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What's Culture Got to Do With It? Educational Research as a Necessarily Interdisciplinary Enterprise

Michael Cole

The author examines the role of culture in education in historical perspective to suggest the conditions required to promote generalized educational reform. Although deliberate instruction appears to be a ubiquitous characteristic of human beings, schools arise only when large numbers of people begin to live in close proximity, using technologies that create economic surpluses. Schooling is associated with the development of institutionalized hierarchies, modes of cultural transmission associated with writing and record keeping, and increased political-economic disparities within societies. The author examines several strategies for seeking change in the cultural foundations of schooling. He offers suggestions for why such strategies appear to have limited impact, and he discusses changes in global conditions that might lead to generalized educational reform.

Keywords: culture; deliberate instruction; history; intent observation; open classroom; recitation script; schooling; social sphere

My focus here is the multiplex and disputed role of culture in education—in education's long and diverse history and its current vicissitudes. Education, I believe, is intimately linked to the human capacity and need to live in a cultural environment. But in the process of education, the social, the economic, the psychological, and the cultural are so complexly interwoven that a serious attempt to understand the challenges of contemporary education cannot be properly undertaken in isolation. It requires analysis in historical, economic, social, and political, as well as cultural, context.

In the Beginning: Deliberate Instruction

Although there is inevitably debate about the matter, primatologists and comparative developmentalists appear to be in broad agreement that pervasive engagement in deliberate instruction is a defining characteristic of *homo sapiens*. Tetsuro Matsuzama (2010), a primatologist who has conducted many years of

research with chimps in natural and laboratory settings, believes that active teaching (formal instruction, positive or negative feedback from the mother) is not among the social learning mechanisms important to chimpanzee cognitive development. Rather, constant proximity of offspring to the mother and an intrinsic proclivity to copy the mother's behavior are the key mechanisms of chimpanzee learning. The extensive work of comparative psychologist David Premack leads him to conclude that while isolated examples of teaching can be found in a few species (cats and meerkats), "teaching in both these species is an adaptation: it serves only one goal. The cat teaches its kittens to stalk; the meerkat teaches its pups to eat without being stung. Neither species can teach any other activity (Premack, 2010, p. 29). Tomasello and Call (1997) reach the same conclusion concerning chimpanzees: Adult chimpanzees do not engage in "instructed learning," or do so only very rarely and only in a restricted domain.

By contrast, although formal education in institutions called schools is a relatively recent historical phenomenon and even now is by no means universal among human groups, there is no human group for which deliberate instruction is completely absent (Fortes, 1938/1970; Konner, 2010; Kruger & Tomasello, 1996; Reagan, 2000). The terms applied to this phenomenon vary somewhat among observers. Kruger and Tomasello (1996), who focused on chimpanzee-human differences, argue that what is common to all human examples of intentional instruction and absent in nonhuman primates is "that the adults do whatever is necessary so that children will learn skills for themselves, and then, when children attain a certain level of skill, withdraw" (p. 375).

What changes across historical time and varies according to particular cultural circumstances is the specific social form through which deliberate instruction is implemented, ranging from children's intent participation in activities organized primarily for other purposes to highly formalized instruction for which production of specific knowledge is the major purpose (Cole, 2005; Kruger & Tomasello, 1996). I will return shortly to these variations in the social forms of deliberate instruction, but first a few words about the core term in the title of my article, *culture*.

Culture

At a time when many anthropologists have decided to chuck the concept of culture as a distraction, after more than a hundred years of trying unsuccessfully to reach consensus about the meaning of this concept that was once defining of their discipline, I do not want to get bogged down in disputations about the “one right meaning” of the term. To me it seems that despite their differences, scholars can agree with the very general notion that culture refers to the full range of socially inherited (extragenetic) accomplishments of past human activities that serve as crucial resources for the current life of a social group (D’Andrade, 1966). This symbolic and materially constituted social inheritance, embodied in language and social practices, as an ensemble, constitutes the cultural tool kit essential to human social and biological reproduction. It is the species-specific medium of human life. It is also, so to speak, history in the present.

It has long seemed to me that for anyone interested in human development and education it is helpful to know that contemporary English-language conceptions of culture originate in terms that refer to the process of helping things to grow: “*Culture*, in all of its early uses, was a noun of process: the tending of something, basically crops or animals” (Williams, 1973, p. 87). From earliest times, this notion of culture included a general theory for how to promote growth: Create an artificial environment in which young organisms can be provided with optimal conditions to develop. Such tending required tools, both material (hoes) and mental (the knowledge that one does not plant until winter is over). These tools were perfected over generations and designed for the special tasks to which they were put. Schools, from this perspective, are institutionalized cultures for growing next generations.

It is important for what follows to emphasize that while ordinarily applied to large social groups with a shared social history (Navajos, Japanese, and even Americans), the term culture applies equally to small groups of people who have engaged in joint activities to achieve some common object, such as working in the same business or the same office, or the same Little League team or army unit. For purposes of discussing culture and contemporary education, it is significant that culture applies to people engaged together in the same classroom.

Working from the general conception of culture as an accumulated body of knowledge and practices essential to the process of raising children in a manner that will secure the future of the social group, developmentalists have long argued that the evolution of a long period of human immaturity goes hand-in-glove with the ability (and need) of human children to acquire, reproduce, and create culture (Bruner, 1972). Even in the simplest known human social groups, there is an enormous amount of culture to be acquired, and such acquisition requires time. It also requires deliberate efforts by the adult bearers of the culture to arrange for its acquisition.

Historical Precursors of Modern Schooling

Hunter-Gatherer Societies

Many scholars who have studied the process of acquiring culture (enculturation) have noted that in small, face-to-face, preliterate societies, there is far less differentiation of the social sphere according to age than in modern societies, so that no spatially or

temporally separate set of instructional practices is required for a great deal of cultural knowledge to be acquired by children (Fortes, 1938/1970; Reagan, 2000). It was once believed that proximity to kindred adults, which allows human young to learn through intent observations and participation and provides motivation to learn, was sufficient in hunter-gatherer societies to make any deliberate instruction unnecessary (Bruner, 1966). Although observation and participation were, and remain, important mechanisms of cultural learning (see Rogoff et al., 2003), more recent, detailed studies have shown that observation and participation do not rule out deliberate instruction; in all societies, one observes many everyday activities in which older siblings and adults change the pace of what they are doing, or pause in what they are doing to correct the efforts of their child coparticipants, provide them with child-sized “play tools” with which to practice their skills, tease them, praise them, or punish them on the basis of adults’ evaluation of the neophytes’ behavior, so that observation, participation, and deliberate instruction are mixed together in the flexible fabric of enculturation.

Among hunter-gatherers, the practical and what might be referred to as the moral/ideological aspects of enculturation are also often linked; being a reliable finder of fruits or edible roots and one who shares the finds displays responsibility and caring for the group. But there are also activities, such as storytelling around the hearth, or singing, in which shared ideas about the history of the group, its cosmology, the secret sources of its power, are made available to the young, whose success in learning them is tested in the process of participating in other settings in an age-appropriate manner.

Small, Face-to-Face Farming Societies

In preliterate societies where farming is the major form of subsistence, children continue to acquire a great deal of their cultural knowledge through participation with adults in practical activities. But play is somewhat displaced by work, and the amount of in situ deliberate instruction appears more frequent, although it is still more or less fused with ongoing adult activities.

It is within such small farming societies that we begin to observe rudimentary forms of separation between in situ participation and deliberate instruction. Spatially and temporally displaced forms of instruction involving, at most, a few adults and several children—a form of social organization characteristic of modern schooling—makes its appearance. In many societies in rural Africa, for example, what are casually referred to as rites of passage may be institutionalized activities combining specialized forms of cultural practices and moral education that last for several years, where teaching (what Kruger and Tomasello, [1996] call “designed learning”) is carried out in age cohorts whose members are systematically removed from the everyday life of the social group (Konner, 2010). For example, among the Kpelle and Vai peoples of Liberia, where I worked in the 1960s and 1970s, children were separated from their communities for 4 or 5 years in an institution referred to in Liberian pidgin as “bush school.” There, the children were instructed by selected elders in the essential skills of making a living, as well as the foundational ideologies of the society, embodied in ritual and song. At the same time, some began their years-long apprenticeships to qualify them later to be specialists in bone setting, midwifery, and other valued, arcane knowledge. Many similar examples could be provided.

Social Accumulation, Differentiation, and the Advent of Schooling

It appears that when a society develops more elaborate technologies, such as the use of bronze and then iron for tools of agriculture and war, with the consequent accumulation of substantial material goods in large, relatively dense populations, the form of deliberate instruction to which we apply the term *schooling* emerges.

As a part of the sea change in human life patterns associated with the transition from the Stone Age to the Bronze and Iron Ages in what is now referred to as the Middle East, the organization of human life began a cascade of changes, which, while unevenly distributed in time and space, appear to have been widely, if not universally, associated with the advent of formal schooling. In the Euphrates Valley the smelting of bronze revolutionized economic and social life. With bronze it became possible to till the earth in more productive ways, to build canals to control the flow of water, to equip armies with more effective weapons, and so on. Under these conditions, one part of the population could grow enough food to support large numbers besides itself. This combination of factors made possible a substantial division of labor and development of the first city-states (Schmandt-Besserat, 1975).

Another essential technology that enabled this new mode of life was the elaboration of previously existing, but highly restricted, ways of representing objects and quantities by inscriptions on clay tokens. The first writing system, cuneiform, evolved slowly over time. Initially the system was used almost exclusively for record keeping, but it evolved to represent not only objects but the sounds of language, enabling letter writing and the recording of religious texts (Larsen, 1986; Schmandt-Besserat, 1996).

The new system of cuneiform could be mastered only after long and systematic study. But record keeping was essential to the coordination of activities in a relatively large and complex society, where crop sizes, taxes, troop provisioning, and multiple forms of exchange needed to be kept track of for the society to exist. Societies began to devote resources to support selected young men with the explicit purpose of making them scribes, people who can write. The places where young men were brought together for this purpose were the earliest formal schools.

Not only the activities that took place in these schools but the architecture, the organization of activities, and the reigning ideologies within them were in many respects startlingly modern. Figure 1 shows an ancient classroom in what is now Syria. It consisted of rows of desks, facing forward to a single location where a teacher stood, guiding students in repetitive practice of the means of writing and the operations that accompanied it. Note that instead of inkwells, the classroom contains bowls where wet clay could be obtained to refresh spent tablets. In many such schools, the compiling of quantified lists of valued items was a major pastime, although some letter writing also occurred.

At the time, knowledge about methods of record keeping, esoteric lists of objects, and the means for creating them were seen as imbued with special powers such as are currently ascribed to those who are “highly educated.” And it was clearly recognized that socioeconomic value flowed from this knowledge. As one early Egyptian father admonished his son several thousand years ago,



FIGURE 1. *Photo of earliest known example of a school, an Assyrian classroom circa 2000 BCE.*

I have seen how the belaboured man is belaboured—thou should set thy heart in pursuit of writing. . . . Behold there is nothing which surpasses writing. . . . I have seen the metalworker at his work at the mouth of the furnace. His fingers were somewhat like crocodiles; he stank more than fish-roe. . . . The small building contractor carries mud. . . . He is dirtier than vines or pigs from treading under his mud. His clothes are stiff with clay. . . . Behold, there is no profession free of a boss—except the scribe, he is the boss. . . . Behold, there is no scribe who lacks food from the property of the House of the King—life, property, health! (Quoted in Donaldson, 1978, pp. 84–85)

Although some features differ, a similar story of the mixing of numeracy and literacy with special forms of moral superiority could be told for China, where bureaucratized schooling arose a thousand or so years later, and in Egypt as well as in many of the civilizations that followed. In the Middle Ages, the focus of elementary schooling shifted to what LeVine and White (1986) refer to as “the acquisition of virtue” through familiarity with sacred texts, but a certain number of students were taught essential record-keeping skills commensurate with the forms of economic and political activity that needed to be coordinated through written records. Such is the state of schooling in many Muslim societies to this day, although there is great variation in Islamic schools, depending on whether the local population speaks Arabic and how formal schooling articulates with the state and religion in the country in question (see Serpell & Hatano, 1997, for a discussion of these variations and their implications).

Universal Characteristics of Modern Schooling

In the 19th century, coincident with the rise of the industrial revolution, formal education in schools was extended to the broad masses of children and in some places made compulsory, a trend that continues to the present day. As characterized by LeVine and White (1986), the dominant forms currently found in most contemporary industrialized and industrializing societies manifest the following set of common features:

1. Schools are internally organized to include age grading, sequentially organized curricula based on level of difficulty, and permanent buildings designed for the purpose of teaching.
2. Schools are incorporated into larger bureaucratic institutions so that the teacher is effectively demoted from “master” to low-level functionary in an explicitly standardized form of instruction.
3. Schools are redefined as an instrument of public policy and as preparation for specific forms of economic activity—“manpower development.”

To this list I would add that such schooling is universally accompanied by increased social differentiation, not only in its internal organization but in the fact that those who perform their academic chores least adequately are channeled into low-paying, low-status jobs in the society. As in antiquity, literacy and numeracy are modes of social control and accumulation of wealth and power. Failure and exclusion have always been a constitutive feature of formal schooling. When those who are least successful are identifiable by their ethnic group, we see the origins of our current preoccupation with “performance gaps” in American schools. For many decades, such gaps were tolerated, and sometimes encouraged, by the state. But since the 1960s, broad demographic inequalities in school performance have been viewed as social and economic problems, and by some, as an ethical problem that needs to be solved. Consequently, for the last half-century we have seen a growing demand to “re-form” the schools. The basic structure of formal schooling, however, has remained strikingly impervious to such efforts. The vast majority of schools to be found in all countries at the present time bear a striking resemblance to the schools of antiquity.

The Inevitable Failure of School Reform?

Over a decade ago, Seymour Sarason (1990) wrote a dysphoric book entitled *The Predictable Failure of Educational Reform*. The book is full of interesting, and still-relevant, ideas about the intractability of contemporary mass schooling in the United States. As far as I can tell, nothing has happened to change Sarason’s gloomy assessment. We have made no noticeable progress on key parts of the reform agenda, such as closing the achievement gaps along lines of social class and ethnicity or significantly increasing the number of highly qualified graduates in the economically important areas of science and technology—nor does there appear any immediate prospect that we will do so.

Rather than rehearse Sarason’s criticisms, I wish to focus on one central fact about reform efforts with which he begins, and to link his observations to the historical origins of mass schooling about which I wrote above. “What is called school reform,” Sarason (1990) writes, “is based on the acceptance of the system as it has been and is” (p. xiv). He notes that there are exceptions to this generalization, but the general trend is unchanged: What passes as school reform remains largely restricted to school improvement within the same system of social structures and economic arrangements. Serious efforts at commensurate reorganization are scattered, transient, and have failed to produce a massive “re-form” of schooling in the overwhelming majority of American schools.

Here I wish to follow Sarason’s lead and ask why it is, not only in the United States but in virtually every country in the world, that the dominant mode of formal schooling, what Rogoff (2003) refers to as “the assembly line model,” is so similar to what we know to have been the forms of schooling from antiquity? Again, allowing for exceptions, such as Japanese elementary school practices (which, however, are largely abandoned by middle school) and open classroom schools in the United States (another subject to which I return), why is it that the structure of that 4,000-year-old school appears to replicate itself over and over again, wherever formal schooling is to be found in the modern world? Why is it that reforms that would literally re-form schools, such as the activity-based schools of the late 1950s and early 1960s, which analyses showed to reduce achievement gaps while raising achievement (Kyle, 1984), are to be found in less than 10% of American schools today? Why does it seem that the more things change, the more they stay the same?

What the continued and widespread dominance of the ancient school structure suggests to me is that there is some deep, social-structural process at work that accounts for the enduring pattern of many children sitting at tables facing forward while a single adult stands before them, doing recitations, interacting through the mediation of written texts, being asked known-answer questions, and routinely reading aloud as a standard practice for beginning readers (when it is well known that reading aloud is a marvelous way to block comprehension of text). Sarason points to power relations as a key point of analytic entry into the problem. Yes, the assembly-line model of deliberate instruction is a mode of power. But my speculation is that we need to back up and ask how it is that the power relations implicit in these arrangements arise in the first place and are maintained despite their evident disutilities. My answer will not please everyone, but I hope it at least has the virtue of providing new ways to think about school reform in relation to issues of culture and education.

My suggestion is that the standard forms of mass schooling arose, and have continued to operate, anywhere in the world where societies have grown large enough and their economies complicated enough to make necessary a complex division of labor, which implies the need for (a) a lot of specialized cultural learning, (b) the use of mediational means, such as written language, that take considerable time to learn as the access route to dealing with the ever-expanding cultural inheritance, and (c) restricted economic resources that make it necessary, and in some sense efficient, to have one person teach many novices at one time in a central location—a kind of economy of scale. Not everyone can be average, let alone above average, in such a system. Power enters the scene as the power to exclude and credential.

Moreover, I would like to suggest that this structure of schooling was not deliberately planned, but emerged from a conjunction of specific historical conditions that, while weakened in the Middle Ages, returned on a more pervasive scale in the 18th and 19th centuries and remain in effect today. Similarly, I argue that the re-formation of schooling will not come about through a single cultural change or instantaneous social recognition that things must be changed, in general. It will come about if, and only if, the constraints that produced this social form themselves change, making it possible for distinctly new forms to arise.

The argument I am making is analogous to the argument that Elizabeth Bates (1999) made about how it comes to be that round-headed bees create hexagonal structures for storing honey. She was arguing against innatist and for emergentist theories of grammatical structure. Bees, she said, do not have genes for making hexagons. They have genes, among other things, for creating round heads and for gathering and storing honey. It turns out that the mathematically most efficient storage structure for a bunch of round-headed bees to store honey in, packing their honey together as compactly as they can, is a hexagon.

Deliberate instruction is a species-specific characteristic of homo sapiens. Formal schooling is not; rather, it is a contingent outcome of a convergence of cultural-historical processes under conditions in which deliberate instruction must pack a large amount of cultural content into a small space and brief time. Viewed in this way, formal schooling arose from human beings' amazing ability to invent ways to extract resources from the environment, to consume them in quantities sufficient to produce large social groups, to improve the quality of life for those who are successful (while, clearly, making life short, brutish, and miserable for those who do not scale the walls of the system), and to compete with each other in this process not only within societies but internationally. Perhaps it is because the basic constraints that originally gave rise to transmission-style, assembly-line education remain in place—constraints enabling high levels of consumption and reproductive capacity—that the system is so difficult to reform in any but a fragmentary way.

At present there appears to be a growing intuition—among some it approaches a certainty—that the conditions that gave rise to assembly-line formal schooling many thousands of years ago are changing. Perhaps the special qualities that make for high achievement in mass schools, that brought us fossil fuels and atomic energy, are the very qualities that will not only enable us, but perhaps drive us, to consume the environment that sustains us. Celebration of the ability of “man the tool maker” to conquer nature may be giving way to a belief that we *cannot* conquer nature. Human beings, after all, are *of* the very nature that we have long taken such pride in conquering. To conquer nature would, by this view, mean to enslave, or more precisely, to annihilate, ourselves.

If this view about the sustainability of human life on earth becomes widespread, it would imply that the cultural practices and social forms through which we prepare next generations to achieve a viable future will also change. The urgent need for new functions would force the evolution of new means. It is with this possibility in mind that I now return to the issue of culture and education in an America that has become multicultural in a way that the European and American architects of compulsory mass education could never have imagined, even in their nightmares. The ancient Assyrian school has been sustained in its basic structure and functions for 4,000 years. What about the alternatives that confront us as human life adapts to the circumstances brought on by the success of those ancient schools?

Where Does Culture Fit Into Contemporary Reform Efforts?

Recent compendia devoted to improvement of education invoke culture in many ways (Gallego, Cole, & Laboratory of

Comparative Human Cognition, 2001). To simplify greatly in light of constraints on the length of articles such as this, I will focus on studies of three approaches to reform: (a) those that emphasize changing the culture of the classroom on the basis of general pedagogical principles intended to be effective for students from all cultural backgrounds, (b) those that seek to leverage cultural resources that children bring from home as a springboard for reorganizing instruction, and (c) those that emphasize the culture of the school as a whole. As we shall see, this neat division easily breaks down, but I find it a helpful heuristic.

Focus on Classroom Cultures

For present purposes, efforts to change classroom cultures as a means of reforming education can be divided into two categories: those that retain the overall architecture and discourse structure of the traditional classroom and those that seek to reorganize classroom procedures in ways that require simultaneously abandoning the traditional recitation script and classroom structure.

Working within the traditional structure. It is important to acknowledge that even within the traditional recitation format, there are variations—in what some call “classroom atmosphere” and others call “classroom culture”—that improve academic outcomes. Unfortunately, the differences one observes when the basic structure of the classroom remains unchanged appear to rest heavily on the special talents of the teacher involved. Exceptional teachers are able, so to speak, to find wiggle room within the iron bars. Two examples will suffice.

The renowned Jaime Escalante, who taught calculus at a working-class, largely Latino high school in Los Angeles in the 1970s and 1980s, when asked about the secret of his success responded, “The key to my success with youngsters is a very simple and time-honored tradition: hard work for teacher and student alike” (“Jaime Escalante,” n.d.). Documentation of Escalante's methods is limited primarily to a docudrama about his classroom, but one can add that within the confines of traditional teaching, he deviated to provide students with a rationale for what they were doing in terms of higher paying jobs, and he challenged them to meet the high standards he set. The high quality of calculus instruction at Escalante's high school declined after he retired, and he was unable to duplicate his accomplishments at another school in northern California.

Marva Collins gained fame in the 1980s for creating a culture of high expectation with classics-based learning in a classroom populated by low-income African American elementary school children in Chicago. Using her version of a Socratic method, modified for use in a large classroom, Collins selected difficult material to challenge students' understanding. Her goal was to foment discussion based on solid reasoning. She began lessons by reading to the children and listing words she expected them to have difficulty learning. Only then did she focus directly on teaching the new vocabulary.

Then the Socratic questioning began. What did the title of the reading mean? As students responded, she challenged their reasoning and asked for evidence (Collins & Tamarkin, 1982). The students read aloud, interrupted by Collins to elicit more thought about the content of the text. Then they would write letters to the

authors and compose critical reviews in which they had to be explicit about how their comments were based on prior learning. Through careful pacing that encouraged children's participation, Collins sought to create a cultural setting in which they withheld final judgment until satisfied that careful reasoning underpinned their answers. The evidence I have seen indicates that she was successful. But when Collins received money to scale up her approach, the effort failed.

Changing classroom structures by implementation of culture-general principles. Most of the examples I know in which there have been serious and successful efforts to change classroom cultures on the basis of general pedagogical principles have broken the traditional architectural arrangements and discourse patterns of standardized schooling.

A number of such efforts can be traced back to John Dewey's (1938) idea that instruction should start with "ordinary experience" and the allied idea that students should be involved in "the formation of the purposes which direct [their] activities" (p. 67), so that the selection of activities will provide them with "the kind of present experiences that live fruitfully and creatively in future experiences" (p. 28).

Gordon Wells's (2000) implementation of this basic approach exemplifies ideas that have been taken up by many others seeking to reconfigure classroom cultures. The elementary school classrooms he and his colleagues designed on the basis of this idea incorporated the following principles:

- The classroom is a collaborative community. It requires joint activity and common purposes; small group work is ubiquitous.
- Purposeful activities involve whole persons and contribute to the formation of individual identity.
- Transformation of the participants occurs as a function of participation in activities that have real meaning and purpose.
- Curriculum is a means, not an end: The aim is to engage particular students in productive activities that are personally as well as socially significant.
- Outcomes are both aimed for and emergent: Outcomes of activity cannot be completely known or prescribed in advance.
- Activities must allow for diversity and originality: Development involves "rising above oneself," both for individuals and for communities.

Implementing curricula based on these principles induces a problem-based approach to classroom design; it requires teachers to be learners and to make it clear to the children that their teachers, too, are inquirers. It also results in radical rearrangements of classrooms. The evidence of the quality of the work produced in such programs is impressive, but my reading of the evidence is that its sustainability, let alone scalability, is open to question.

Leveraging family cultural resources to change classroom cultures. Anyone who has been following the work of the current and immediate past presidents of AERA, Kris D. Gutiérrez and Carol D. Lee, is likely to be aware of the solid literature demonstrating that when teachers incorporate children's home-based, culturally organized knowledge into classroom practices, academic achievement can be improved (see Nasir, Rosebery, Warren, & Lee, 2006, for a recent review). A few examples suffice.

Many years ago, Kathryn Au and her colleagues built a reading curriculum around the discourse practices prevalent in the homes of native Hawaiian children (Au, 1979; Au, Tharp, Crowell, Jordan, Speidel, & Calkins, 1984). They called the practice "talk story," in which adults and children mutually participated while conarrating and discussing an oral text. People often talked in overlapping turns as a part of such discourse. The authors also referred to the curriculum approach they had developed for teaching reading comprehension as an "E-T-R approach": The teacher began by encouraging the children to draw on, and use, their previous experiences (E) as they read the text (T) and then to discuss the relationship (R) between their experiences and the text. The teachers, who were themselves native Hawaiians, took on both leader and listener roles, encouraging mutual participation. The students' reading scores improved significantly, a result that Au attributed to the altered curriculum structure that encouraged the students to apply their existing experiences, skills, and knowledge to classroom activities. Analogous successful examples using the same general approach could be cited, but they have not generally proved sustainable.

Carol Lee (2006) coined the term "cultural modeling" in her influential studies based on detailed analysis of routine everyday practices that leverage familiar modes of reasoning and speaking, and habits of mind embodied in everyday problem-solving. She focused on "signifying," a form of talk rooted in African American English characterized by frequent use of figurative language, including symbols, irony, and satire. As knowledge taken from her students' everyday experiences (dubbed cultural data sets) she used rap lyrics, videos, short films, and film clips where symbolism was a central element. Her students had extensive knowledge of these materials, but their knowledge was tacit and their ways of reasoning about it akin to what Lee calls "subject-matter-specific modes of reasoning." The goal of instruction was to render this tacit, content-bound knowledge explicitly available for analysis and to promote generalization of its core principles to standard literary examples through discussions that provided students with a meta-language to describe their reasoning. Starting instruction in this matter engages not only students' interest but also their expertise. It also changes power relations in the classroom, because often students have more knowledge of the meanings in the text than the teacher does. As in the case reported by Au, Lee notes that as instruction progresses, "new rules emerge for who can talk, when and about what; and as a consequence a different genre of classroom talk emerges" (p. 312). With such instruction, students' ability to apply their now-explicit knowledge of literary genres generalizes to canonical literary texts. The program, implemented by many teachers working together in the same school, has proved successful for well-trained teachers and for the kinds of materials taught.

In both of the prior cases, the teachers were highly familiar with the practices of the local community. But in most classrooms, this is not the case; teachers commute to work from other neighborhoods. To deal with a situation where teachers are unfamiliar with the home culture of their students, Moll and his colleagues have developed a complex, multifaceted approach to leveraging the "funds of knowledge" of the local community. This method begins by having the teachers conduct ethnographic research into the experiences and cultural practices of the Latino

families whose children come to their classrooms. The teachers visit the children's homes, participate in seminars with the researchers and other teachers in a meeting room located in the community, and, reciprocally, invite parents and respected community members to their classrooms (Gonzales, Moll, & Amanti, 2005).

As a result of knowledge gained about their students' wealth of experience, the teachers developed instructional units around topics familiar to the students, for example, the topic of building and construction. Most of the teachers knew little about construction, but they knew that their students, their students' families, and many other people in the community knew a lot about it.

Consequently, the teachers began to introduce new curricular activities, such as asking students to do research on building construction. The students not only read about construction but also created model buildings as homework projects and wrote short essays explaining their research, their ideas, and their conclusions. The teachers then invited parents and other community members who worked in construction to talk with the students about varied topics such as their tools, how they used numbers and measurements, and how they solved problems that came up in the course of their work. As a result of this complicated ensemble of activities, teachers established a broad social network to support their work in the classroom. They came to think of their teaching as "teaching through the community."

One important question about this entire line of work, for which I have no answer at present, is to what extent innovations that rely on importation of local, out-of-school cultural knowledge also act to change the overall structure of the instructional process. Clearly, each such innovation changes the patterns of interaction or the participation structures, if only because the teacher cedes to others the right to speak and share expertise. One suspects that new arrangements of desks and the introduction of new instructional spaces also ensue (for example, spaces to build model houses, spaces for small group-discussions), but whether such changes are required in all such cases, I do not know.

I am also uncertain of how well these innovations travel. They require specialized knowledge, time spent in teacher preparation that is not covered in most union contracts, and time commitments from parents, all of which have to be orchestrated. Perhaps as in the case of the unusually talented teacher, these innovations are inherently limited in their application. However, such limits have yet to be tested.

Efforts like these, insofar as they are focused on a single cultural group, also face the increasingly frequent circumstance that children from many cultural groups share the same classroom. In this case, some of the principles involved in linking in-and-out-of-school knowledge may remain applicable, while others will not.

Changing the Culture of the School

It has long been known that there are variations in the "atmosphere" of schools, such that some are more successful than others, even when they draw children from the same neighborhood and offer equivalently prepared teachers and equivalent facilities (Rutter, Maughm, Mortimore, & Ouston, 1979). Moving from a metaphor such as atmosphere to specifying what it is about the cultural organization of schools that makes a difference is more

complex. I will contrast two examples of such efforts, one that took place within a traditional school structure and one that made a radical break from it.

Retaining school structure: Creating a "culture of excellence." One clear trend in contemporary school reform is to move away from ethnicity as a criterion for arranging for children to attend school outside their neighborhoods. Instead, more often, the criterion for such arrangements is whether they reduce the proportion of children living in poverty for any given school (Kahlenberg, 2001; Konstantopoulos & Hedges, 2008). In addition, such efforts are now a matter of choice, not mandate, and care is taken to ensure that the proportion of disadvantaged children mixed into a middle-class school remains relatively small, under 30%.

This strategy, which takes its inspiration from the Coleman report and recent studies of the effect of changing neighborhood composition through changing housing arrangements, has reported significant gains by the poor students and no loss of performance by their more well-to-do classmates. Tellingly, when a small number of middle-class children are introduced into a lower-class school, their performance falls. The effect appears symmetrical.

If this line of research proves effective, it raises the issue of culture in an entirely new way, leading us to reexamine what can only be called "the culture of poverty," a term with a controversial history (Gorski, 2008; Lewis, 1961). It also harks right back to ancient schools whose structure, values, and practices provide us with the first example of middle-class culture.

The OC: An open classroom school in Salt Lake City. Recently, Barbara Rogoff and her colleagues wrote about an open classroom (OC) school that has existed for several decades and about which there is a good deal of information (Rogoff, Turkani, & Bartlett, 2001). The contributors to their volume include the editors, two of whom are teachers, as well as parents, other teachers, and children. Rogoff was not the originator of the OC school in Salt Lake City, but she participated in it as a parent for several years while her children were enrolled there. By her own account, her ideas and subsequent research on organizational and cultural variations in children's learning were markedly shaped by the experience.

The OC school was opened in 1971 by a group of parents dissatisfied with the curricula offered in both public and private schools in their area. The originators wanted to create a child-centered curriculum with significant daily participation by parents, in which everyone would be considered a learner. "Child-centered" is a term with many meanings, but as its application at the OC evolved, it came to refer to the effort "to build instruction on children's interests in a collaborative way—learning activities are planned by children as well as adults, and adults learn from their own involvement as they foster children's learning" (p. 33). (The affinity to Wells's approach at the classroom level should be clear.) The OC school was and continues to be a "community of learners" school, where the community includes the parents, teachers, and children.

The insistence that children engage in tasks of genuine interest to them results in an astounding diversity of activities, even in a single classroom, as well as the consequent difficulty of figuring out who is teaching and who is learning at any given moment.

The idea that everyone is a learner at OC is clear from the difficult learning process reported by parents, who spend three sessions a week at the school as the “price of admission.” It requires time, effort, and patience before new parents can contribute effectively and comfortably to the ever-changing mixture of activities and find their proper role in them. That everyone is also a teacher is evident from the ubiquity of activities that involve children in teaching each other or teaching the adults.

It is difficult to do justice to the richness and complexity of this pedagogical strategy in a few paragraphs. Assuming that the reader can glean the basic spirit of this model for organizing the learning process, a natural but difficult-to-answer question arises: Does this form of education work? Despite the nature of the school’s participants and practices (e.g., there is no standardized testing, the children’s parents self-select them into the school, and the adult family members are primarily middle-class professionals), two indicators of conventional success stand out. First, the school became an accredited public charter school in the Salt Lake City school system and has been in operation for almost 40 years; it has been institutionalized. Second, children graduating from the school are successful (except in spelling!) when they move on to regular public schools at graduation time and are often valued role models for the teachers into whose classrooms they move. Less conventional, perhaps, is the finding that the children graduate with enthusiasm about their future schooling, indicating that OC is achieving one of its goals: to create lifelong learners.

Other examples of changes in the overall cultural organizing of whole schools require mention, even if I have no space to describe them here. Brown and Campione (1996) described a school based on the idea of a community of learners, which produced marked gains in student achievement but proved very difficult to replicate and has ceased to exist. James Comer’s well-known School Development Program, implemented in many locales, seeks to mobilize entire communities in support of the children in their schools; this approach, too, warrants extensive discussion, both for all that it has achieved and for all the problems it continues to wrestle with. Evaluations show that in some social ecologies, the program is successful, in others, less so (Cook, Murphy, & Hunt, 2000).

What About the Future? Should We Put Faith in a Technological Fix?

In the concluding chapter of *The Cambridge Handbook of the Learning Sciences*, editor Keith Sawyer (2006) summarizes a growing consensus that the world has undergone a shift in the developed nations from an industrial to an innovation- and knowledge-based economy. He cites a Finnish report asserting that economic success requires education that stresses collaborative teaching and learning, networking, and teamwork. “Networking” means computer networking; and in various reports from around the world, computers and computer networks are seen as central tools for this transformation of schooling. And note, Sawyer’s chapter was written when hand-held computers were in their infancy and before the explosion of smart phones and “apps” that appear to hold great promise for the radical transformation of classroom cultures in the service of improved education.

By this time we should all be very suspicious of claims that a new technology is going to transform education. Larry Cuban has spent a lifetime seeking to nail the lid on the coffin of such technological determinism, and thus far he has not been proved wrong (Cuban, 2010). But this is no guarantee that he will not be proved wrong in the future, and many are actively seeking to do just that.

Here I will focus on the applications of new technologies that support efforts to change the culture of the classroom through internal changes in modes of interaction that implement inquiry-based learning. These changes may occur through new divisions of power, or by breaking down the walls of the classroom to enable two-way exchanges between the classroom (or school as a whole) and the adults in the community who want to see their children well educated and who see themselves situated in an environment with serious global problems.

A Tool to Enable Inquiry-Based Schooling

I will start with a program that began by creating a tool for implementing inquiry-based, collaborative learning that has expanded to include both local communities and communities in distant locales. The knowledge-building curriculum was developed by Marlene Scardamalia and Carl Bereiter in the mid 1980s as “an attempt to refashion education in a fundamental way, so that it becomes a coherent effort to initiate students into a knowledge-creating culture. Accordingly, it involves students’ not only developing knowledge-building competencies but also coming to see themselves and their work as part of the civilization-wide effort to advance knowledge frontiers.” (Scardamalia & Bereiter, 2006, pp. 97–98). Communication between local classrooms enabled by the Internet made possible such a broad cultural reorientation.

At the core of Scardamalia and Bereiter’s innovation is a computer platform called the Knowledge Forum, designed to support enhanced idea formation and collective collaborative problem solving within and among local classroom communities. But the basic principles of the program as a whole could have been written by Wells, or Rogoff, or any number of scholars already mentioned who have sought to focus on culture, in one or more senses of the term as used here, to reorganize education. The issue of evaluation of these programs remains complex. Teachers report that their students grow daily in their knowledge and deep understanding of school subjects, developing ever-greater skills in creating, refining, and sharing ideas; however, the change is visible through on-line discussion and collaboration rather than individual work with standardized tests. The development of online assessment tools is an ongoing challenge to this effort.

“Serious Gaming” in Microworlds: Quest Atlantis

The burgeoning genre of Internet-based, multiuser digital video games designed for educational purposes has become prevalent in many domains of contemporary life, including education. I have selected as an example the game Quest Atlantis (QA; see it at <http://atlantis.crlt.indiana.edu/>) because its designers have explicitly drawn upon the same family of theories that motivated the other examples described above (Barab, Thomas, Dodge, Carteaux, & Tuzun, 2006). Moreover, QA has been used on an extraordinarily broad scale, involving some 10,000 children in several countries.

The core activity of QA is to complete quests on the mythical planet of Atlantis, presented as a place much like Earth. Quests are designed to engage children in simulated and real-world activities that are deemed to be socially and academically meaningful: In one virtual example, fish are dying in the local lake, a strange disease is killing people, a mayor needs information about how to solve his city's problems. The children conduct research by a variety of means, develop plans of action, implement the actions, find out about the consequences of their actions, and engage with other participants in discussions about their experiences. Quests are also designed to include standards-based academic skills, and a number of evaluation studies have demonstrated learning gains in science, language arts, and social studies. At the same time, the real-world anchoring of the quests' contents serves to link the children with the game in the context of their own world and other participants, wherever they may live. Not only do children appear to find the game and its ancillary activities attractive in the classroom; they also seek to engage the game outside school. Moreover, they and their teachers report increased levels of engagement and interest in pursuing the curricular issues modeled in the game outside school.

Some Concluding Remarks

In his concluding chapter in *Handbook of the Learning Sciences*, Sawyer (2006) evokes a vision of education in the future drawn from the work of Stallard and Cocker (2001), who are focused mostly on the promise of education but whose vision provides a handy alternative to that of the Assyrian classroom or the open classroom, because it envisions the disappearance of the aggregated institution called "the school" altogether. In its place would be

a nation of home-based activities organized around small neighborhood learning clubs, linked through high-bandwidth Internet software. "Teachers" would operate as independent consultants, who work from home most of the time, and occasionally meet with ad hoc groups of students at a learning club. (p. 569)

Lectures, what there were of them, would be available online. Project-based learning and multigenerational, overlapping, small communities of learners would converge virtually or face-to-face as conditions required.

Such a vision is not likely to be realized in the lifetime of anyone here, if ever. It presupposes not only the material conditions required for its implementation but a sea change in people's ideas of what education is for. The fact is that, despite pronouncements about the advent of an innovation and information economy, great masses of the American public (and I believe the same is true quite generally on the international scene as well) are not anxious to have their children at home all day. They do not want their children wresting authority from them, deciding for themselves what constitutes an interesting problem to work on; and they fear the social chaos that would result from such a change in the cultural foundations of the nation state. By and large, American parents are not cosmopolitan, they are fiercely nationalistic; and those who are economically well off are deeply concerned about losing economic dominance in an increasingly competitive world. They are not unhappy about high-stakes testing, just low

performance on those tests. Their goal for their children echoes that of the Egyptian father I quoted early in this article: "Behold, there is no scribe who lacks food from the property of the House of the King—life, property, health!"

We cannot look to voluntarism to produce an alternative to assembly-line schooling. For much longer than anyone can remember, success in that system has been the royal road to economic prosperity and relative safety. And so it is today. A very large part of the American economy is driven by consumption and defense. China is rapidly industrializing, and there, too, consumption and defense are the master motives.

In light of the extraordinary persistence of this "proven" system of deliberate instruction, what change in the circumstances of humanity could engender its massive re-formation? As far as I can tell, massive change will occur only when, or perhaps only well after, government policy makers and the general public in countries around the world fear for their lives if assembly-line schooling and the mass consumption that is its driving force are allowed to continue. If such a new, pervasive cultural understanding becomes widespread, and people act on it in time, perhaps the ancient model of mass schooling will be replaced.

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