’t be trusted, to actually prove/discover/come to understand things themselves (see Cook-Sather, 2002, for a discussion of this point). Thus while it might make very good sense to think critically about how and why teachers try to persuade students, to argue that persuasion should be the guiding metaphor for teaching seems to undermine what the authors are arguing for as a collaboration between teacher and students.</p>
Teaching is improvisational dance.	<p>Heaton (2000) argues that teaching itself is fundamentally improvisational, and she uses the metaphor of improvisational dance to describe a mathematics classroom full of improvisation moving towards meaning. To discuss this metaphor she draws on the language of “preparation, improvisation, and contemplation” (p. 60). Describing her experience, Heaton writes: “I found myself <i>in</i> teaching in ways I had not experienced before. For a moment I felt what it was like to improvise, to be responsive, beyond the first few moves, to students’ understanding and the mathematics I was trying to teach” (2000, p. 68). This metaphor focuses on “the interdependent relationship among the participants” in the dance (p. 90). It involves making different decisions at different points about who is going to lead and who is going to follow. Heaton opposes this metaphor to traditional textbook math teaching, which she sees as closer to traditional, rote dance.</p>

	She discusses a sharing of leadership and control creation through action and response. Implicitly important is expecting the unexpected and letting the learning emerge through the process of collaborative improvisation.
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