



# Literacy for Modern Times

Scientific literacy is more than technical skills;  
it is the active use of knowledge to make decisions  
in a world of increasing uncertainty.

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In her *Newsweek* commentary on the report of the National Commission on Excellence in Education, Meg Greenfield<sup>1</sup> noted that educators and media alike were prone to focus on the report's tone of urgency, crisis, and fear, to motivate and prod the American public into reforming its schools.

While there are many differences between the reform movement of the 1950s-60s and this one, Greenfield has pointed to a striking similarity—one that may result in another round of figures: both are reactive rather than proactive.

In response to various pressures, American education has assumed this reactive posture for the last 30 years. Curricula (programs and goals) are proposed and evaluated in response to social forces seen as problematic: drugs, teenage pregnancies, social inequality, "high-technology," Japan Inc., and so on. In effect, American schools function without a clearly defined set of unified goals based on consensus about the kind of society we want.

A related concern, perhaps more profound in its implications, is that in succumbing to the fear of being placed in a competitively inferior economic or technological position, America continues to equate schooling with the production of human capital.<sup>2</sup>

That is, during the last 30 years the American school system has been assigned the role of producing a productive workforce to enhance the nation's competitive edge in the economic marketplace.<sup>3</sup> From this perspective schools serve an economic function and are evaluated as an investment.<sup>4</sup> As Meg

Greenfield points out, the stress on investment is based on extrinsic motivation and rewards that equate education with the acquisition of "comparative advantages" affecting the socioeconomic status of individuals and nations.<sup>5</sup> What will be ignored, commented Greenfield, is the Commission's suggestion "that the value of education is not contingent on any material public or private 'payoff'."<sup>6</sup> Education, she argued, "is not about getting ahead; it is about discovering the joy of learning itself."

Perhaps it is the reduction of schooling and education to an economic function that has caused America to become illiterate, in its true meaning,<sup>7</sup> while simultaneously achieving a high level of educational attainment as measured by diplomas and degrees. Even the most prestigious of law schools are now lamenting the fact that their students are motivated more by potential income than by potential wisdom.<sup>8</sup>

With their reactive stance, contemporary reformers are focusing on the symptoms and symbols of technological and economic change rather than on the cultural norms, values, and goals that have driven technological and economic change since the 16th and 17th centuries—a mind-set sociologists have labeled "modernity."<sup>9</sup> In fact, it is these historical and philosophical groundings that have produced the "high-tech" society of the mid-1980s. Moreover, they will probably produce future technological changes in chemistry and biology that will make humankind the true creator and destroyer of their social and biological world, thus fulfilling the logi-

cal extension of modern science and philosophy.<sup>10</sup> The point is that we have not seen the end of "high-technology" and should not attempt to design a school system to fit the contemporary material world with students perceived as potential workers.

The same basic theme was expressed in separate editions of *Daedalus* by Stephen R. Graubard<sup>11</sup> and Anthony Smith.<sup>12</sup> For both Graubard and Smith, the motivating force for school reform should not be fear of economic collapse or fear of technological inferiority. Instead, school reform should be concerned with what ought to be the processes and outcomes of an educational system within the context of modern society. For Graubard, the paralysis of America—manifested by malaise, alienation, and lack of consensus—is grounded in institutionalized evasion, a lack of will, "an incapacity to confront certain truths about itself." How many Americans can characterize and explain modernity? How many Americans recognize that the prerequisite skills for success are grounded in the philosophical/scientific values and norms of modern western civilization?<sup>13</sup>

Graubard commented that scientific literacy does not require isolation in an "occupational box labeled 'science.'"

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## "Education in contemporary society is not concerned with literacy or skills per se, but with action and values."

Rather, it is to be able to reach out to others, in the arts, humanities, the social sciences, to have some small purchase on modernity in a way that very few can claim today."

Smith questions the notion of "technological revolution"—technology leading to cultural change and cultural transformation. Behind seemingly revolutionary technology lies a history of incremental leaps and steps which produced both predecessor technology and contemporary technology. In addition, the history of the technology (the material object) is subordinate to the cultural context that drives the pursuit of technological change and innovation. Thus, while it is true that major breakthroughs in technology have led to transformations in social, economic, and political relationships, to design schools for a particular set of technological innovations that appear on the surface to be revolutionary or "high-technology," is to doom the educational system to possible short-term and definite long-term obsolescence.

For many, the technology that is transforming our contemporary society is telecommunications, including computers. However, while schools must help prepare individuals to respond to the flow of information inherent in contemporary technology, the crucial characteristic of the telecommunications technology is the creation of options.

It is this availability of options and the accompanying uncertainty that are the true characteristics of modernity, and philosophy, science, and technology have been unrelentless in the pursuit and creation of both.<sup>14</sup> The reduction of Milton Friedman's<sup>15</sup> economic philosophy to the phrase "Free To Choose" is not merely a clever marketing strategy. The freedom to choose is modernity—it implies alternatives, which in turn require judgment and evaluation. Modernity generates varying degrees of impermanence and normlessness, which necessitate action rather than passivity.

Franklin J. Baumer<sup>16</sup> has observed that the essence of modern society is a state of mind always "becoming"—a world of endless flux:

Becoming, it should be made clear, does not refer here to merely new and changing answers to perennial questions, which may be taken for granted, nor even to great revolutions in ideas. It refers instead to a mode of thinking that contemplates everything—nature, man, society, history, God himself—*sub specie temporis*, as not merely changing, but as forever evolving into something new and different. It disbelieves in all fixities, absolutes, and 'eternal' ideas.

Impermanence, change, and innovation become the key characteristics of both the society and the science mindset upon which it is grounded. As Stephen Jay Gould explains, true scientists, "when their evidence fails . . . do not crawl into a hole, and don a hair shirt. They retain their interest and struggle to find new explanations."<sup>17</sup> As empirical evidence disproves a theory, scientists realize the inherent weaknesses and submit to rigorous self-criticism. "The enemy of knowledge and science," writes Gould, "is irrationalism." Recognizing both its cultural context and its fallibility, Gould writes that "science advances primarily by replacement, not by addition . . . scientists do not debunk only to cleanse and purge. They refute older ideas in the light of a different view about the nature of things."<sup>18</sup>

Thus, to function in a modern society individuals must not only construct, maintain, modify, or reify their social reality but they must be able to deal effectively with increasing amounts of uncertainty as more and more options for individual and collective action become manifest.<sup>19</sup> Unquestionably, modernity is predicated upon the scientific method. To eliminate the randomness of action and to effectuate rational decision making, an individual is required to sort out his or her goals and select a way to fulfill the goals while hypothesizing potential consequences for each methodology.<sup>20</sup> Once action is initiated, success leads to more effective decision making. Increasing an individual's data base through education and collective experience decreases uncertainty by illustrating the consequences of others' behaviors.

Education in contemporary society, then, is not concerned only with literacy or skills per se, but with action and

values.

An "Active Society," wrote Etzioni,<sup>21</sup> is one that "is master of itself," one that can respond to changing situations and transform itself, one that can "reset its own code," one that understands that "social laws can be altered." An "Active Society" presents an inherently secular vision of humankind in that by definition the actors are consciously capable of changing their social combinations, changing themselves, and in effect, becoming the creator. Active individuals are aware of their identities, possess the ability to act, and seek to control their own lives. Knowledge and information become the crucial variables for both the active society and the active individual. Both must have knowledge and information to act, to transform, to create, and to recognize the limitations of their actions and beliefs in order to make the necessary changes in their lives and their social reality. This is not unlike the view Gould presents of science as "a powerful agent for questioning and even overturning the assumptions that nurture it."<sup>22</sup>

Scientists, he writes, "struggle to identify the cultural assumptions of their trade," asking "how answers might be formulated under different assertions," proposing "creative theories that force startled colleagues to confront unquestioned procedures."

Knowledge in this sense is not merely knowing or comprehending. In Bloom's terms, it is the ability to apply, analyze, synthesize, and evaluate information in the process of making effective decisions. It empowers both individuals and nations to act; it puts them in control.

Mary Budd Rowe<sup>23</sup> has articulated the relationship between science, fate-control (action), and productivity:

How well a nation thrives and how rapidly adaptation takes place depend in part on the extent to which a substantial portion of its people understand the connections between possession of scientific and technological knowledge and the power to act effectively on the world. The products of science and engineering indeed produce fundamental shifts in economics and world view, *but the methods of science and the values attached to it have the power to shape our sense of purpose and to turn us into architects of our destinies*<sup>24</sup> (italics added).

**"Intertwined with the ability to perform is the ability to acquire and process knowledge—for without that, we are creating limited function automatons or robots."**

For Mary Budd Rowe the possession of science is equated with high fate-control. That is, individuals with high fate-control believe that events (natural and social) "have roots that evolve by processes they can discover and thereby influence . . . that the future grows out of what one does in the present."<sup>25</sup>

This, then, is the emergent thought: education should focus on strategies that impart modern rationalization—the ability to use deductive and inductive reasoning including the scientific method, the ability to read and process information critically (which includes application, analysis, synthesis, and evaluation skills), and the ability to transmit information via print and telecommunications. This constitutes literacy in its general and scientific sense.

If this sounds familiar, it is because the College Board<sup>26</sup> has released a report delineating these abilities in detail. Mortimer Adler<sup>27</sup>, in the "Paideia Proposal," has advocated a similar notion of basic education.

At present, the document to discuss with regard to school reform is the report of the College Board because it does not focus on material events or skills that are symptoms of larger and more significant educational problems. The College Board report delineates the prerequisite and fundamental skills for success in modern society—be it 1984 contemporary or 1999 futuristic. It demonstrates the connections between scientific and general literacy, and it boldly documents the fact that literacy is not merely the ability to perform or demonstrate a specific quantity of information, training, education, or experience. Intertwined with the ability to perform is the ability to acquire and process knowledge—for without that, we are creating limited function automatons or robots.

It is ironic to note that as educators are discussing what specific information should go into the heads of children so they can be labelled intelligent or literate, scientists in pursuit of "artificial intelligence" are trying to create machinery that can process (sort, collate, categorize, store and retrieve, analyze, synthesize and evaluate) seemingly unconnected streams of information in

order to make rational decisions and in effect act "human."<sup>28</sup>

The conception of education as a social process and function has no definite meaning until we define the kind of society we have in mind. . . .

—John Dewey<sup>29</sup>□

<sup>1</sup>Meg Greenfield, "Creating a 'Learning Society,'" *Newsweek*, May 16, 1983, p.100.  
<sup>2</sup>For one of the more recent statements of this position in connection with "scientific literacy" see: Herbert J. Walberg, "Scientific Literacy and Economic Productivity in International Perspective," *Daedalus*, Spring 1983, pp.1-28.

<sup>3</sup>Amitai Etzioni, *An Immodest Agenda: Rebuilding America Before the 21st Century* (New York: New Press/McGraw-Hill, 1983). See also: Daniel Bell, *The Coming of Post-Industrial Society* (New York: Basic Books, 1973, 1976), chapter 3.

<sup>4</sup>For background on this perspective refer to: Frederick H. Harbison, *Human Resources as the Wealth of Nations* (New York: Oxford University Press, 1973); Theodore W. Schultz, *The Economic Value of Education* (New York: Columbia University Press, 1963); and John Vaizey, *The Political Economy of Education* (New York: John Wiley & Sons, 1972).

<sup>5</sup>Meg Greenfield, "Creating a 'Learning Society,'" . . .

<sup>6</sup>*Ibid.*  
Definitions of literacy are crucial because performance is relative to the cultural context. One has only to refer to the definitions of literacy as used by the United Nations to note the cultural parameters. In general, literacy is a function of knowledge acquired through reading and study; as a result, illiteracy is significantly different from ignorance.

<sup>7</sup>David Margolick, "The Trouble With America's Law Schools," *The New York Times Magazine*, May 22, 1983, pp.21-38ff.

<sup>8</sup>Peter L. Berger, *Facing Up to Modernity: Excursions in Society, Politics, and Religion* (New York: Basic Books, 1977).

<sup>9</sup>Hans Blumenberg, *The Legitimacy of the Modern Age* (Cambridge: M.I.T. Press, 1983). See also Jurgen Habermas, *Communication and the Evolution of Society* (Boston: Beacon Press, 1979); and Alfred North Whitehead, *Science and the Modern World* (New York: The Free Press, 1925, 1953).

<sup>10</sup>Stephen R. Graubard, "Nothing To Fear, Much To Do," *Daedalus*, Spring 1983, pp.231-248.

<sup>11</sup>Anthony Smith, "Information Technology and the Myth of Abundance," *Daedalus*, Fall 1982, pp.1-16.

<sup>12</sup>Educators can begin to appreciate the implications of this by reading the work of C.A. Bowers, professor of education and social thought, University of Oregon, particularly his articles that have appeared in *Teachers College Record* over the last four years.

<sup>13</sup>Peter L. Berger, *The Heretical Imperative: Contemporary Possibilities of Religion Affirmation* (New York: Anchor Press/Doubleday, 1980).

<sup>14</sup>Milton and Rose Friedman, *Free to Choose: A Personal Statement* (New York: Harcourt, Brace, Jovanovich, 1980).

<sup>15</sup>Franklin L. Baumer, *Modern European Thought: Continuity and Change in Ideas, 1600-1950* (New York: Macmillan Publishing Co., 1977).

<sup>16</sup>Stephen Jay Gould, "Unconnected Truths," *Natural History*, March 1983, p.28.

<sup>17</sup>Stephen Jay Gould, *The Mismeasure of Man* (New York: W.W. Norton, 1981), p.322.

<sup>18</sup>Peter L. Berger, Brigitte Berger, and Hansfried Kellner, *The Homeless Mind: Modernization and Consciousness* (New York: Vintage Books, 1974).

<sup>19</sup>In my estimation, the work of John Dewey must be read in the context of "modernity." Dewey's whole concept of education and society is both a manifestation of modernity and a methodology for coping, effectively, with modern times.

<sup>20</sup>Amitai Etzioni, *An Active Society: A Theory of Societal and Political Processes* (New York: The Free Press, 1968), pp.1-18.

<sup>21</sup>Stephen Jay Gould, *The Mismeasure of Man*, p.23.

<sup>22</sup>Mary Budd Rowe, "Science Education: A Framework for Decision Makers," *Daedalus*, Spring 1983, pp.123-142.

<sup>23</sup>*Ibid.*, p.134.

<sup>24</sup>*Ibid.*, p.135.

<sup>25</sup>The College Board, *Academic Preparation for College: What Students Need To Know and Be Able To Do* (New York: The College Board, 1983).

<sup>26</sup>Mortimer J. Adler, *Paideia Problems and Possibilities* (New York: Macmillan Publishing Co., 1983).

<sup>27</sup>James Gleick, "Exploring the Labyrinth of the Mind," *The New York Times Magazine*, August 21, 1983, pp.23-27ff. See also: "The Race To Build a Supercomputer," *Newsweek*, July 4, 1983, pp.58-64.

<sup>28</sup>John Dewey, *Democracy and Education* (New York: The Free Press, 1916, 1944).

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