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ABSTRACT

The current wave of school reform, with its emphasis on the learner, affords the opportunity to create environments that can foster excellence. The ability to support the development of excellence is threatened by commonly held beliefs that excellence depends on innate ability and that anyone who works hard enough will succeed, irrespective of the support they receive. This paper, one of a series of essays written for New York State's "Standards of Excellence" project, challenges common beliefs and asserts that: (1) human beings possess a varied array of mental competences, strengths, or "intelligences" that they can combine and call on in different ways to achieve excellence in diverse disciplines; and (2) those who are deemed excellent have developed their competences in meaningful contexts over an extended period of time. Topics discussed include the varieties of potential excellence, broad and narrow views of excellence, conditions for the achievement of excellence, community involvement in the creation of meaningful contexts, teacher involvement in the nurturing of domains of excellence, and forms of curriculum and assessment that engender understanding. Recommendations for schools seeking to support excellence include encouraging and supporting teachers to develop diverse competences through cooperative learning; providing forms of assessment that are fair to those with diverse strengths; and aligning school, family, and community to support the long-term development of individuals' competences. Contains 113 references. (SM)

# *Varieties of Excellence: Identifying and Assessing Children's Talents*

**Mindy Kornhaber**
**Howard Gardner**





*A Series on Authentic Assessment and Accountability*





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*Varieties of Excellence:*

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Mindy Kornhaber
Howard Gardner
Harvard Project Zero

March 1993

# Preface

This paper was commissioned by the New York State Department of Education as one in a series of essays on "Standards for Excellence." Under the leadership of Commissioner Thomas Sobol, the state is engaged in an effort to rethink the ways in which it organizes, manages, supports, and assesses education so as to promote greater equity and higher levels of educational excellence in all schools. New York's ***New Compact for Learning*** establishes directions for the state's efforts to help communities redesign their schools in response to the demands of the 21st century. A major goal is to support schools that will encourage *all* students to construct, integrate, and apply their knowledge; solve problems; create; produce; think critically; and invent solutions to the unforeseeable problems that will confront them in the complex world of tomorrow.

Together the papers in the series discuss standards for educational outcomes, school practices, and educational assessment that can allow such schools to become the norm, rather than the exception to the rule. This paper details the range of intellectual competences that human beings possess and describes the conditions needed in schools to foster sustained engagement and reflection in diverse domains of knowledge. Under separate cover, NCREST has already published ***Standards of Practice for Learner-Centered Schools*** by Linda Darling-Hammond, a discussion of how standards for resources and professional practice should operate to enhance accountability.

# Summary

Achievement of excellence has been a focal concern for the current educational reform movement. Politicians decry America's failure to compete on the international economic scene and point the finger at the American educational system. Educators and social service professionals see the achievement of excellence as a way for young people to develop the self-confidence and skills necessary to succeed in adulthood. Despite widespread agreement on the need to achieve excellence, two fundamental questions remain unanswered: What is excellence? And how do we create the optimum conditions for its achievement?

This paper begins to answer those questions, based on research undertaken at Harvard Project Zero. Authors Mindy Kornhaber and Howard Gardner define excellence as "...regular, high-level performances in domains of knowledge that are relevant to an individual's culture." The authors make two key points:

1. **Human beings possess a varied array of mental competences, strengths, or "intelligences" that they can combine and call on in different ways to achieve excellence in diverse disciplines.** Furthermore, excellence in these disciplines, or domains of knowledge, is developed and exhibited in different ways. Most schools miss opportunities to support the development of excellence because their curriculum, assessment, and pedagogy neglect all but linguistic and logical-mathematical competences.

2. **Those who are deemed excellent have developed their competences in meaningful contexts over an extended period of time.** While these individuals may have possessed certain strengths from an early age, none is excellent from the beginning. Instead, they engage in a series of efforts, which include many small victories and defeats, ultimately enabling them to meet high standards in a discipline. To help young people excel, schools need to create conditions that foster sustained engagement and encourage reflection on one's own and others' efforts.

This view of excellence challenges the narrow view held by schools and derives from Gardner's theory of multiple intelligences first articulated in his book ***Frames of Mind.*** Gardner believes that human beings possess seven autonomous, but coordinated, intelligences: linguistic, logical-mathematical, musical, spatial, bodily-kinesthetic, interpersonal, and intrapersonal.

The current wave of school reform with its emphasis on the learner affords the opportunity to create environments that can foster excellence. This is threatened, however,

by American myths that excellence depends on innate ability and that anyone who works hard enough will succeed, irrespective of the support that they receive. To engage learners' diverse strengths, teachers need to combine a variety of strategies as entry points to domains. Community involvement is also needed; it is the community that provides the necessary support, meaningful contexts, and opportunities for domain-relevant practices like apprenticeships and collaborative learning.

Based on their research, Kornhaber and Gardner make six recommendations for fostering excellence:

- **Recognize the broad range of human competences**. Excellence is not one thing; rather, it requires the full range of competences and is realized in diverse domains.

- **Create a social environment that supports the long-term development of individuals' competences**. Developing children's competences often builds on synchronous forces between schools and other social institutions. Thus, school structure and governance should foster an alignment of school, family, and community.

- **Encourage and support teachers in efforts to develop diverse competences over time** through such practices as cooperative learning, cognitive apprenticeships, and projects.

- **Encourage teachers to take advantage of the reality that domains of knowledge are complex bodies of facts, principles, and practices** and not small splotches of ink on paper. Support them in efforts to design curricula and pedagogies that build on genuine practices in a domain and that are meaningful to students and members of their community.

- **Provide forms of assessment that are fair to those with diverse strengths and that help them to develop those strengths**. Assessment needs to be ongoing and to use the media or symbol systems that are sensible for the competences and domains it is testing. It should provide feedback that is beneficial to students, parents, and teachers. Video recording of student projects provides an excellent means for the development of assessment schemes for domains of knowledge not addressed in standardized tests.

- **Seek as a marker of excellence performances of understanding**: those in which children flexibly apply the facts, principles, and skills of a domain to solve problems they have not encountered before.

# Acknowledgements

Publication of this landmark paper would not have been possible without the contributions of many people.

First, gratitude is owed to Edmund Gordon, who coordinated the New York State "Standards of Excellence" project for which this paper was originally written. Dr. Gordon's wise and experienced leadership guided that project in pragmatic and useful directions, so that it could make a real difference to New York schools.

For support of the research discussed in this paper, we would like to thank the William T. Grant Foundation, the Lilly Endowment, the Rockefeller Brothers Fund, the Rockefeller Foundation, and the Spencer Foundation.

Finally, we thank NCREST editor Elizabeth Lesnick and communications director Diane Harrington for polishing the draft and producing this volume.

*Mindy Kornhaber*
*Howard Gardner*
*Harvard Project Zero*

# Contents

# Looking at Varieties of Potential Excellence

Since early 1989, members of a research group at Harvard Project Zero have been spending several hours each week watching videotapes. The tapes are not produced by major motion picture studios; yet in their own way, they are quite compelling. The tapes show urban public school students giving presentations about projects they were to have worked on over a period of several weeks.

Among the projects we are examining are ones done by youngsters at the Key School, a public elementary school in Indianapolis. The school was inspired in part by Gardner's theory of multiple intelligences (1983), which asserts that all individuals possess several, different intellectual competences. The Key School provides opportunities for children to use the full array of these competences each school day. Teachers at the school encourage children to employ their unique combinations of competences in realizing the school projects as well as other work (Olson, 1988).

Key School projects are based on broad, schoolwide themes, such as "Heritage," "Connections," or "The Renaissance: Then and Now." The themes provide a focus for the entire curriculum. Thus, during "The Renaissance," the art teacher helped students to construct life-size paintings of Renaissance-era people. The music teacher encouraged students to learn Renaissance music on the recorder or the violin. Classroom teachers discussed the theme both in historical terms and in terms of the current rebuilding of the children's own city.

At the Key School, youngsters work alone or in small groups to create their projects. Much of the actual work is carried on outside of school, often at home. Toward the end of the theme period, the children present their projects to their classmates. Their presentations are videotaped for the children's individual "video portfolios." These video recordings represent an attempt by the Key School to document interests, strengths, and achievements that are not readily captured by standardized tests or other written assessments.

Our research group's charge is to devise an assessment scheme for student projects at the Key School and elsewhere. The assignment is more complicated than it sounds. Like adult efforts, the student projects and presentations vary widely in quality. In addition, the projects do not all explore the same domains of knowledge, such as science or history or music. Not all the projects have a similar format. Even when keeping a topic constant, such as "The Renaissance," we find efforts that range from the familiar book report, to scale-model buildings, to musical performances.

Noting this difficulty, and having looked at many students' efforts, both on videotape and in classrooms, we believe that some of the most notable projects have been done by an African-American elementary school girl we will call Kimberly. Kimberly's projects usually

entail a drama or dance performance. One was an extended and well-rehearsed balletic dance to contemporary, popular music. In another she researched and rehearsed a variety of dances that were in vogue during this century. She then performed the dances to music appropriate to their respective eras. Alongside this, she created a poster of drawings showing fashions that were worn during each decade of the century. For the "Heritage" theme, we watched her deliver from memory an expressive dramatic monologue based on the experiences of a slave girl.

In nearly all of her projects, Kimberly demonstrates excellence by giving skillful performances on challenging assignments in disciplines that are widely appreciated in the larger society. Her achievement is not surprising given her talent and her delight in and dedication to dance and drama, as well as the support she receives both at home and in school for her efforts. Nor is it surprising that Kimberly was subsequently admitted to a magnet school for the arts based on her dance and drama auditions. What may be more surprising is that this school success comes in the face of marginal results on IQ tests and a failing grade on the state's standardized test of math and English.

Project Spectrum, a research group launched six years ago by David Feldman at Tufts University and Howard Gardner at Harvard Project Zero, is another effort aimed at exploring the range of human competences. Investigators in this group focus on preschoolers and early elementary school children Project Spectrum researchers have devised an inviting collection of classroom materials that help them, as well as teachers, assess and build on a given child's intellectual strengths. Among these materials are games that call on children to use their linguistic and mathematical abilities. There is a scale model of the classroom and its inhabitants through which social and spatial abilities can be plumbed and developed. In addition, Spectrum uses musical instruments, dance and movement exercises, and machinery of various complexity, which children are free to take apart and reassemble (Krechevsky, 1991; Krechevsky and Gardner, 1990; Malkus, Feldman, and Gardner, 1988).

This assembly activity helped to reveal an extraordinary strength in an at-risk boy. "Jay" did poorly on standardized tests, and evinced little skill, interest, or persistence in traditional classroom activities that focused on language and numbers. Nor was this youngster adept at socializing with his classmates or teacher. In fact, his teacher later admitted she had already given up on him. What kept her awake for several nights reconsidering this judgment was watching Jay become totally engaged in taking apart a food grinder, intently studying its mechanism, and then putting it back together in a careful way. His performance on this task was not only superior to his work in other activities, but it was also better than that of his peers. It was obvious to all concerned that, at least in this mechanical domain, he was capable of concentrating, proceeding in an orderly fashion, and doing a skillful job in which he took pleasure and pride.

These research projects and the examples of Jay and Kimberly help illustrate two key points on which we will expand in this essay. The first is that human beings possess a varied array of mental competences, strengths, or "intelligences" (Gardner, 1983) that they

can combine and call on in different ways to achieve excellence in diverse disciplines. Furthermore, excellence in these disciplines, or domains of knowledge, is developed and exhibited in different ways. Most schools miss opportunities to support the development of excellence because their curriculum, assessment, and pedagogy neglect all but linguistic and logical-mathematical competences.

Our second key point is this: Those who are deemed excellent have developed their competences in meaningful contexts over an extended period of time (Bloom, 1985; Gardner, 1990; Hayes, 1985). While these individuals may have possessed certain strengths from an early age, none is excellent from the beginning. Instead, they engage in a series of efforts, which include many small victories and defeats, which ultimately enable them to meet high standards in a discipline (See Collins, Brown, and Newman, 1989). To help young people excel, schools need to create conditions that foster sustained engagement and encourage reflection on one's own and others' efforts.

In this paper we begin by detailing the range of intellectual competences that human beings possess and the evidence in support of these competences. We do this because these competences serve as one of the foundations for excellence. However, it is also evident that excellence is not solely skull-based; individuals' minds intersect with the domains of knowledge and system of values maintained by their cultures (Csikszentmihalyi, 1987; Csikszentmihalyi and Robinson, 1986; J. W. Gardner, 1961; Goodnow, 1990; Keating, 1984; Rogoff, 1990). Therefore, we also discuss socially based foundations of excellence. These include the values and practices of the wider society as well as the schools. Such values and practices help to establish the degree of engagement and the domains of engagement that appear worthwhile to individuals.

## Broad and Narrow Views of Excellence

Excellence depends on the meshing of complex aspects of individuals' minds and of cultures' values and practices. Despite this complexity, it is possible to formulate a reasonably succinct definition of excellence: Excellence consists of regular, high-level performances in domains of knowledge that are relevant to an individual's culture. Our first task in this section is to "unpack" our definition by characterizing domains of knowledge and high-level performances. Following this, we examine varying conceptions of the mental abilities that account for individual performances. We do this in preparation for exploring how values and practices in the wider society affect the development of these mental abilities.

Domains of knowledge consist of bodies of facts, principles, and skills that evolve over time because they play a useful role in sustaining a culture's economic or social needs (Csikszentmihalyi, 1990). Obviously, cultures' needs vary and change. As a result, there

are many domains ranging from dance to car repair to shamanism. A domain that is useful in one culture may be less appreciated elsewhere: Shamanism is a vital part of many cultures in the world. In Western Europe, however, it is not. As a result, there are few, if any, European practitioners of shamanism. Despite their great number and variety, "authentic" domains such as shamanism, anthropology, dance, or car repair share several features:

***Practitioners***. As indicated above, domains of knowledge are *practiced* in their culture (J. S. Brown, Collins, and Duguid, 1989). There is at least a small band of individuals, and probably a sizable number of people, who work in the domain, who communicate with each other in some fashion, and who may contribute to the domain.

***Repertoire***. A domain's practitioners share certain kinds of skills and knowledge, such as interviewing and observing in cultural anthropology, or conducting rituals in shamanism, or diagnosing and repairing car problems in the domain of auto mechanics. Practitioners of a domain make use of a repertoire of laws, principles, theories, and models of explanation or evidence (Chi, Glaser, and Rees, 1982; Perkins *et al.*, in preparation). These guide them in their work and help them to refine their practice.

***Time***. Because domains are rich with content and practices, it takes time to become a skilled practitioner (Hayes, 1985; Perkins and Salomon, 1987). As noted earlier, people are not born excellent. Instead, they advance through a domain, usually in a series of steps. These steps may be formally recognized, as they are in a traditional apprenticeship (Feldman, 1980).

***Varied Effort***. Since domains are rich, the routes into skilled practice may take many forms. In literate communities, broad aspects of many domains are captured in books. Despite this, it is important to recognize that only in extremely few domains can individuals achieve expertise solely by reading about them. Just as in nonliterate communities, individuals must "get their hands dirty" by, for instance, attempts at fixing a car or conducting interviews and by having others respond to these efforts (Polanyi, 1958).

***Recognition of Expertise***. Finally, because those in a domain draw on a pool of shared principles, skills, and facts, other practitioners and informed appreciators (e.g., a dance critic) can usually recognize individuals who excel in the domain. These two groups help constitute the "field" that can bestow official awards or recognition of excellence (Csikszentmihalyi, 1987; Gardner, 1988). The field's judgment is based on an individual's ability to make flexible use of the domain's facts, skills, and principles to tackle some of the domain's most complex matters with success.

We consider an instance of such flexible use to be a *performance of understanding* (Gardner, 1991a). A performance of understanding may be seen when a student solves a math problem that is new to her; or when a student like Kimberly performs a monologue that moves her audience; or when Jay handles a new machine and through this reveals how all the

parts work together. We believe that, in Western culture, excellence consists of strings of such performances on genuinely challenging matters in the domain. (In other cultures, which may value faithful demonstrations of traditional skills on traditional problems, a different definition of excellence may hold; see Gardner, 1989.)

Given that excellence takes place in many domains, and that it is determined on the basis of diverse kinds of high-level performances of understanding, it seems counterintuitive to maintain that excellence relies on just one or two underlying mental abilities. Nevertheless, a widely held but narrow view of excellence is based on just this premise. We need to contend with the narrow view because it has a long and influential history in Western culture generally and in our schools in particular.

The narrow view of excellence regards the linear, abstract reasoning characteristic of the domains of mathematics and logic as the basis for accomplishment in all disciplines. This belief extends from Plato, through Descartes and Bertrand Russell, to many contemporary psychologists, from psychometricians to Piaget. Typically, schools have focused their efforts around a slightly expanded version of the narrow view. This scholastic version allows language to spread beyond the linear, propositional argumentation of essayist literacy (Goody and Watt, 1963; Olson, 1977) to encompass creative literature.

The narrow view often prevails in schooling for a number of reasons. First, schools came along specifically to transmit the abstract notations that people invented to capture regulations, knowledge, and accounting techniques prized by the leadership of early civilizations (Csikszentmihalyi, 1990; LeVine and White, 1986). Thus, schools were places in which the capacity to manipulate abstract symbols, as is characteristic of logic and math, were highly valued (Gardner, 1990).

Second, early schools were largely training grounds for the next generation of leaders. Their charges were usually the sons of the elite or other boys who were deemed particularly apt at learning symbol systems, manipulating them, and memorizing long passages comprised of them. It is easy to imagine that a confounding of social status with particular kinds of symbol manipulation would support a narrow view of excellence.

Yet a third reason for the narrow view of excellence, both in schools and throughout Western society, was the widespread adoption of intelligence testing. Modern forms of intelligence testing were developed when schools became mass institutions. The initial purpose of this testing was to identify those children who were not able or willing to learn what was taught in school and provide them with remediation. The first test, published in 1905 by Alfred Binet and Theodore Simon at the request of the French government, consisted of a variety of short practical tasks. These were not based in the practices of a domain as they were learned over time. Instead, children were asked to do such things as follow simple instructions (e.g., to be seated or pick something up from the floor), to count backward, to repeat sentences of different lengths, to name familiar objects from pictures of

them, and to copy geometric forms (Binet and Simon, 1905). A single score, known as a "mental age," was assigned to the child's effort.

Despite this numerical label, Binet himself did not hold a narrow view of intellectual competences. Instead, he asserted that intelligence was a complex characteristic of diverse qualities. Furthermore, Binet made no claims about the origins of intelligence and asserted that intelligence was remediable. He argued against using test scores to consign children to a basically custodial classroom (Binet and Simon, 1905; Gould, 1981).

Unfortunately, Binet's ideas about human abilities were subverted when his tests were adapted for mass administration by Lewis Terman and others in the United States. In books that explained and advocated these adapted tests as a means to solve the organizational dilemmas of expanding schools systems, Terman (1916, 1919, 1923) offered his own ideas about intelligence: It was genetically determined, irremediable, and readily ascertained, like the amount of gold in ore, "by sinking shafts, as it were, at a few critical points" (Terman, 1919, p. 1).

Thus, Terman's work, as well as that of many others involved in the development of intelligence tests (see Gould, 1981), promoted narrow views about the bases for excellence. Equally important, the acceptance of testing fostered the belief that valid assessments about individuals could be divorced from practices within authentic domains. "Science" could efficiently discern whether individuals had the capacity for excellence largely by the way they responded to short-answer paper-and-pencil tests. Edwin G. Boring, a prominent psychologist and a historian of this domain, captured the involuted nature of the testing movement: "Intelligence is what intelligence tests measure" (Boring, 1923). And what the tests tended to measure was a very limited range of language and logical-mathematical problem solving.

While some theorists nominate language and mathematical logic as the bases for excellence in all domains (Eysenck, 1981; Jensen, 1969; Spearman, 1927), others have disputed that claim. Those opposing the narrow view usually base their arguments on an alternative form of the statistical technique called factor analysis (Guilford, 1967; Thurstone, 1938). Such analyses attempt to identify the mental abilities that account for the positive correlation among different intelligence tests. These analyses have determined that anywhere from 2 to an unwieldy 120 underlying factors are responsible for intellectual performance.

There are at least two significant problems in such arguments. One is that the number of factors any reputable factor theorist posits results from the use of different, but defensible, statistical techniques. Second, these analyses are based on outcomes of intelligence tests. They do not look beyond the puzzles these tests employ to ascertain the kinds of cognitive capacities human beings rely on when they encounter genuine problems in an authentic cultural domain. Thus, both claims as well as many counterclaims about the nature of individual competences have focused on results from assessments that look only at

limited performances in a small band of human competences (Gardner, 1991b; Sternberg, 1990).

Rather than just attempting to explain the correlations among intelligence tests, Gardner (1983) sought to account for the cognitive bases that enable people to perform in the broad range of domains humankind has developed. To determine these cognitive foundations, he relied on a variety of evidence. He took into account the outcomes of intelligence testing. In addition, he considered evidence from evolutionary biology, cross-cultural studies, and psychology. In particular he looked at the development of different symbol-using capabilities among normal children; the unusual profile of these capabilities in prodigies, autistic individuals, and *idiots savants*; and the selective sparing or injury of symbolic capacities in brain-damaged individuals.

These investigations indicated that several different capacities and skills are present in all cultures. These competences tend to develop at different rates, to reach greater or lesser degrees of finesse in the absence of rigorous instruction, and to be governed by different areas of the brain. For example, use of language develops at a rapid rate in all normal individuals with very little tutoring. The ability to work in mathematics, in contrast, varies among cultures, develops slowly among individuals, and usually requires formal instruction to reach high degrees of skill. Furthermore, illness or injury that renders an individual incapable of speech may have little or no effect on mathematical skills (Gardner, 1983).

Based on this research, Gardner proposed his theory of multiple intelligences (Gardner, 1983). According to this theory, there are at least seven relatively autonomous intelligences: linguistic, logical-mathematical, musical, spatial, bodily-kinesthetic, interpersonal, and intrapersonal. In Gardner's theory, an intelligence is a potential that enables a person to solve genuine problems or to fashion products that are valued in some cultural setting (Gardner, 1983, Chap. 4). Each intelligence gives a person access to forms of thought that prove especially appropriate to handling specific types of content or problems.

Only in rare cases of pathology do intelligences appear in isolation. For normal individuals to function in and across cultural domains, several intelligences or competences must be coordinated. Thus, a dancer relies on bodily-kinesthetic and spatial competences to control her movements through time and space. She also needs inter- and intrapersonal competences to access her own feelings and convey these with expression to an audience. A mechanic needs spatial and bodily-kinesthetic competences as well. He uses the former to figure out how parts relate to each other and the latter to take apart and assemble components. He may also need some logical-mathematical skills to measure how things fit together and to test parts systematically to see which one is failing to operate as it should. An anthropologist requires a great deal of interpersonal intelligence, but logical-mathematical competence may come into play as she tests her theories, and linguistic competence is essential in explaining her findings and writing them up.

We believe that excellence in dance, mechanics, anthropology, and nearly all other domains rests on a broader array of competences than the traditional narrow view acknowledges. Excellence depends, however, not only on an individual's underlying competences. It also depends on socially based conditions that enable the development of competences through sustained engagement in meaningful, domain-relevant tasks.

## Conditions for the Achievement of Excellence

One way to think about the development of excellence is to place it within the context of general human development. Unlike many other species, human young are not born in the morning able to set off running with the herd an hour or so later. As is the case with human development generally, excellence within domains of knowledge requires sustained support from nurturing adults. It rarely if ever materializes solely out of the resources of an individual's mind (Feldman, 1986).

The support needed for the development of excellence is threatened by numerous myths and practices of American society. Rather than intoning a litany of these, we focus first on two prominent myths and some of the beliefs that flow from them.

### The Myth of "The Natural"

As the adaptation and popularization of intelligence tests by Lewis Terman indicates, Americans sometimes appear all too willing to believe that excellence depends primarily on innate ability. Parents in America are far more likely than their Asian counterparts to accept the idea of inborn talent as an explanation for their children's achievement (Stevenson, 1990; White, 1987). While Japanese parents insist that their children have lots of homework, American parents do not necessarily want their children to be saddled with the amount of work that may be needed to make significant progress in a domain. Though there are several reasons for this (see, for example, Barrett, 1990), the myth of natural talent -- that "you've either got it or you don't" -- probably plays a potent role. This myth makes it hard to justify foregoing free time and devoting energy to challenges for which one simply "hasn't got the knack."

If we love the natural, it makes sense that we are not terribly fond of "the grind." The grind is a student who gets ahead of others by working harder. The grind violates the myth of the natural by forcing others to notice that, with extra work, they too might excel. Thus, rather than gaining support for engaging in challenges over time, hard-working students may be seen as breaching acceptable community norms and beliefs (see Horowitz, 1987).

It is worth noting that violating community standards is rarely appreciated anywhere. Thus, the issue is not that Japanese students are diligent and the Americans are lazy, but rather that both operate to maintain the support of those around them. Generally neither wants to stand too far outside of the behaviors accepted by their parents or peers, since such deviation threatens their social ties (see, for example, Fordham and Ogbu, 1986).

Unfortunately, for a variety of historical reasons (see Bailyn, 1960; Hofstadter, 1963), the predominant U.S. views about grinds, intellect, and scholarship are not terribly conducive to achieving excellence or inculcating it as a goal among students. Hofstadter (1963) noted that we are a pragmatic culture in which displays of intellectual strength are subject to suspicion. The upshot of such views is not surprising. As John W. Gardner (1961, p. 102) wrote, "We cannot scorn the life of the mind and expect our young people to honor it." At best, even if we do not scorn the mind, the messages from nurturing adults and the larger society may be ambivalent enough to undercut motivation for sustained work toward excellence, especially in intellectual endeavors.

## The "Horatio Alger" Myth

The Horatio Alger myth may be seen as both contradictory and complementary to the myth of the natural. Its message is that anyone who works hard enough will succeed. This myth is less contradictory than it appears, because it is usually applied to pragmatic, financial success rather than to more "mental" achievements. At the same time, this myth complements the natural because it too posits that the resources individuals need to excel are largely within their personal sphere. In both myths, success comes from drawing upon one's own strengths, whether innate or self-forged. Thus, both help to explain some of the dearth of dedicated effort among those who might nurture excellence in the young.

While the myth of the natural undoubtedly has some impact on everyone, the Horatio Alger Myth may have more definitive effects on groups of people who, historically, have not reached the levels of income or school achievement of white, middle-class men (Lewis, 1979; Sniderman, 1989). Flowing from the Horatio Alger myth is a belief that if parents just worked hard enough, they would solve their own problems, provide for their own families, and deliver eager and charming young learners to the schoolhouse door. The Horatio Alger myth undermines support for excellence at the wider societal levels by allowing Americans to neglect problems in their social structure (Patterson, 1986; Sniderman, 1989). These problems deliver to classrooms children who lack nutrition, housing, medical care, and other basic needs. In the absence of these basics, it is difficult for many children to engage their competences or to find the work of school compelling (Fine, 1986; Quality Education for Minorities Project, 1990).

The Horatio Alger myth also makes it possible to blame the poor, minorities, and women for their absence from fields and institutions from which they have been excluded (Lewis, 1979; Ryan, 1976). If those who work hard succeed, and if legal obstacles have been largely lifted, what excuse can there be if such individuals do not get into doctoral

programs or enter the sciences? The fallback answer for some is that these people lack "natural" ability.

Both myths ignore the barriers created by historic forms of discrimination, which have an impact on individuals' motivation to develop their competences over time in school (Comer, 1988a, 1988b; J. W. Gardner, 1961; Ogbu, 1978; Wilson, 1987). As a result of exclusionary practices, the "cultures" of certain domains and occupations appear uninviting to some groups, and the routes into and through these domains are obscure. Thus, young women have not entered engineering, mathematics, or the physical sciences in numbers that reflect their abilities to grasp and succeed in these fields (Armstrong, 1980; Chipman, Brush, and Wilson, 1985; Kahle, 1985). Too many young black people do not enter or graduate from four-year colleges. Of those who do, extremely few pursue hard sciences (American Council on Education, 1988; Green, 1987; Thomas and Hirsch, 1989; Wilson and Justiz, 1987/1988). There is little, if any, reason to assert an uneven distribution of competences that would make some groups of people more likely than others to succeed in given domains; yet, our social practices have, in Jacqueline Goodnow's words, made it seem as if "some skills and some areas of knowledge belong to some people more than to others" (Goodnow, 1990, p. 264).

## Community Involvement in the Creation of Meaningful Contexts

It is unlikely that the myths and values that undermine the creation of contexts for engagement will suddenly evaporate. Certainly, schools by themselves cannot radically alter beliefs created over the course of American experience. Nor do we think schools can bring about equality in the society at large, in the absence of economic and social policies that support families, children, and equitable access to quality education (Birch and Gussow, 1970; Cohen, 1989; Fine, 1988; Orfield, 1988; Orfield and Peskin, 1990). Having looked at these myths and their impacts, however, we do think that schools can help youngsters within their immediate sphere develop their competences in domains of knowledge by creating meaningful contexts for engagement.

Schooling and its practices look irrelevant to many students (Sarason, 1983), not just to those in difficult circumstances or those who have faced historic discrimination. Yet among more fortunate students there is an alignment between the school and the community that makes schooling seem important, if not often intriguing, to those within it. It is at least this level of meaningfulness that suburban districts have counted on and cultivated to foster student cooperation and effort (Comer, 1988a).

If less privileged students are to develop their competences in schools, schools may need to forge greater alignments with people in the school community. If members of the

community are treated with respect and community issues are considered matters worthy of study, students may come to see the school as a part of their own value system rather than as something foreign to it (Comer, 1980).

We recognize that relationships between minority communities and teachers have often been fraught with tension due to issues of social status, culture and language, perceptions of power, and limitations on time (Bastian *et al.*, 1986; Comer, 1980, 1984; Heath and McLaughlin, 1987; Lightfoot, 1978, 1980; Trubowitz, 1984). Nevertheless, we see some hope for alignments in the many schools that have established meaningful involvement with their communities, perhaps most notably the Comer schools.

In Comer's model, parental involvement is not seen as a burden, but as a plus. Parents are encouraged to participate through a parents' group and to serve as classroom aides, tutors, and volunteers (Comer, 1980, 1988a, 1988b). Furthermore, the governance of these schools includes parents, teachers, and other school staff as well as the principal. Rather than the usual route to co-opting parents via the "put a parent on a committee" approach (Wilson, 1983, p. 160), Comer schools devote the time, energy, and training necessary for parents to have a real voice in running the school (1980, 1988a). Such long-term relationships between homes and schools reinforce the value of sustained effort in school work and have yielded better levels of achievement in these schools and elsewhere (Ascher, 1988; Henderson, 1987).

Dissonances between communities and schools exist not only because of the impediments to communication between them. They also exist because of "silencing" (Fine, 1988). These are attempts to ignore prominent aspects of nonschool life that children carry with them to class. Rather than shutting out community life, its patterns, problems, and strengths, schools can create meaningful contexts for engagement by making the life of the community an object of rigorous study. Like anthropologists, sociologists, or political scientists, teachers and students can attempt systematically to answer questions such as: What are the important events that happen in the community? Are there regularities or patterns in these events? If so, what are the reasons for their recurrence? How do we know these are the reasons? What might change the conditions in the community? If one of the goals of schooling is to help young people become skillful citizens, harnessing students' concerns to study of these matters is an important and valid task (see Fine, 1988).

While the above suggestion is redolent of "critical pedagogy" (Freire, 1989; Giroux, 1988), others who are not known for that ideology use similar strategies in building meaningful involvement with the community. Comer's work in New Haven offers one example. In the schools' "social skills curriculum" there is a unit on elections geared toward helping students see themselves as players in the political process. Students prepared to talk with candidates about substantive issues, including those they uncovered in a walking tour of the city, which highlighted disparate conditions in different areas of the city. They wrote to the candidates to invite them to the school to discuss their platforms. Because of their

research, the students could do more than listen politely; they questioned the candidates and were ready with follow-up probes to the candidates' answers (Comer, 1980).

The efforts to make the community a source of curriculum can enhance the school context not only for students but for teachers. An example of this comes from the ethnographic work of Shirley Brice Heath (1983). Heath helped to lower the cultural barriers between school and home by building understanding of home communities among teachers through ethnographic projects. Ethnographic skills encouraged teachers to look closely at their own habits and their beliefs about students and learning. Ethnography also led the teachers on a quest to understand why and how the languages and cultures that students brought to school differed from school practice. This understanding made it possible for teachers not to reject the patterns that young children brought with them but to adapt their materials and teaching methods to help children bridge the differences between home and school.

In summary, schools should foster alignments with their communities because this helps students engage their competences and thus enhances the possibility that they will excel. To build alignments, schools need to help family and community members to feel comfortable in a two-way conversation with school personnel (Herman and Yeh, 1983; Lightfoot, 1980; S. H. Wilson, 1983). This dialogue can be facilitated in part by training school personnel and community members to work together (Comer, 1980, 1988a, 1988b). It can also be achieved through changes in school governance and structure. Structural changes should be geared to enable counselors and teachers to have more sustained contact with individual students (Fine, 1988; Powell, Farrar, and Cohen, 1985; Sizer, 1984). Without this, the stresses operating on many teachers and many families -- urban, minority, and even privileged -- will continue to make involvement difficult to secure (Heath and McLaughlin, 1987). Finally, making the community itself a valid topic for rigorous study is a way to lessen the dissonance between school and community and to enhance students' competences (Fine, 1988).

Each of these efforts is a way to renew adult interaction with young learners and to provide the kind of meaningful relationships and contexts that promote excellence. Yet each must still be seen as only one part of a complex endeavor against myths and practices in schools and the larger society that make the development of competences problematic.

## Pedagogy

Until this point we have underscored that excellence takes place in disparate domains; that individuals have a variety of competences that enable them to perform in these domains; and that excellence requires extensive engagement in domain-relevant practices and in

meaningful contexts. Now the question is: How can teachers help nurture these competences over time not only in anthropological or political studies of the community, but in other topics where there may be a less immediate affective lure?

Disengagement can stem from many sources. Silencing is one. Another is the narrow range of intellectual competences that students can regularly use in school. Especially after the early elementary years, youngsters are asked to grasp the workings of subjects ranging from social studies, to math and science, to English and foreign languages primarily through linguistic and logical-mathematical intelligence. Those few who can do this may become "A" students (although as we will see later, they may still not achieve performances of understanding). For students with intellectual strengths outside the traditional two, however, schooling provides too few "hooks" to allow for even this "paper" achievement.

In schools, domains of knowledge seem restricted to, or adequately represented by, notations on paper (or computer screens). Outside of schools, however, domains of knowledge are comprised of facts, principles, and skills that are susceptible to contributions and parsing by many different competences. Different combinations or "profiles" of intelligences can serve as routes into and through the same domain. So, for example, a mechanic can proceed to understand auto engineering by relying heavily on bodily-kinesthetic and spatial intelligences to work with engine parts and figure out how their connections work. Such an approach could be one route for a child like Jay. Others may proceed from their logical-mathematical intelligence, which might look toward physics principles to explain why certain parts have to be present and function in certain ways. This approach could have been an important route for Click and Clack, the MIT-educated car experts that engine tinkerers hear on National Public Radio.

A teacher who acknowledges other intelligences as legitimate ways of knowing stands a good chance of encouraging sustained engagement among her students. Such a teacher can use a student's strength as springboards into various areas of the curriculum (Walters and Gardner, 1985; Kornhaber and Gardner, 1991). Thus, rather than relying solely on linguistic intelligence to make history comprehensible, Jay's teacher could exploit his spatial and bodily-kinesthetic strengths and his mechanical interests. She could have him explore the differences between older and more modern forms of transportation and farming equipment and ask him to think about the reasons for these changes and the impact they have had. Jay's same gifts might also facilitate learning of mathematical concepts. Given that he readily assembled a series of gears as well as grinders, he might be encouraged to think about proportions and ratios. His talents could also be drawn on in the realm of physical sciences. What are the mechanics of simple machines like planes or levers? By virtue of using the machine as an analogy for the body, it may be possible to lure a child like Jay into thinking about biological sciences. How do different systems in the body enable it "to work"? Tapping into Jay's understanding of the mechanical domain might also be a means to build up his linguistic and interpersonal skills. In the former, it would be worthwhile to ask Jay to keep a notebook of his thoughts about different mechanisms. In the latter, he

might be encouraged to serve as a resource person or local expert (see Brown and Palincsar, 1989) to other members of the classroom who have questions about the workings of mechanical things.

Similarly, Kimberly's teachers at the Key School could engage her interpersonal, bodily-kinesthetic, and spatial intelligences to grapple with diverse areas of the curriculum. We saw inklings of Kimberly's willingness to exploit her competences in the area of history with her exploration of changes in costume, music, and dance, which drew her into library research. These same intelligences and interests can be used to strengthen her language skills as well. Kimberly's teacher could encourage her to write her own dramatic monologues, or have her conduct interviews with performing artists and write up what she has learned. Given her interests and profile of strengths it is possible to envision ways of making a unit on the body truly intriguing for this child. How do muscles develop? Why does exercise make a difference? What other systems does the body rely on to maintain health and strength? Physical sciences might be broached through topics like acoustics and lighting that coincide with her interest in stagecraft. How does sound carry to the back of the audience? How do so many different colors come out of just the few gels that cover the stage lights?

As these examples indicate, domains of knowledge are rich with possibilities for engagement and therefore excellence. To exploit these possibilities we need to consider children's strengths and interests at the same time that we play on the many elements of the domains themselves. Gardner (1991a) has claimed that one way to do this is through "entry points." These are more or less harmonious with different students' learning styles, and they roughly map onto strengths in different intelligences. Gardner has hypothesized that there are five entry points and that all domains can be broached by applying any of these five to central or generative topics in a domain. The following illustrations may help to make these ideas more concrete:

In attempting to help students develop an understanding of American history, a teacher could focus on the central topic of democracy and employ a *narrational entry point.* Here the focus would be on major figures, their motivations, and conflicts between major figures. This entry point would emphasize the way different people helped to shape events like the American Revolution and craft documents like the Declaration of Independence and the Constitution. The same entry point applied to biology might focus on a central topic of evolution through exploring Charles Darwin's adventures on the Beagle, and the way this voyage influenced his thinking and methods.

It is also possible to build understanding of biology and history through a *quantitative-logical entry point.* In this case, a teacher could explore democracy by looking at voting blocks. She could then have students consider the implications of voting blocks for various kinds of legislation. In the case of evolution, the study of the laws of genetics and principles of variation would be salient.

A *foundational entry point* provides a third approach. This examines the basic philosophical concepts within domains, the origins of these concepts, the reasons they are important, and the ways in which they relate to other concepts within and beyond the domain. With this entry point, democracy could be explored by asking about its central principles and by comparing how the rights and duties of citizenship under democracy compare with those under other forms of government. In evolution, a foundational approach examines the root metaphors of this concept and contrasts it with other ways of thinking about speciation and the course of nature over time. Thus, a teacher could contrast the Darwinian concept of evolution with that of Lamarck and with other biological or philosophical systems that attempt to shed light on the diversity of life.

An *aesthetic entry point* emphasizes artworks and literature as well as patterns and forms detectible through human senses. A teacher who helps students to think about democracy through this entry point might look toward public symbols and literature. A teacher could have students create new artworks that they think express this concept. In the study of evolution, an aesthetic entry point could look at the pattern of variation of features within species. A teacher could also call on students to devise a classification scheme for insects or plants based on the patterns they see.

Finally, there is the *experiential entry point*. This seeks to build understanding through hands-on practice. When it is applied to democracy, it is possible to imagine a group of students involved in organizing a "town meeting," working on a local referendum issue, or, as with Comer's students, grilling politicians about their platforms. The experiential entry point to evolution could call on students to breed fruitflies and take note of variations and mutations across generations.

The notion of different entry points is not a new one. Good teachers have always sought ways to make subject matters accessible to diverse students by appealing to their strengths and interests. The means by which teachers accomplish this, however, is not always schematized or conveyed to others. This framework is intended to provide a basis for systematic study, development, and dissemination of the ways teachers help students use their learning styles to engage them in different domains.

In addition to drawing on students' strengths, good teachers are often able to exemplify genuine performances of understanding in a domain. For example, in a history lesson, they make clear that the domain is not just a matter of providing correct names, places, and dates on short-answer quizzes. Rather, they can show how history works in practice. For example, these teachers can gather evidence from original sources and site visits. They can explain how they interpret evidence and how they weigh the role of human motivation in evaluating conflicting accounts. They can also put what they have learned from the evidence into a coherent and defensible story that is accessible to others (Tuchman, 1982).

Teachers who exemplify such performances of understanding, and who "externalize," or reveal, the thought processes used in such performances, are affording their students a cognitive apprenticeship (Collins, Brown, and Newman, 1989). These teachers provide a model for thinking in a domain (Greeno, 1990). It becomes clear that being a practitioner of history or any other domain requires more than isolated facts or "formulaic methods" (Collins, Brown, and Newman, 1989, p. 454). Demonstrating and externalizing domain practices not only model understanding but build needed connections between schools and the outside world.

A further way that teachers provide a cognitive apprenticeship is by connecting their efforts in the classroom to events in the rest of the world. Thus, their efforts are not limited to well-worn problems but offer new and challenging issues in domains. For instance, a social studies teacher might gather evidence and put together a coherent story about why people do not vote or about how democracy is being realized in different Eastern European countries. A science teacher might connect the laws of genetic inheritance to current efforts to map the human genome and the implications of such a mapping. In short, their performances are not just good "school performances" but ones that have meaning in real-world contexts.

There is no doubt that the idea of apprenticeships in education is "trendy." There are books and many articles that deal with this topic (Brown, Collins, and Duguid, 1989; Collins, Brown, and Newman, 1989; Gardner, 1987, 1989, 1990, 1991c; Hamilton, 1990; Lave, 1988; Rogoff, 1990). We do not want to oversell it. Indeed, aspects of certain domains and the learning styles of certain students make traditional "mimetic" forms of instruction useful in some situations (Jackson, 1986). For example, it is unlikely that high schoolers will achieve excellence in a second language without some drill and reiteration of verb forms and pronunciation. It is also true that not all teachers can provide apprenticeships for the many different learners in a class (Palincsar, 1989; Wineburg, 1989).

Nevertheless, the popularity of apprenticeship is based on sound reasoning. Until the advent of mass education, children learned domains in rich and meaningful contexts by observing domain practices and by developing skills by working on tasks the community relied on. This learning afforded regular and informal feedback from those "older and wiser." It also allowed children to draw on diverse strengths and to use tools and other supports provided by the environment and the adults around them (Gardner, 1990; Resnick, 1987). A traditional apprenticeship is a somewhat more formalized system, in which increasing levels of skill are clearly demarcated by the kind of tasks the apprentice is allowed to do. In these highly contextualized circumstances, the great majority of children were able to assume competent roles in their society.

While outcomes of schooling cannot be divorced from the effects of social values and supports, there are indications that the decontextualized environment of schooling is not engaging (Jackson, 1968; Sarason, 1983). Excellence is unlikely to evolve without engagement in at least one domain. Thus, a growing number of authors have suggested that

schools arrange apprenticeships for students with organizations or individuals outside the schools, if the school itself cannot provide them (Fine, 1988; Gardner 1989, 1991c; Hamilton, 1990; Sarason, 1983).

In addition to using apprenticeships and different entry points, teachers can provide support for diverse learners in other ways. Many researchers and teachers have studied how children working collaboratively help each other to foster understanding (Berger, 1991; Brown and Palincsar, 1989; Brown, 1990; Brown, Collins, and Duguid, 1989; Hatano, 1991). One of the keys to these group efforts is that students attempt to make sense of a complex problem in a domain. Thus, rather than just trying to answer questions on a worksheet, a group of students working together may seek to grasp a concept such as density by experimenting with liquids and objects of different size, shape, and weight.

Another significant element of these collaborative efforts is that they call on interpersonal and intrapersonal intelligences. Brown and Palincsar (1989) have found that an important component in cooperative learning is that children are taught about effective group and metacognitive processes. For example, in the metacognitive realm, these researchers have coached children to ask their classmates to summarize, clarify, and formulate questions in order to help group members consolidate their understanding. Eventually these metacognitive techniques become a natural part of the group's discussions. In the realm of group process, students need to learn that each member of the group can play important but different and complementary roles. Thus, one student could have specific knowledge or expertise to help the group, another might provoke understanding by being critical or a doubter, a third might keep track of unanswered elements or new questions that pop up. This person can remind the group of questions that help its members stretch their knowledge even further (Brown and Palincsar, 1989).

An important part of group learning experiences is that students not only work together, but that each student is responsible for being able to report on the results of the group's effort (Hatano, 1990). Thus, while members may play different roles, and while some may be more vocal than others, all must work to ensure everyone understands the problem and can give an account of what the group has done. In this group effort, children gain domain-related knowledge, as well as intrapersonal understanding of their own strengths and interpersonal understanding by seeing the needs and contributions of others.

Like apprenticeships, collaborative learning reflects properties of learning outside of school (Brown, Collins, and Duguid, 1989; Resnick, 1987). In the nonschool world, no one is expected to know all the information, play all the roles, and rely solely on himself to work out complex problems. In essence, "intelligence" is distributed among many resources, including other people, books, and equipment like blackboards and calculators (Gardner, 1991b; Pea, 1990; Resnick, 1987). Analogously, in collaborative learning, neither teachers nor students need to know everything. Instead, they need to know how to use a variety of resources and thinking strategies to develop their understanding (Brown, 1990).

Cooperative learning has been helpful in many classrooms (Collins, Brown, and Newman, 1989; Brown and Palincsar, 1989). This technique appears especially useful among students whose communities or cultures are not especially enamored of competitive social interaction (Fine, 1988). Collaborative studying, as researched by Uri Triesman, has also been a road to achievement in mathematics among black college students. However, like apprenticeship, cooperative learning is not the only route to excellence for all children in all domains. If there were one such route, no doubt it would have been found by now.

Rather than looking toward a formula, we look for teachers who recognize not only individual strengths, but the potential for these strengths to be exercised in meaningful ways. Rather than relying on a formula, teachers need to be able to employ and combine a variety of strategies to engage these diverse strengths. One such strategy uses children's intellectual strengths as levers through domains. Another looks to broach domains through entry points that are harmonious with students' styles. Other strategies play on the fact that the stuff of a domain is distributed among different resources in rich contexts. Apprenticeships and collaborative learning have brought many of these approaches together. Other existing pedagogies are likely to exist, however, that combine the richness of domains with the various strengths of learners and thereby enable children to engage, understand, and excel. We encourage administrators and policy makers to allow teachers the time to develop and explore these and other approaches.

## Forms of Curriculum and Assessment that Engender Understanding

It is evident that children who have competences or learning styles that are not synchronous with those called on in schools will have difficulty enhancing their competences and mastering school material. In addition, it is apparent that children whose physical and emotional needs go unmet will also have problems learning. What is less obvious is that many children who *do* have intellectual strengths, social supports, and even grades typical of "successful" students are not necessarily excelling. Again, our definition of excellence rests on high-level *performances of understanding*. These require an individual to apply facts, skills, and principles to complex problems successfully in domains not previously encountered.

Some of the clearest evidence that successful students often fail to understand comes from research on learning in physics. In one study, investigators asked Johns Hopkins' students who had varying amounts of formal physics coursework to solve problems involving the concept of velocity. Students were given a diagram consisting of a pendulum made up of a ball tied to the end of a string. They were asked to indicate what path the ball would take if the string were cut when the ball had travelled halfway through its course (i.e., when the

string is at 90 degrees to the surface below it). More than half the students who had a year or more of formal instruction in physics drew a line showing the ball dropping straight down (Caramazza, McCloskey, and Green, 1981). In other research using a task-analysis approach, an MIT undergraduate was asked to play a videogame in which a creature was to be guided across a computer screen according to the laws of Newtonian physics. The student had trouble abandoning the same Aristotelian principles that elementary school children relied on to play the game (DiSessa, 1982).

Although these successful college students were taught and could talk about Newton's laws, they did not demonstrate performances of understanding. Instead, their "naive physics and classroom physics stood side by side but unrelated" (DiSessa, 1982, p. 59). With problems of a type they had not encountered before and been explicitly tutored to solve, they did not summon up domain principles but reverted to childlike knowledge.

A less rigorously studied example illustrates lack of understanding in the realm of social sciences. Among those who have been admitted to leading universities are at least some students who harbor simplistic stereotypes about various racial and ethnic groups. Increasingly, some of these college students have resorted to acts of violence and vandalism against those they perceive as not belonging (Farrell, 1988; Wilkerson, 1988).

It is likely that these students had a reasonably thorough exposure to American history, the civil rights movement, the idea of equal rights, and political science. They may be well aware of affirmative action and other programs that attempt to increase diversity on college campuses. They may even realize that many of those they deem not to belong are as well or better qualified as they are. Yet, despite their previous education, such students reveal little ability to restrain naive and even primitive behavior. Among the many deficits in their understanding is an inability to apply the principle that minorities have a right not to be dominated by the majority.

We believe that students do not demonstrate performances of understanding because they are usually asked only for rote, ritualistic, or conventional performances (Gardner, 1991a). By this, we mean that their performances are limited to the routines of symbol manipulation they learn in school. Successful "A" students can plug variables into formulae, and can manipulate formulae in a way called on in traditional testing (see Chi, Glaser, and Rees, 1982). Outside of an exam format, however, many physics students are stumped. The social sciences present a similar picture. No doubt at least some of those who violated others' rights could compose an essay on democracy or the Constitution; yet in genuine social interactions many students revert to thinking in simplistic stereotypes.

Why do so many students seem stuck in conventional performances rather than demonstrating performances of understanding? Part of the answer has to do with issues discussed in the preceding section. Students are often called on to use a limited range of intelligences and are rewarded for their quantitative-logical styles. Also, too few students have experienced domains as they operate beyond school walls. There, the problems are not

always clear cut and not always assigned. Information about when to invoke knowledge and principles is not contained in "the question" (Csikszentmihalyi, 1988). We believe this state of affairs exists largely because of the kind of testing Americans have come to rely on.

Standardized tests have one primary virtue: They make it possible readily to compare students, or school districts, or even countries. This technology has been very convenient for colleges looking for comparable indicators across districts, families in search of prestigious public schools, and policy makers who like to beat the drum of international competitiveness. Unfortunately, it has not been notably beneficial for students or teachers.

Standardized tests show which children can answer fragmented, puzzlelike problems in a short period of time. Because such tests often carry such high stakes, they warp classroom practice (Fredericksen and Collins, 1989). They encourage teachers to look toward "test-taking skills," and to use short-answer tests and other practices that bear little relationship to high achievement in authentic domains.

Furthermore, these tests are not "intelligence fair." They evaluate all students primarily on the basis of linguistic and logical-mathematical intelligences, and they reward facility with abstract notations rather the range of skills that go into genuine domains. Tests like these cannot reveal how well a child can use spatial and bodily-kinesthetic competences to solve mechanical problems. At best, they ask children to solve two-dimensional visual rotation problems. They test competences relevant to the mechanical domain only insofar as they require the student to use a pencil to fill in exam bubbles.

If educators are looking to foster excellent dancers, anthropologists, teachers, physicists, mechanics, historians, and other practitioners, standardized tests are not very helpful. What we need instead are what Fredericksen and Collins (1989) have called "systemically valid" assessments. These induce "curricular and instructional changes that foster the development of the cognitive traits that the test is designed to measure" (Fredericksen and Collins, 1989, p. 1).

We see promise for excellence in curriculum and assessment that allow students to develop and deploy the wide array of their strengths in genuine domains over time. The work of Project Spectrum is one such effort for preschoolers and early elementary-age children. Spectrum assumes that each child is capable of developing his or her strengths in one or more domains. To help parents and educators uncover this potential, the project makes use of intelligence-fair assessment and curriculum. Thus, children work with materials that are directly linked to the abilities being assessed. Jay was not asked to talk about or draw machinery or to fill in bubbles. Instead, he worked to fit together the pieces of the machines in front of him. This accomplishment clearly and fairly demonstrated his bodily-kinesthetic and spatial skills, as well as his ability to concentrate when engaged in mechanical tasks. Similarly, language is not evaluated by asking children to generate rhymes or repeat words. Rather, children play with a "storyboard" containing lively animals, people, and scenery and are encouraged to use these as prompts for storytelling.

Furthermore, Spectrum is not a one-shot assessment that is kept secret until the moment of administration. Instead, its materials are organized in learning centers around the classroom. The learning centers are designed to help children use their competences in a range of domains, among these mathematics, science, visual arts, dance, athletics, creative language, and reporting. As in authentic learning in all domains, children develop by working with these materials regularly.

The blurring of curriculum and assessment helps teachers, parents, and researchers gain a better idea of a child's strengths. Teachers and researchers observe the children throughout the year. They periodically collect samples of their work and complete observation checklists. Occasionally a child is scored on performance in a specific domain, for example, in using creative language with the storyboard. This information is not evaluated with the aim of ranking and ordering children -- a primary aim of standardized testing. Rather, the result is a "Spectrum Profile," intended to help those concerned with the child's development. The profile is a short, narrative, nontechnical report that describes the child's strengths. It suggests activities that parents can carry out as a follow-up to those in the classroom to support a child's strengths and build up areas that are less strong. Along with the profile, parents received the "Parent Activities Handbook" with concrete examples of activities they can structure using readily available and inexpensive materials (Krechevsky, 1991; Gardner and Hatch, 1990).

We also see promise for excellence in project-based curriculum and assessments that focus on genuine, rather than ritualistic, performances in a domain. The work of our video-portfolio research project is aimed in this direction. Its researchers are currently exploring how teachers help to foster and assess projects in five "nonprivileged" elementary schools in New England and the Midwest.

Based on our work with teachers, project members are developing description and evaluation sheets. These lay out critical dimensions of projects and presentations in different domains. For example, they provide a taxonomy of different resources that might be useful for a research report in history. The taxonomy is not intended to dictate which resources a teacher requires or a student uses. Nor is it a net to catch students whose projects fail to meet the standards for use of resources. Rather, its purpose is to enable ongoing discussion between teachers and students about the many resources that exist and to select from these ones that may be appropriate to a given project. Instead of just going reflexively to an encyclopedia or a magazine, children can learn about and use many kinds of resources just as historians do. Different resources are available for different competences: Interviewing, touring sites, and reading may all be used and are useful in different projects.

Because projects take place over time, a successful project usually demands sustained engagement. This is one ingredient for excellence. Because projects require effort and planning, they counter the notion of "you've either got it or you don't." Rather, success comes through drafts, revisions, and reflection. Another virtue of projects is that their goal or outcome need not be captured wholly or even partly in language or mathematics.

Depending on the domain, a child can work through ideas in symbolic forms that rely on other intelligences: in sketches or three-dimensional models, in gesture, or in music. Thus, projects permit a child to make use of a variety of ways of knowing. Furthermore, by working over time and using different underlying competences, both facile symbol manipulators and those with other strengths are less likely to deliver ritualized performances and more likely to demonstrate performances of understanding.

In the opening section of this paper, we saw how project work helped Kimberly engage her bodily-kinesthetic, musical, and interpersonal intelligences. Her ability to demonstrate understanding in dance and drama using these intelligences earned her acceptance into an arts magnet program. Another example can be drawn from the work of Shirley Brice Heath (1983), mentioned earlier.

Heath taught ethnography skills to a fifth-grade science class, in which nearly all the students were rural black boys who were working far below grade level in science. She then had them use these skills over eight weeks to find out how successful local gardeners' explanations and methods could be understood in terms of scientific theories and practices. To figure this out, the boys gathered information from newspaper clippings and science books, and they interviewed local growers. They also conducted their own gardening experiments. Finally, they produced a booklet containing charts, photographs, descriptions, and scientific explanations of the growers' produce and methods.

Thus, throughout the project, the students could tap their various intelligences, bring them to bear on the problem, and help each other. They could also use a full range of learning styles. For example, they employed experiential and narrative styles in interviewing and gathering life histories. In experimenting, they may have used a quantitative as well as an experiential entry point. They could access foundational approaches in grappling with folk and scientific theories about gardening. The aesthetic style was called on in designing the booklet and cataloging illustrations of plant species.

Heath actively worked to get the youngsters to build links between local folk knowledge and explanations, and science's theory, experimentation, use of multiple sources of evidence, and verification. Thus, unlike the physics students' knowledge, which was frozen in the symbols of classroom instruction and testing, the boys' knowledge was flexible. They could "translate" explanations back and forth between folk knowledge and scientific knowledge (Heath, 1983, p. 321). It is also crucial to note that the project had meaning for the boys because it broke down barriers between the school and the community. This was evident beyond the classroom walls, since members of the community who rarely had contact with the school before came to visit and volunteer information.

At the end of eight-week project, all 23 children passed a "standardized unit science test." None had ever passed such a test in his entire school career (Heath, 1983, p. 321). No doubt passing the exam was an important accomplishment in these youngsters' school life. We believe, however, that if the aim of education is understanding, such an

accomplishment is gravy. The heart of their accomplishment lies in their high-level performance in the domains of botany and cultural anthropology: They had flexible knowledge of the principles, facts, and skills in these areas and could use them to answer many previously unencountered and complex questions. In short, they showed they could excel.

## Conclusion and Recommendations

This paper has set out a definition of excellence and asserts two interacting levels that are needed for excellence to occur. Excellence rests on many factors at the individual level as well as many at the social level. Within individuals there is an array of intelligences and learning styles. These need to be developed by extended and meaningful engagement in authentic domains. This engagement allows individuals to use a domain's facts, skills, and practices in a flexible way to solve new problems. When they regularly use this flexibility to solve complex problems in a domain, they have achieved excellence.

But engagement is not just a matter of what is in the head. Many aspects of the wider society and of schools can promote or hinder sustained engagement. These include myths and practices that render domains more accessible to some than to others. It also includes dissonances or harmonies between schools and communities. Within the schools, matters of pedagogy, curriculum, and assessment are crucial. If schools seek to support excellence, they must be designed to involve diverse competences over time in genuine domain practices.

Clearly, excellence is more readily defined than realized. Nevertheless, we see some reasons for optimism. By allowing that excellence is based in many components, rather than just one or two, we can begin to construct designs that make excellence possible for more American schoolchildren. We have noted ways to support excellence en route to this point, but emphasize below recommendations that apply especially to schools.

1. Recognize that excellence is not one thing. Rather, it requires a broad range of human competences and is realized in diverse domains.

2. Excellence also requires a social environment that supports the long-term development of individuals' competences. Developing children's competences often builds on synchronous forces between schools and other social institutions. Thus, school structure and governance should foster a synergistic alignment of school, family, and community.

3. Encourage and support teachers in efforts to develop diverse competences over time through cooperative learning, cognitive apprenticeships, and projects.

4. Encourage teachers to take advantage of the reality that domains of knowledge are complex bodies of facts, principles, and practices and not small splotches of ink on paper. Support them in efforts to design curricula and pedagogies that build on genuine practices in a domain and that are meaningful to students and members of their community.

5. Provide forms of assessment that are fair to those with diverse strengths and that help them to develop. Assessment needs to be ongoing and to use the media or symbol systems that are sensible for the competences and domains it is testing. It should provide feedback that is beneficial to students, parents, and teachers.

6. Seek as a marker of excellence performances of understanding: those in which children flexibly apply facts, principles, and skills of a domain to solve problems they have not encountered before.

Finally, we wish to underscore that excellence is not a single point of arrival. It is better to think of it as a series of steps or degrees, marked by performances of understanding. These steps are undertaken by those who have opportunities to take risks and who are supported through failures and successes in their efforts to reach high standards. The steps are spurred on by engagement, reflection, and commitment both on the part of individual students and those concerned with their development.

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