



CREATING THE FUTURE
Perspectives on Educational Change

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INTELLIGENCE IN SEVEN STEPS

[Howard Gardner, Ph.D.](#)

The concept of intelligence, a very old one, has been employed in the most varied ways over the centuries. During the past century, there has been considerable movement on the "intelligence front," and this trend shows no sign of abating. In this essay I briefly describe seven historical steps, or phases, in the development of thinking about intelligence, focusing in particular on work inspired by the Theory of Multiple Intelligence.

Lay Conceptions

Until this century, the word "intelligence" has been used primarily by ordinary individuals in an effort to describe their own mental powers as well as those of other persons. Consistent with ordinary language usage, "intelligence" has been deployed in anything but a precise manner. Forgetting about homonyms which denote the gathering of information, individuals living in the West were called "intelligent" if they were quick or eloquent or scientifically astute or wise. In other cultures, the individual who was obedient, or well behaved, or quiet, or equipped with magical powers, may well have been referred to by terms which have been translated as "intelligent."

For the most part, the word "intelligent" was used in a beneficent way; however, its imprecision can be readily displayed by a recognition that it has been applied to nearly all of the American presidents in this century, even though it is doubtful that any two of our presidents exhibited similar kinds of minds. Perhaps ironically, Herbert Hoover and Jimmy Carter, two of America's least successful presidents, both of whom were engineers, probably came closest to the lay idea of "intelligence." It may be worth noting that they have become distinguished by their behaviors as *ex*-presidents.

The Scientific Turn

In a sequence of events that is by now familiar, Alfred Binet responded to requests from Parisian ministers at the turn of the century by creating the first intelligence test. It then became possible to estimate an individual's "intelligence" by noting his or her performance on a deliberately heterogeneous set of items, ranging from sensory discrimination to vocabulary knowledge. Used first clinically for "at risk" Parisian elementary schoolchildren, the intelligence test became "normed" on Californian middle-class children and was administered quite widely, thanks in large part to the efforts of Lewis Terman at Stanford University. By the 1920's and 1930's, intelligence tests (and their product, an individual's IQ) had become deeply ensconced not only in American society but also in many other parts of the world.

Pluralization of Intelligence

While intelligence was initially perceived as a unitary (if overarching) concept, which could be captured by a single number, a debate soon arose about whether the concept could legitimately be broken into components. Such researchers as L.L. Thurstone and J.P. Guilford argued that intelligence was better conceived of as a set of possibly independent factors. In recent years, buoyed by findings from fields as disparate as artificial intelligence, developmental psychology, and neurology, a number of investigators have put forth the view that the mind consists of several independent modules or "intelligences."

In my own "theory of multiple intelligences," I argue that human beings have evolved to be able to carry out at least seven separate forms of analysis:

1. Linguistic intelligence (as in a poet);
2. Logical-mathematical intelligence (as in a scientist);
3. Musical intelligence (as in a composer);
4. Spatial intelligence (as in a sculptor or airplane pilot);
5. Bodily kinesthetic intelligence (as in an athlete or dancer);
6. Interpersonal intelligence (as in a salesman or teacher);
7. Intrapersonal intelligence (exhibited by individuals with accurate views of themselves).

These ideas have attracted some attention on the part of educators seeking a more comprehensive and individualized educational system. Recently my colleagues and I have been exploring certain educational implications of the theory in our own research.

Contextualization

As initially put forth, most theories of intelligence—whether singular or multiple—have assumed that intelligences are simply biological entities or potentials, which exist "in the head" (and "in the brain") and can be measured reliably, independent of context. While the theory of multiple intelligences was deliberately formulated to take into account the unfolding of intelligence in different cultures, it nevertheless suffered in its early formulations from an "individual-centered" bias. Most students of intelligence, however, are now coming to the realization that intelligence cannot be conceptualized, or measured with accuracy, independent of the particular contexts in which an individual happens to live, work, and play, and of the opportunities and values provided by that milieu. Bobby Fischer might inherently have had the potential to be a great chess player, but if he had lived in a culture without chess, that potential would never have been manifested, let alone actualized. Intelligence is always an interaction between biological proclivities and opportunities for learning in a particular cultural context.

Project Spectrum, a curriculum-and-assessment project for young children, is one reflection of this view. We initially designed the project to determine whether young children exhibit distinctive profiles of intelligences, but we soon came to realize that intelligences could not be measured in the abstract; instead we had to create new environments, contexts more like children's museums than like traditional schoolrooms, in which children's intellectual proclivities had an opportunity to be elicited and practiced. Only then could some kind of meaningful assessment become possible.

Intelligence As Distributed

Closely related to the trend toward the contextualization of intelligence is the realization that significant parts of intelligence are *distributed*. The essential insight here is, again, that not all intelligence is in the head. But rather than residing simply in the general context wherein a person lives, much of everyday intelligence can be located in the human and non-human resources with which individuals work, and on which they come to depend in their productive work. Typically these resources are thought of as non-human artifacts, such as books, notebooks, computer files, and the like. And it is true that in a literate world, much on which the productive individual depends inheres in these materials.

It is also appropriate, however, to think of other individuals as part of one's "distributed intelligence." Most workers do not depend exclusively on their own skills and understanding; rather, they assume the presence of others in their work environments with whom they can regularly interact. This view is brought home vividly when one considers an office that is being computerized. Rarely does all relevant knowledge reside with a single individual; much more commonly, different office members exceed the novice level in different areas of hardware or software expertise. In our terms, intelligence about computers is "widely distributed" across individuals under such circumstances.

Our own efforts to examine the "distributed nature" of intelligence can be seen in two of our projects. In Arts Propel, a cooperative project in arts and humanities assessment, we ask students to keep detailed "processfolios" - complete records of their involvement in a project, from initial conception through interim sketches and drafts, ultimately to new plans that grow out of the final completed project. We believe that students' learning is significantly enhanced when they can have an on-going dialogue with the record of their previous efforts, as captured in these constantly evolving processfolios.

In the Key School, an Indianapolis elementary school, children are exposed each day to contexts that nurture each of the intelligences. As part of their regular work at this experimental public school, students carry out each year three theme-related projects. Our research interest is in developing methods whereby these projects can be evaluated in a fair and comprehensive way. Part of that evaluation centers on the ways in which participation in a project has been cooperative: the human and non-human resources involved in preparation of the project, the help given by others in the presentation of the project, and the reactions of other individuals-peers as well as experts-to the final project. By deliberately including these "extra-individual" elements in our evaluations, we hope to bring home to the community the importance of "distributed aspects of intelligence." At the same time we want to undercut the common notion that all skill and learning must exist within a single brain, be that brain at home, at school, or at the work place.

Thus far, I have spoken of historical "steps" that have already been traversed, or which at least are being taken at the present time. My last two "steps" represent hopes for future work on intelligence in our own laboratory and in others around the world.

Nurturance of Intelligence

Even though our efforts to understand intelligence have been advancing, we still know very little about how to nurture intelligence, be it conceptualized in unitary or pluralistic fashion, in individual-centered, contextualized, or distributed form. Yet surely our efforts to understand intelligence as scientists can best be crowned by a demonstration that intelligence can be nurtured in particular educational settings, using strategic pedagogical or facilitating techniques. Here lies one important challenge for the future.

Humanizing Intelligence

In the Key School, an IndUnderstanding the nature of the human mind in all of its complexity is no mean feat, and a complete understanding may well exceed human investigative capacities. But understanding intelligence-and even knowing how better to develop it-does not suffice in itself. Any human capacity can be used for ill as well as for good; and it is part of our responsibility as human beings living on a single troubled planet to try to use our competences, our intelligences, in morally responsible ways. This assignment cannot fall exclusively on the shoulders of researchers; nor can we simply afford to pass this responsibility on to others.

The human being is also more than his or her intellectual powers. Perhaps more crucial than intelligence in the human firmament are motivation, personality, emotions, and will. If we are ever to obtain a comprehensive and fully integrated

picture of human beings, we need to meld our insights about cognition with comparable insights in respect to these other aspects of the human being. Perhaps, indeed, a different view of human nature will result from this activity of synthesis.

Obviously so grand an undertaking requires the highest degree of "distributed collaboration" among researchers, educators, and the general citizenry. Although the task is formidable, the advances made in understanding over the past decade give one some reason for optimism.

About: Howard Gardner

In 1981 Dr. Howard Gardner was awarded a MacArthur Prize Fellowship in support of [Project Zero](#) at Harvard University. An announcement of the award quoted Gardner as saying early in his career, that he had been a committed Piagetian, but as he pursued his own studies he came to view Piaget's theories as "too narrow a notion of how the human mind works."

He noted further that he didn't believe there was "one form of cognition which cuts across all human thinking. There are multiple intelligences with autonomous intelligence capacities." This state-ment heralded the writing of his book *Frames of Mind*, which was published in 1983.

Dr. Gardner's Theory of Multiple Intelligences, described in this seminal book, has become the framework for many of the effective educational strategies currently being implemented to expand human development. All the conferences presented by New Horizons for Learning have been produced with that theory in mind-presenting new information through all the intelligences.

Gardner's Theory of Multiple Intelligences proposes that people use at least seven relatively autonomous intellectual capacities - to approach problems and create products. These include linguistic, musical, logical-mathematical, spatial, bodily-kinesthetic, interpersonal, and intrapersonal intelligences.

He suggests that "although they are not necessarily dependent on each other, these intelligences seldom operate in isolation. Every normal individual possesses varying degrees of each of these intelligences, but the ways in which intelligences combine and blend are as varied as the faces and the personalities of individuals."

Dr. Gardner is a professor of Education and co-director of [Project Zero](#) at the Harvard Graduate School of Education. He is also a research psychologist at the Boston Veterans Administration Medical Center and adjunct professor of Neurology at the Boston University School of Medicine. Since *Frames of Mind*, Dr. Gardner has written six books including *The Mind's New Science*, *To Open Minds*, *The Unschooled Mind*, *Multiple Intelligences*, *Creating Minds*, and *Leading Minds*.

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New Horizons for Learning
The Building
P O Box 15329
Seattle WA 98115 USA
206.547.7936
<http://www.newhorizons.org>
E-mail: building@newhorizons.org

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