

Chapter 7

Educational Planning: Reacting to the Future

Richmond, a suburb of Vancouver, B. C., is interesting to social scientists as a prototype of the communities that globalization will create as it becomes a human reality. Richmond was a typical large suburb, similar to those found around any North American city. Then suddenly it received a huge influx of what Canadian immigration calls 'business class' immigrants, more generally known to social scientists as 'transnational' immigrants. Unlike other opportunity-seeking migrants, these bring substantial wealth with them, they do not sever business connections with their former country, they enter the new society at a high level instead of having to start over on a low rung, and they may well migrate again as other opportunities beckon. These particular transnationals came mainly from Hong Kong, bringing sufficient millions to start new businesses or branches of their Hong Kong businesses. Their children now make up half the population of the local schools, and that is where trouble started.

As Katharyne Mitchell (xx) puts it, the parents aspired to 'transnational excellence' for their children, a level of education that would enable them to become transnationals as well, able to enter any society at a high level. By this standard, they found the education their children were receiving inadequate. Complaints grew, but they changed to calls for positive action when a popular Chinese broadcaster began to publicize an option that is available within the provincial system for educational funding. It is called the 'traditional school'—a school that features high standards, emphasis on basic skills and traditional academic subjects, discipline and decorum, hard work, and lots of testing. A poll showed 95% of Asian parents in favor of traditional schools (although efforts to gain school board approval continue to be unsuccessful after four years of campaigning).¹

So here are parents with a strong investment in preparing their children for life in a global, knowledge-based economy, determining that the best way to do this is through a kind of education that is a throw-back to olden times. 'Back to' movements are of course commonplace, but the Richmond case is interesting because the parents were ones who ought to have had some idea of what 'transnational excellence' really requires, being themselves exemplars of it. Could it be that they made the right choice?² That question loses most of its interest if we consider what they had to choose from. They really had only two choices, the same two choices that figure in most of the current school debates. The alternative to the traditional model is what we may call the 'standard' model. It is standard not only in the sense that it is the most widely

¹ News and archives are currently available on the Web at www.bbr.ca/ParentNetwork.

² It is, of course, relevant that in opting for 'traditional schools,' the Asian parents were opting for something probably closer to what they were familiar with in their country of origin. But, given that many things are different in Canada from how they are in Hong Kong, it remains to explain why the parents were so insistent that the schools should be changed to their liking.

adopted in English-speaking countries but that it is also the most generally supported by teachers unions and by education officials, except when political pressure forces them to change their spots. Its main outlines are the same as the traditional one. The same subjects form the core of the curriculum, but in the standard model there are more extras and electives, there is less emphasis on performance and more on individual development and self expression, course content is thinner and geared to the less academically inclined student, and the curriculum features more hands-on and social activities with correspondingly less time given to recitation. In both models, however, seat work occupies much of the time in elementary school and lectures and recitations are a mainstay of secondary education. The models, thus, are not radically different. Depending on your viewpoint, the traditional model is a toughened-up version of the standard one or the standard model is just the traditional model gone flabby. Those viewpoints may be radically different, based on different political and world views. I am not trying to minimize such differences. My point is that the educational approaches associated with them, what pass for right-wing and left-wing or middle-of-the-road pedagogies, do not really offer much choice to people concerned about something like 'transnational excellence.'

Educational Planning in the Face of Economic Uncertainties

What would education be like that was well designed to prepare students for the world of the future? To answer that question, we need to look more critically than educational planners usually do at what can be made of current trends and prospects. Like many educationists, I have some aversion to thinking of education in economic terms, but the predicted changes to which education is supposed to have a response are either economic changes, such as globalization and the ascendancy of knowledge-based industries, or they are other kinds of changes with serious economic implications, such as changing demographic profiles of student populations and the work force.

In 1993 the government of Ontario established a Royal Commission on Learning, with a charge "to set new directions to ensure that Ontario youth are well-prepared for the challenges of the 21st century." (Royal Commission on Learning, vol. I, p. vii.) As to what those challenges might be, however, the Royal Commission reported:

On the basis of research and policy analysis, we have concluded that predictions about educational ties to the economic future are uncertain at best; it is difficult, if not impossible, to be sure which jobs will be available and which specific skills will be required. (vol. I, p. 27)

Accordingly they eschewed prediction and based their 167 recommendations largely on what various constituencies spoke up for.

The Royal Commission had good reason to be cautious. Added to the usual uncertainties of economic prediction are two new elements that make education for future employment an especially elusive target:

1. Automation and deskilling. Whatever skills may be required for a job today, we must expect that someone is busy devising a way to reduce those

skill requirements if not to eliminate the job altogether in favor of a machine. Educators tend to regard deskilling as the work of evil forces, especially when applied to their own craft, while at the same time welcoming the deskilling of computer use, for instance, which is a major cause of job downgrading.

2. Globalization and outsourcing. It used to be that unskilled manual work was what got outsourced to poorer nations, thus making a nice argument for convincing kids to stay in school and acquire literate skills. But knowledge work is proving to be eminently outsourceable. We see programming and accounting work being shipped out to India and to states of the former USSR, while jobs flipping hamburgers remain at home.

Educational planning does not require certainties. The Royal Commission on Learning, by avoiding prediction, implicitly predicted that things will remain the same and accordingly brought forth a bland set of proposals which, except for a nod in the direction of computers, could have been produced any time in the last 50 years. Creative educational planning, like any kind of design, needs to take account of realistic possibilities, however divergent. When there are contradictory scenarios, the task is to invent something that will work in either case. The Royal Commission's mistake, repeated by many other reform-minded bodies, was to listen only to pundits and pressure groups, ignoring designers and problem-solvers.

Based on present conditions and plausible eventualities, a number of major design criteria for 21st century education can be set out:

1. Public education must serve the needs of the whole populace, the majority of whom will not be knowledge workers or "symbolic analysts," in Robert Reich's terms (1992). Exactly what they will be doing is not clear. In the worst case, a large proportion of them will be unemployed (Rifkin, 1995). Thus, *education for unemployment*, an idea so horrifying that it is never discussed, ought to figure in educational planning. The proportion of those employed in service occupations is already high and seems likely to grow. This suggests that educational planning must pay attention to the development of social competencies.
2. At the same time, education must produce people who are able to create and exploit the potentialities of new knowledge. Some economists and business analysts assert that such high-level knowledge work will be the main generator of wealth in the future (Drucker, 1993; Romer, 1993). Even if they are only partly right, education has to develop talent for knowledge creation, because the society that lacks it can expect to end up providing low-priced services to the society that has it.
3. Public education in a democracy must not prejudge who will enter the elite class of high-level knowledge workers and who will not. As nearly as possible, every youngster should have an equal chance, regardless of family background. This means that, despite the widely divergent requirements suggested by points 1 and 2, they must somehow be met within a common educational program.
4. From an economic standpoint, the value of school learning is in what it enables you to learn on the job. This is not a new insight, but it is

brought to the forefront by studies of situated action (Wenger, 1995), by studies of expertise (e.g., Lesgold & Lajoie, 1991), and by the rate of technological change. A fuzzy belief in 'learning to learn' will not do any longer. Educational planning needs to get serious about the role of knowledge in acquiring knowledge.

5. Although automation, speech recognition, and the like may reduce the amount of reading, writing, and figuring that people have to do, there is no realistic prospect that functional literacy and numeracy will become economically less essential than they are now. The demands of back-to-basics zealots, however misguided they may be in other ways, have to be taken seriously in this respect. In a knowledge-based economy, those who lack competence in the major symbol systems that our civilization has evolved are going to be in bad shape.
6. *Career craft* needs to become an educational objective. We hear much about the pace of change creating a need for lifelong learning, but that truism masks more serious challenges. Aging workers are liable to find themselves out on the street before lifelong learning has a chance to kick in. A career can no longer be based on a particular job or a particular organization. A successful career is likely to thread its way through a number of short-term jobs and service contracts. In order for it really to be a career—something that has coherence, that adds meaning to your life, and that you can feel is getting someplace—you have to build it yourself. This is something educational planning has not had to think about in the past.
7. Schools need to position themselves with respect to other providers of information and learning opportunities. The effects of new media such as those based on the World Wide Web are difficult to predict, except that we can be sure they will be highly variable, just because of the range of options available. Given greater access to the world of thought, knowledge, and social action, some young people may become far more sophisticated and responsible than is common today (Tapscott, 1998). Others may merely become increasingly skillful at electronic equivalents of the pinball machine. 'Positioning' would include figuring out how to avoid competing head-to-head with things like video games and identifying and concentrating on what schools can do better than other agencies.
8. Learning for the future, whatever form it takes, has to start early. This assertion is not based on critical periods of brain development or anything like that, but simply on the length of learning time required. As Peter Drucker (1994) pointed out, during the Industrial Revolution a relatively brief period of learning was enough for a farm worker to master a semi-skilled industrial job. For an industrial worker to master a knowledge industry job, however, is next to impossible. The kind of learning that is required has prerequisites built on prerequisites that reach all the way back into childhood. That is why Drucker sees education as central to a knowledge society.

This may not be an exhaustive list, but it seems fair to claim that it represents a formidable enough set of challenges that, if educational planners could figure out a way to meet them, they could afford to take a breather before going out to look for more challenges. Many of them are already well recognized, however, and so the first job is to evaluate ready-made educational approaches to see what they do and do not have to offer with respect to them.

The Ready-Made Alternatives

Although Drucker does not formulate it as such, his analysis of the role of education in a knowledge society presents a dilemma. Education must become more strongly oriented toward the cognitive demands of adulthood at a time when those demands are becoming increasingly unpredictable. The tables have almost completely turned since the time of Rousseau, whose reflections inform the standard model that the Richmond parents were reacting against. Rousseau's most compelling argument for what has since come to be called child-centered education was that the majority of children would never live to see adulthood. Therefore, he argued, education should aim at enriching the present lives of children rather than preparing them for adulthood. Looking back, we could add a further argument to support Rousseau's position: For those children who did survive, their future as adults was pretty much determined by social position, and so education could not have been expected to do much about it anyway. Now, in the developed nations, survival to adulthood is almost certain but what that adulthood will amount to is highly uncertain and education has at least the potential to influence it strongly. Yet Rousseau continues to provide one of the small number of ready-made answers to the question of what kind of education will best prepare for the uncertainties of a rapidly changing, innovation-driven world.

Accepting the idea that preparation must start early does not in any way prejudice what the nature of that preparation should be. The fact that adult knowledge workers need to be literate and to use information technology tells us nothing about when children should be taught to read or how and it is not a compelling reason for use of computers in the schools. During the 1980s, when computer literacy was the rage in North American education, Japan (looked to as the country that had the high-tech future in its grasp) was doing hardly anything with computers in the schools. The Japanese view was that there was plenty of time to acquire computer skills later through a computer science course and on-the-job learning. Instead, they concentrated on things like mathematics, which take many years to learn. In this they were largely right. Learning to use a computer is not much more complicated than learning to drive a car, and we do not send kindergarteners to driver training camps. Mathematical competence, on the other hand, does take the average learner a long time. Recognizing this, schools everywhere start mathematics education at an early age and continue it in some more or less coherent way over many years. The heightened need for articulation between school

learning and on-the-job learning, however, compels us to ask questions such as “Is the mathematical competence we are developing in schools the right kind?” and “Are we developing mathematical competence rapidly enough and soundly enough?” The second question is the kind back-to-basics advocates are asking. The first is being asked by mathematics associations and, in a more pointed way, by researchers of school-to-work connections (e.g., Lesgold, 1996).

But there is a higher level question that is hardly being asked at all. It has to do with socialization or enculturation and it points to the way in which Japan’s early rejection of computers in the schools (since then reversed) was mistaken. In order to thrive in a modern organization, you need more than the ability to master the software applications used in your work. You need to feel at home in and to know your way around in a world in which computing and network communication are ubiquitous. This is not the matter of a few weeks’ training, it is the matter as Don Tapscott (1998) puts it, of “growing up digital.” As Tapscott’s investigation shows, there are young people who are becoming thoroughly socialized into this world, and they are undoubtedly at a great advantage in terms of future job competence. I shall argue that the kind of socialization Tapscott describes still does not go far enough. Students need to be socialized into the world of work with knowledge, and that is an even more radical cultural change than becoming ‘digital.’

To the question of what kind of education best prepares students for the uncertain future, I make out four different kinds of answers, each having some following or installed base. Each has virtues, but even in their best combination they fall short of addressing the higher level need to socialize students into a knowledge society.

Back-to-basics. Judged according to their timing, back-to-basics movements appear to represent a panic reaction to any sort of menace that shakes confidence in the education system—whether it is some show of strength by a Cold War enemy, a competing economy on the rise, poor showings on achievement tests, or just the uncertainties of future employment. The panicked reaction is to fall back on the few skills that are demonstrably both teachable and critical and to seek assurance that these, at least, are being effectively taught. The effects that this kind of intervention can have on an education system are highly variable, but they are not at issue here. The question is how far the *idea* of going back to basics can carry us, and the answer is not very far. Once people have agreed that students must learn to read, write, and figure, and that schools must take responsibility for making this learning occur, the back-to-basics idea has exhausted itself. That is why, regardless of their pedagogical persuasions, people who care about improving the teaching of any school subject groan when a back-to-basics movement takes over. It means that any new ideas about objectives, content, or process will have to be shelved for the duration. Back-to-basics advocates are not necessarily opposed to new ideas, but they have no basis for evaluating them, apart from proved results on conventional measures. Across the whole spectrum from mathematics to literature, they have

nothing to aim for except better mastery of whatever happens to have become established as the conventional content. As far as rallying education to confront the 21st century is concerned, back-to-basics is a bugle that can sound only one note.

Futuristic education. By this term I refer to a collection of educational ideas that swirl around economic and technological developments and prognostications. Globalization, competitiveness, digitization, the Internet, knowledge-based entrepreneurship, reinventing the corporation—all the same ideas that have inspired a vast futuristic business literature are translated into educational prescriptions. The prescriptions call for less emphasis on instilling knowledge (which is believed to become obsolete within months after being learned), putting the emphasis instead on higher-level thinking skills, flexibility, creativity, lifelong love of learning, cooperativeness, and information-finding skills. These objectives are to be achieved by abandoning the content-centered curriculum in favor of an array of projects that engage students with the latest technologies, that involve collaboration in face-to-face and virtual groups, and that draw on widespread human and digitized information sources.³ For the most part, educational futurism is a mixture of trendiness, bad psychology, and technological impressionability. Its value lies in presenting educators with challenges that need to be taken seriously. It is very likely true that life in a knowledge society requires more high-level thinking, flexibility, creativity, readiness to learn and relearn, cooperation, and skill in the use of knowledge resources. But bad psychology turns these challenges into bad prescriptions. There is an inordinate belief in transfer of learning. Becoming clever at some trivial puzzle is supposed to transfer to creative problem solving in real life; cooperating in mounting a brick wall is supposed to increase one's ability to cooperate in mounting a sales campaign. And there is pervasive failure to recognize the fundamental principle that ability to find or acquire new knowledge depends foremost on what one already knows. That is the foundation of a progressive curriculum, and without it futuristic education merely raises the price of busywork.

Liberal education. Liberal education still exists conspicuously in some private schools, and remnants—sometimes substantial ones—may be found in public high schools geared to preparation for university. Central to the tradition of liberal education is the *canon*—a designated body of ideas, competencies, and artifacts that together represent the cultural world into which the student is to be introduced (Carus, in press). To forestall one criticism immediately, we should recognize that the canon need not be unchanging or universal. The classical canon changed to incorporate science and more recently literary and historical canons have been changing to

³ I would not know where to start in documenting this exuberant literature. A Worldwide Web search on “school(s),” “computer(s),” and “paradigm shift” turned up 38,750 Web pages that contained *all three* of these terms. Adding the word “hype” to the search string reduced this number to 240.

represent greater cultural diversity. The canon can be as modern as you please. The International Baccalaureat, which sets examinations aimed at establishing international standards for a liberal secondary school education, includes an examination in computer science that puts most other conceptions of computer literacy to shame. Changes in the canon are always controversial, but that is a strength. It means that liberal education, unlike back-to-basics, contains standards and processes for judging the worth of innovations. 'Cultural transmission' is a term often applied to traditional liberal education. The term is accurate, but it invites misunderstanding. 'Transmission' suggests students are passive recipients of knowledge, but this has never even in ancient times been the ideal. Active, preferably passionate engagement with the objects of knowledge has always been prized. The problem, rather, is in the split between established knowledge—the stuff that is being 'transmitted'—and the constructive, meaning-making activities of the students. Because of this split, educators have tended to line up on one side of the gap or the other, resulting in ideological warfare. That gap must somehow be closed before liberal education can be more than a partial model of education leading toward competence in knowledge work.

Developmentalism. This is the term used by J. E. Stone (1996) to characterize approaches that emphasize "(a) the sufficiency of a natural inclination to learning, (b) the dangers of interference with native characteristics and proclivities, and (c) the desirability of learning experiences that emulate those thought to occur naturally." Developmentalism finds its clearest and least controversial expression in the nursery school and kindergarten, but so attractive has it been to educationists that it has gradually worked its way up through the elementary school and into the high school, even being found in some college courses that cater to the academically underprepared. It is the foundation of the standard model that I described earlier, although the standard model shows influences from all the other models. How does developmentalism address the need to prepare students for adult life? The long-standing claim has been that the best preparation for adulthood is a full and happy childhood, proceeding in harmony with the child's own interests (Weber, 1971, p. 170 ff). Although it embodies undeniable wisdom, this has never been an entirely satisfactory argument (Geary, 1995), and it provides little reassurance to people who are anxious about what the future holds. To the more optimistic, however, it means that there is no need to modify education according to predicted future needs. Nature has designed us to be creative and adaptable, so all education has to do is nurture and protect those human attributes.

The controversies actually going on about approaches to education are not usually framed according to the four approaches I have represented here. A presentday dispute might pit something called 'direct instruction' against something called 'constructivism,' or it might involve a controversial practice such as phonics or controversial subject matter such as ebonics or evolution. If the issue of preparedness for the future should arise, however, claims and counterclaims will likely fall into the categories above. That is, the

policy in question will be claimed to succeed or fail at teaching basic skills, building foundational knowledge, getting in step with the digital revolution, or promoting optimum personal and social development. Thus, controversies are about which educational approach will do the best job of achieving x , but x itself is seldom brought into question. What I have been trying to get across through this examination of four different x 's is that they differ importantly and, moreover, they all fall short.

Forced to choose among the available alternatives, any informed person would opt for liberal education. That is what parents who can afford a private school have been doing for generations. A well-run liberal education program will take care of basic skills, it will be humane and will allow the young plenty of opportunity to enjoy their youth, and it will be attuned to contemporary needs—in addition to cultivating the knowledge that traditionally sets the educated apart from the uneducated. Thus it offers the best of four worlds to an extent that none of the other four models can do.

This discourse is not about forced choices, however, but about ideas and possibilities. And so what I want to consider here, and in the remainder of this book, is how education could go beyond the ready-made choices. The reason people are bound to the ready-made choices is not merely because policy has to deal with the actual rather than the hypothetical. Debate about basic approaches in education has never been very much constrained by reality. It has been constrained instead by the available concepts, drawn as they are from folk theories of knowledge and mind. These constraints draw discussion away from those realities that folk theory makes it difficult to conceptualize. In this light, we can see the four models as four different lines of retreat from problems too difficult to grasp:

- Back-to-basics retreats from all the intangibles that constitute an educated person and fixates on the few attributes that can be demonstrated, reduced to behavioral objectives.
- Liberal education retreats from the challenge of producing people who can create knowledge, relying instead on building an all-purpose foundation of established knowledge.
- Developmentalism, to put it perhaps too dramatically, retreats from civilization. That is, it retreats from all the ways in which human beings have sought to transcend the limitations of their nature (Bereiter, 1997).
- Futuristic education retreats instead from the need to consider how we actually learn and think. The conceptually most primitive of the four approaches, it deals in surface resemblances: Imagine what the future will look like on the surface, then make education mimic that surface.

It should not be surprising then, that none of these four models addresses future prospects on the basis of a cognitive or sociocultural analysis. Back-to-basics, liberal education, and developmentalism offer solutions to the problem of preparing for the future that are the same today as 80 years ago. Futuristic education, which supposedly rejects past solutions and looks boldly to the future, does not offer anything new either, except a rosy belief in technology. A great deal of the reform currently being pressed forward as

innovative or “breaking the mold” represents yet another revival of John Dewey’s ideas. I have also seen reform proposals that revive the Human Potential movement of the 1960s and early ‘70s, the project method, and the community school concept (I taught in a notable example of the last in the 1950s). Any of these, or some combination of them, *might* be just what we need to educate for the 21st century, but we ought to see some deep analysis and comparison of alternatives to make a case. I have not seen that. Instead, each proposal is put forward as a contrast to the mythical traditional school devoted to drumming dead facts into reluctant minds. By such a contrast they all look good. But if the future really is going to be profoundly different from the past, we ought to have a way to think new thoughts about education. In the remainder of this book I try to make a few steps in that direction.

Learning How to Learn

It has always been true that the workplace value of school learning lies in what it enables you to learn on the job. Recent developments only make this more obvious. As occupations become more numerous and varied, it becomes more evident that school cannot train people for a job. The old clerical skills course, meant to provide girls with an occupation in case they were so unfortunate as to need one, is a museum piece—despite the fact that keyboarding skills are becoming an everyday necessity. And, as the rate of knowledge advancement affects more and more of people’s daily lives, it becomes increasingly apparent that purposeful learning has no endpoint.

The traditional school’s stock-in-trade, consisting of book learning plus training in the three R’s, makes a clear albeit limited contribution to future learning of diverse kinds. To this extent the back-to-basics reformers are on the right track and the Richmond parents made the right choice in throwing out a system they perceived as failing in this limited role. Advocates of liberal education, however, see it as contributing to future learning in a broader and more powerful way. Mortimer Adler, a leading recent proponent of classics-based liberal education sounded much like today’s futurists in saying “the only appropriate ‘career education’ is *learning how to learn*, so that one can quickly prepare for new jobs and career opportunities as they come along” (Adler, 1984, p. 157). But what backing is there for his claim that a liberal education produces this remarkable result? Or that any other kind of education does it, for that matter? Perhaps, beyond a few basic skills that are useful everywhere, the benefits of education are all personal and social: it makes you a more complete person and helps you gain entry to the best circles. Those may be all the justification that education needs, but if that is all it warrants then the 21st century is no different from any other century as far as education is concerned and there is no educational point to all this millennial fuss.

“Learning how to learn” has become a mantra, uttered as if it meant something but in fact conveying no meaning. There is something to it, but there is not sufficient evidence to say how much. Learning to learn has, in fact, only recently developed into an issue that can be researched in an

educationally useful way (Bransford & Schwartz, 1999). I will give some attention to its theoretical and scientific aspects in the next chapter, but what is called for at this point is simply a touch of realism. Realistically, all we can expect of learning a school subject is that it will help in learning a more advanced level of that subject or its near neighbors. This is by no means a negligible value, but it does deflate the kind of claim that Adler was making and that is echoed by most people who recite the “learning how to learn” mantra. There is no question that learning a foreign language increases your ability to learn foreign languages and that learning history equips you to learn more history, but to claim that either of these helps you to learn a new programming language or a new Internet protocol is a big stretch and claiming that it will help you learn how to fix a copying machine or to close deals in the bond market is a leap into fantasyland.

Unfortunately, the same must be said about another information age mantra, “lifelong learning.” The fact of life that has brought this old slogan to prominence is office automation. Those aging graduates of the high school clerical skills course suddenly found they had to learn word processing and the use of databases and spreadsheets. Some resisted or couldn’t get the hang of it, and found themselves in trouble as a result. Soon computerization hit the shops and schools and we began to see learning casualties everywhere. This constituted a serious human predicament that is gradually working itself out as far as basic computer skills are concerned. Whether the Worldwide Web or some other wave of innovation will produce a similar learning crisis we don’t know. It is surely best to be prepared. But what would being prepared mean? To say that the answer is for schools to develop a lifelong love of learning is to insult the intelligence and spirit of all those who suffered when computerization changed their jobs. We have no reason to suppose that their problems arose from a general unreadiness to learn anymore than that they arose from general stupidity. People were unprepared to learn *computing*. They were stupid about *computing*—and often ready to admit it. When the next wave of radical innovation comes along, there will be people unprepared to learn *it*, people who are stupid about *it*. Inasmuch as we don’t know what *it* will be, we cannot prepare people specifically. But creating a lifelong fondness for curling up with a good, informative book is no solution. There are scholars who exhibit this fondness to an extreme degree, yet who break into a cold sweat when told that they will have to put their course announcements on a Web page.

The best prescription we know of for generalized readiness to learn is youth, but the drug companies have not yet produced a pill to satisfy that prescription. There is much more to it than aging of the brain cells, however. There are emotions: fear, anger, envy, and resentment can easily overwhelm the pleasure of learning, and these can be found in abundance wherever there is radical change in the nature of people’s work. And there are no doubt personality and constitutional factors that have a general influence on how confident and willing people are to face change. There is a carry-over from past related experiences; success breeds success, and all that. On top of that,

there is likely to be a collective response to change that conditions the individual response. Everyone knows all of this and probably understands it reasonably well, which makes it absurd that people should go on reciting the “learning how to learn” and “lifelong learning” mantras and imagining that schools could provide the magic pill that so far eludes the drug manufacturers.

Less well understood, but closer to something schooling might influence, is the role of prior knowledge. Established habits and beliefs can stand in the way of new learning. That is why educational futurists tend to think of knowledge as old baggage that ought to be discarded or at least reduced to carry-on dimensions. But existing habits and knowledge are also what enable us to learn. The experienced typist who had to learn word processing was hampered somewhat by the carryover of old typing habits and by thinking of the computer as a kind of typewriter (Carroll, 1987). But imagine what it would have been like for Bob Cratchit if computers had suddenly appeared in Scrooge’s counting house. He would not have known how to even start thinking about them. We tend to be conscious of the interference that past learning sometimes causes and to be unconscious of the vast amount of prior learning that helps us in our encounters with the new as well as the old (Singley & Anderson, 1989).

The good and the bad of prior knowledge arise out of the reciprocal processes that Piaget called assimilation and accommodation. We are always assimilating new information to existing mental structures and at the same time accommodating existing structures to new information. Without assimilation we couldn’t function; without accommodation we couldn’t adapt. According to commonsense psychology and the artificial intelligence models based on it, assimilation is the normal thing and accommodation is exceptional. Normally we process new information according to existing rules or schemas. Only when there is trouble do we revise those rules or schemas (Schank, 1982). But according to the connectionist view of mind that I have been advocating, every mental event is a bit of both assimilation and accommodation—which is how Piaget saw it.

When a new situation arises the whole person responds. There is emotion—mild or intense; positive, negative, or more likely mixed. There is interpretation, conditioned by past experience and influenced by what aspects of past experience happen to be most alive at the time. Usually there will be other people responding to the new situation as well, and their responses will affect one another’s. Where it happens, the physical surroundings, the other events that command attention—all of these combine to determine whether a person’s response to a new situation will be one that, from a distant perspective, we would judge to be satisfactory. Again, everybody knows this, but its educational import is ignored when people start talking about learning skills, flexibility, and willingness to learn—talking about them as if they were subjects that could be taught in school.

These commonplace observations point to what has come to be called the ‘situatedness’ of cognition and action (Suchman, 1987). Research on

situatedness has looked into how people actually cope with the intellectual challenges of work and everyday life—challenges such as learning to use a sophisticated copying machine or doing comparison shopping in the supermarket. The overall effect of this research is to impress us with the resourcefulness of ordinary people and to lower our estimate of the practical value of school learning. For instance, people devise clever and efficient ways of working with quantities and prices that owe little to school mathematics. While research on situated cognition casts doubt on the practical value of academic learning, it also offers little encouragement to those who would make schooling more practical. Whatever school is, it is one kind of situation. What is learned there will tend to work in that situation but will have doubtful utility in other situations.

So the dilemma intensifies: The learning that is required for competence in the Knowledge Age has to start early, in the elementary school if not before, but what that learning should consist of is rendered obscure both by uncertainties about the future and by increasing awareness of the limited practical value of school learning. In this light, the back-to-basics, liberal education, and developmentalist models of schooling begin to look good. There are a few basic skills that we know can be taught and that are certain to be useful, so schooling should ensure that those are learned. There is a body of knowledge that will not soon go out of date and there are works of literature, art, and music that will not soon cease to be valued. So an education that brings students into intimate association with these ought to be of value in their development as citizens, even if not in any more utilitarian way. And there is surely merit in trying to support healthy physical, social, intellectual, and emotional development. But that leaves us, as I observed before, with no educational wisdom that would distinguish these from earlier times.

Schooling for a Knowledge Society

There are two recent developments in education that do address preparation for life in a knowledge society in ways that go beyond the traditional answers of back-to-basics, liberal education, and developmentalism and beyond the superficiality of futurism. These developments are

1. A new assault on the problems of teaching for understanding.
2. The deliberate crafting of school cultures supporting work with knowledge.

Neither teaching for understanding nor the deliberate crafting of school cultures is new, of course. Teaching for understanding has been an objective of education from the time of Socrates. What is new is a heightened awareness of the importance of understanding, mounting evidence of the failure of schooling to produce it, and what look like genuine breakthroughs in ways of teaching for understanding (Gardner, 1991). There is also a history of school cultures being crafted to support certain systems of values, such as those of the British ruling class, those of participatory democracy, and those of

natural human development. What is new is the idea of a culture in which knowledge is central rather than incidental to other values.

The Economic Value of Understanding

Although the value of understanding has long been appreciated, it has been appreciated as a personal good. The pursuit of it, as Socrates taught, makes life worth living. Practical value, however, was thought to reside in skills, rules of thumb, and useful facts. This view survives in the back-to-basics mentality. One of the few arguments you will here today against teaching for understanding is that, while it is undeniably a good thing, it must yield to the more urgent requirement of teaching skills that will lead to employment. You may lose a job because of inability to subtract 24 from 51, but you will not lose it because of inability to explain why a subtraction algorithm works.

It is difficult, although theoretically possible, to assign a dollar value to understanding. What we can say with some confidence, however, is that the dollar value of learning without understanding is declining. As microchips do more of the arithmetic, what remains for the human operator is to understand the problem and call for the right operations. As speech synthesizers convert printed words to spoken words, what is left is the problem of understanding the message, which depends on understanding the words and having the relevant background understanding. In the limit, it may turn out that the only knowledge-based functions that cannot be automated are those that require deep understanding. This is already becoming apparent, if you regard outsourcing as analogous to automation.

In principle, the dollar value of understanding could be estimated the same way economists estimate the dollar value of a college diploma: compare the earnings of those who have it with the earnings of those who do not, controlling statistically or experimentally for other factors. The problem, of course, is in deciding how to judge whether someone has it, which in turn depends on deciding what *it* is. Suppose, to make it simple, we decide to base our estimate of understanding on only one significant concept—say the Newtonian concept of force, tested by a variety of clever questions and problems and using some reasonable standard such that you do not have to be a physicist to earn a passing score. It is a safe bet that those who pass would on average have higher earnings than those who fail. The difference would probably be significant even after we control for all the obvious correlates, such as years of schooling. But does that mean that studying Newton will raise your income? Not as a rule. The test is just a marker, a diagnostic sign, of something much more general.

We could broaden our scope, testing understanding of a variety of concepts in different areas. This would give us a more precise estimate and ought to result in assigning an even higher dollar value to understanding. The estimated value would probably be higher yet if we were careful to target understanding of those concepts that are central to a discipline, that are the basis for further understanding—Newton's laws in physics, natural selection in biology, supply and demand in economics, the idea of a function in

mathematics, the idea of genre in literature. But we would still be wary of suggesting that the economic value lay in those particular understandings or in any other particular understandings. What we could reasonably infer, however, is that the *kind of person* who understands such things has an economic advantage. We could also reasonably suppose that you cannot be that *kind of person* unless you have pursued and achieved some understanding of the ideas that make further understanding possible.

Thus there is both a content side and a dispositional side to understanding and both have economic value over and above their value in constituting a mental life. There are important identifiable things to be understood. They are conceptual artifacts (see Chapter 3), the product of preceding generations' sustained efforts to understand the world. Then there is being the kind of person who exerts such sustained effort. That is the dispositional side. The content side of understanding is well recognized and all but the most degenerate schools deal with it in some way. However, they have been obliged to deal with it on the basis of folk theories of knowledge and mind that, as we saw in Chapter 4, are inadequate.

Schooling as Acculturation

When companies outsource everything they can, what is left? Presumably what is left is the main wealth-producing work of the enterprise. In knowledge-based companies this consists of ill-structured tasks in knowledge-rich domains. If a job can be well specified and if the knowledge required to carry it out is of a generic kind that can be acquired at school or by working anywhere in a particular occupation, then the job is susceptible to outsourcing or to being eliminated through automation. Central to productive thinking in knowledge-rich domains is deep understanding of the task and of the resources and conditions relevant to it.

There is a missing link, however, in the argument that can be made for teaching for understanding. It is a link between the understanding that is acquired in school and the highly situated and task-specific kinds of understanding that knowledge work requires. These are kinds of understanding that can only be acquired on the job. The best that schooling could hope to do is equip people to acquire such knowledge. This is the consideration that leads people to start beating the drum for thinking skills. But that does not solve the problem, it only represents a different (and generally inferior) way of talking about the same problem. For the thinking skills that make you an expert have to be learned on the job too, and so we are still faced with the question of what schooling could do to enhance people's ability to acquire such skills.

Defining a Role for Schools

I suggest that one day we will have to revolutionize psychology by looking at the human mind as an organ for interacting with the objects of the third world; for understanding them, contributing to

them, participating in them; and for bringing them to bear on the first world. (Popper, 1972, p. 156).

The rise of the Internet makes dramatic a trend that has been going on for well over a century. It is the school's loss of monopoly over knowledge transmission. Of course, schools never did have a monopoly over most kinds of knowledge transmission, and so we need to clarify what that limited monopoly has amounted to. Deferring that question (until Chapter 9), however, let us just refer to the school's traditional stock-in-trade by the portmanteau term, "academic knowledge." The growth of public libraries weakened that monopoly, albeit for a small part of the population. Then came radio and television and now the Internet. Modern societies are full of organizations that store, process, and disseminate academic knowledge. Schools ought not to be clinging to the illusion that they are the whole game. They ought to be positioning themselves in such a way as to make use of other societal resources. Like other organizations that are 'reinventing' themselves, they ought to identify what they can do uniquely well and concentrate on elevating that function.

The proposal that schools in a knowledge society should focus on what they can do best and what other institutions cannot do better may sound commonsensical, but it is by no means a self-evident precept. As the term *in loco parentis* reminds us, schools have many of the responsibilities of parents, and one would not get away easily with proposing such specialization for parents. There are all kinds of things parents have to do whether they do them particularly well or not, because the welfare of children demands it, and so may it be with schools. But in fact parents who can afford it do 'outsource' a lot of their parenting, and in a well-functioning neighborhood or extended family parenting functions may be widely distributed, with different people contributing in ways that particularly suit them. "It takes a whole village to raise a child," according to an overworked proverb. It is this kind of distributed responsibility for bringing up the young that I am thinking about—not nostalgically but in the belief that, with the spread of knowledge work and with the possibilities of decentralization that telecommuting is already demonstrating, a whole new range of opportunities for the distribution of educational responsibilities will emerge (Scardamalia & Bereiter, 1996). These possibilities have led some enthusiasts to imagine the disappearance of schools, with an Internet-based 'global village' taking over the now completely decentralized educational mission. I think this is fantasy, but the reason it gets taken seriously is that we have not identified anything that schools are uniquely suited for other than baby-sitting.

Is there a core function or set of functions that schools could be stripped down to, outsourcing everything else? Back in the 1970s, in *Must We Educate?* (Bereiter, 1974), I argued that the core functions were custodial care and training in basic academic skills. 'Education,' in its grander sense, was to be left in the hands of parents, to be delegated in whatever ways they saw fit. That was proposed more as a thought experiment than as a feasible design. Evidently, for many educators who tried the thought experiment, the

conclusion was that it would result in the end of civilization (Levine & Havighurst, 1971). It now seems, after several decades of tentative experimentation with voucher schemes and other forms of choice, that the result would be the rise of private schools, differing in curriculum and pedagogy, but playing the same many-faceted role that schools do now. Reconceptualizing the role of schools, therefore, does not seem to lie in that direction.

Custodial care remains a core function, which probably ensures that schools for the young will continue to be physical entities and will not dissolve into cyberspace. And providing a safe and healthy living environment is something that a surprising number of schools do surprisingly well, although it is the failures that make news. Beyond that, however, the role of schools is so broad and vague that the idea of narrowing down to a core function and concentrating on performing it well seems preposterous.

Let us therefore look at it the other way. What are functions of the common school that might be 'off-loaded' as current jargon puts it? The most obvious is that of information supplier. The traditional expectation has been that the textbook and the teacher between them embody all the knowledge that is to be acquired in a course. That model can only be maintained today by suppressing inquiry. And with schools starting to provide access to the World Wide Web, the practical justifications for the model disappear. It may be argued that schools now have an additional responsibility, in enabling students to deal with the overabundance of information, but that is another matter; it could mean establishing strategic relationships between schools and various information suppliers, but it still means taking schools out of the information supply business themselves.

Another venerable role of schools ready to fall before advancing technology is that of providing coached practice in cognitive skills. A random visit to a conventional elementary school is unlikely to happen upon a lecture in progress or a discussion or any sort of inquiry. More likely, it will find students bent over their tables doing exercises of some kind—arithmetic problems, language skills worksheets, or other varieties of what is aptly called 'seat work.' Computers are unlikely to take over swimming instruction in the near future because the technology is not up to observing swimmers in the water and evaluating their strokes. Coaching requires monitoring process not just performance—otherwise you have a scorekeeper, not a coach. Classroom teachers are not actually able to provide much cognitive coaching, partly because of the pupil-teacher ratio (most coaching requires individual attention) and partly because teachers are untrained in it. Thus they tend to be more practice supervisors and scorekeepers than coaches. Most of the skill-development software available to schools does not provide coaching either, but only more refined score-keeping. However, the technology for cognitive coaching in mathematics is well advanced and has proven effective (Anderson, Corbett, Koedinger, & Pelletier, 1995). Computer coaching of basic reading processes is on the verge of practicality, now that speech-recognition

technology is maturing ; and coaching in the technical aspects of writing is also coming closer to practicality. Many educators are categorically opposed to cognitive skill training and would like to see it stricken from the schools. One way or the other, however, coached practice in skills seems a likely candidate for removal from the core functions of school teaching.

If you took away information transfer and skill practice, some schools would find their curriculum quite barren and for many others what remained would not look much like a serious educational program. At the same time, there are schools where such removal would go almost unnoticed. These are schools that practice some version of ‘open education’ or ‘constructivist learning,’ in which the students spend almost all their time on projects or in conferences. Such schools, however, are liable to be among those coming under most attack for failure to address the ‘new economic realities’—that is, the perceived rising standards for employability and wealth creation.

Formal Education as Acculturation to World 3

After schools unburden themselves of information supply and coached practice, what they should be left with is freedom to concentrate on higher objectives. But what ought those objectives to be? The futuristic literature, as I indicated, points to higher-order thinking skills and traits. Even if one believes in the teachability of these things (but see Chapter 10), they cannot realistically be put forth as something schools are ideally positioned to teach. Indeed, schools are uniquely ill-suited for it because of their isolation from real-world problems. Furthermore, thinking skills enthusiasts have almost all come around to thinking that such skills cannot be taught in isolation, through artificial exercises, but must be taught through work that has substance. So the question of what that work of substance should be remains to be answered.

The traditional idea of a liberal education, centering around classics and disciplines, provides a good starting point for considering what schools are actually suited to do. Almost everyone would credit liberal education with some virtues, and it generally requires schooling—that is, some kind of planned and managed program aimed at learning.⁴ Accordingly, we may start with liberal education, as traditionally conceived, and ask what is required in addition or how the conduct of liberal education needs to be altered in order to meet today’s challenges.

These matters will start to become clearer if we drop the terms ‘liberal education’ and ‘cultural transmission’ and recast the central idea as follows: *The purpose for which formal education is uniquely suited is enculturation into World 3.* Most of the preceding text of this book has been directed toward

⁴ There are, of course, examples of self-educated people. Eric Hoffer is a notable modern example; but it could be argued that such people are self-schooled. The autodidact or “self-educated man” most often appears in literature as a somewhat ridiculous figure, however (e.g., Sartre, 1964), characterized by smatterings of largely useless and often distorted knowledge. Snobbery apart, this tells us something important about the value of schools.

making this an intelligible statement, and so I cannot be expected to start over and explain it from scratch here; but I will expand briefly on what these 14 words are and are not meant to say.

Note first that the statement refers to *formal* education. This is not a sharply defined category, but in most schools it is not difficult to distinguish the formal part of the school program from the informal. Usually the formal part is marked by some accountability on the part of students for learning and on the part of the teachers for producing that learning. In the informal part of the school program, which typically includes sports, arts, and performing groups, the focus is more on the doing than on the learning. John Dewey (1916/1944, p. 9) called “the method of keeping a proper balance between the informal and the formal” “one of the weightiest problems with which the philosophy of education has to cope.” Central to solving that problem is determining what, if anything, formal education is peculiarly good for. I am suggesting *enculturation into World 3* as an answer.

World 3 is the world of artifacts that may be discussed as knowledge—theories, factual assertions, problem statements, histories, interpretations, and many other products of human thought. World 3 is not limited to accepted, verified, or important knowledge objects. It can include discredited theories, crank notions, unsolved problems, and new ideas that may or may not gather a following. In this respect World 3 is more inclusive than the canons of liberal education. This inclusiveness goes a long way toward eliminating the split between established knowledge and students’ constructive efforts, because it places the ideas created by students in the same world as the ideas handed down from authoritative sources.

This brings us to *enculturation*.⁵ To me, enculturation into World 3 means *joining the ranks of those who are familiar with, understand, create, and work with the conceptual artifacts of their culture*. It is tempting to shorten this statement by saying it means becoming part of the community of knowledge workers, but this implies a level of solidarity and shared identity that does not exist. An analogy would be joining the ranks of those who are familiar with, understand, work with, and make things out of rocks. These ranks would include rock hunters, geologists, quarriers, stonecutters, and masons. Such people do not constitute a single community but rather a set of interacting and partly overlapping communities. However, they share a good deal of knowledge and interest not shared by people outside their ranks; they would have things to talk about, ways of working together, made possible by their shared knowledge and interests. That is what may be expected as well of

⁵ Whether to call it ‘enculturation’ or ‘acculturation’ is not entirely clear. As these terms are used by anthropologists, enculturation refers to assimilating the culture one is born into whereas acculturation refers to acquiring a different culture—as an immigrant, for instance. For the child born into a family where ideas are often the subject of dinner table conversation, ‘enculturation’ would seem to be the word, whereas for the child who has never been exposed to intellectual discourse before encountering it at school ‘acculturation’ is more appropriate. Merriam-Webster does not recognize ‘enculturation’ but instead assigns both meanings to ‘acculturation.’

people who have had a good liberal education, and it is what I am trying to pin down in identifying World 3 as the basis.

Here is another analogy, which offers a different slant on what it means to be enculturated into World 3. In discussing shortcomings of the idea of mental content, I have referred to a kind of knowledge that consists of “knowing one’s way around” in some domain. Suppose the domain is a large park, such as Yosemite National Park in California. Those who know their way around in this park do not constitute a coherent community. They do not live in the park, although their paths cross there from time to time. They have different knowledge and interests related to the park. Some are climbers, some are hikers, others are naturalists or artists. But, again, their mutual knowledge—their knowing their way around in the park and all that entails—affords them possibilities of productive interaction not open to the casual visitor. Just so, knowing one’s way around in the world of conceptual artifacts affords a wealth of possibilities not open to people who know that world only from a distance, if at all.

Painting with a wide brush, let us say that the World 3 that students are to learn their way around in is that of the disciplines represented in a modern university (what those disciplines are, how they are practiced, what they treat as foundational—these of course vary from time to time and place to place and are often in dispute). Most university students, it must be granted, do not learn their way around in that world. They learn their way around in a small part of it. And many do not even do that. They take courses. They learn facts and advance their understanding of some aspect of the real world—its geography, economics, history, or whatever—and acquire some professional competence; but research indicates that many of them never become engaged with the problems of the disciplines they study (Entwistle & Ramsden, 1983). They may hardly make any contact with World 3 at all, their academic efforts being wholly occupied with acquiring learning (World 2) and dealing with the material world (World 1).

There are, however, students who come to university or college already enculturated to World 3 and generally knowing their way around in it, even though they still have a lot to learn. They know something of the classics and of what thinkers of the past were up to. They have a sense of history and a grounding in mathematics and science that extends beyond received knowledge to include some experience of really *doing* history, mathematics, and science. They have not just acquired itemizable knowledge. They have already joined, as novices, *the ranks of those who are familiar with, understand, create, and work with the conceptual artifacts of their culture.*

Regardless of how one might feel about the virtues and limitations of this kind of education, it would have to be acknowledged that enculturation to World 3 is something schools are structurally well suited for and that no other institution could do as well. The detachment of schools from the practical activities of life affords the opportunity for study and reflection. Their social organization affords opportunities for extended discourse, which

is the engine of progress in World 3. The essential resources are books and other knowledge media, which schools are in a good position to provide.

Enlarging the Conception of Schooled Knowledge

I am acutely aware of how unfashionable my proposal is. Despite all the talk about a knowledge-based economy and a knowledge society, the idea of schooling being focused on knowledge sounds drab and out of date. Problem-based learning is fashionable, but the problems are never knowledge problems. Project-based learning is fashionable, but the project is never the construction of a knowledge object. A look through the curriculum materials and literature on so-called constructivist approaches to learning will suggest that it does not even occur to educators that what students set about constructing might be knowledge itself. This, I believe, is a consequence of folk theory of mind. It has no place for knowledge in the World 3 sense. Knowledge is either something in students' heads or else it is something lodged in textbooks and multimedia documents, to be reconstructed internally. So one is always dealing with mental states, texts, physical phenomena, or social processes, never with knowledge as such. From this standpoint, a proposal that formal education should consist of enculturation to World 3 can mean little more than that students should acquire a lot of book learning—stored representations of the information contained in books. No wonder, then, that the proposal comes across as unexciting and anachronistic.

Enculturation to World 3 means a great deal more than learning what is in books, however. Enculturation to World 3 encompasses all six of the varieties of knowledgeability discussed in Chapter 5:

Statable knowledge. This kind of knowledge, the 'book learning' whose value is so suspect in some educational circles, is of course central to functioning in World 3. It is knowledge whose validity and significance can be critically discussed and that can be improved through such discussion. Enculturation into World 3 means participating in a school culture in which such knowledge is, in fact, continually under negotiation.

Implicit understanding. Implicit understanding of a conceptual artifact means in effect that it has become part of the way your mind works. You no longer have to remember and apply the idea of natural selection, for instance. It is integral to the way you think about intergenerational change in organisms. Thus, when you read that natural selection takes place among the cells in a cancer, thereby making the cancer as a whole increasingly resistant to chemotherapy, this discomforting fact is instantly comprehensible. Implicit understanding does not negate the importance of negotiable knowledge, however. Evolutionary theory keeps advancing and what you learned in school about survival of the fittest may no longer be tenable. Important revisions of implicit understanding can descend from changes in statable knowledge.

Episodic knowledge. Episodic knowledge is the stock of remembered experiences we call upon to suggest what to do in the present. School experience is generally not rich in episodes that have practical application in the world at large; that is what the College of Hard Knocks specializes in. But formal education can provide certain kinds of episodic knowledge that are important to the educated person and that are not readily acquired elsewhere. Clear and striking demonstrations of scientific principles are one such. Science museums, of course, provide these as well, and with better production values, but those that occur in school have a better chance of occurring at the right time, when students are actively engaged with the underlying questions, so that the episodes become more memorable and interpretable. Not to be discounted is episodic knowledge gained from fiction, biography, and history. Memorable episodes from these sources can function much like personally experienced episodes, especially when it comes to making moral and life-changing decisions. Other important episodic knowledge may concern arguments or discussions, the recall of which helps in the reconstruction of partly-forgotten principles and lines of thought.

Impressionistic knowledge. This is knowledge in the form of hunches and feelings. To the extent that students are engaged in creating or improving conceptual artifacts, they rely, as creative people always must, on impressionistic knowledge that points them in promising directions. The same is true in thinking critically about received ideas. Everything starts vaguely, with an intuition that something is interesting, promising, on the right track, or somehow wrong, and firmer knowledge develops from there. In the conventional view, the acquisition of established knowledge is quite different. It comes to us in the form of clear propositions: Columbus discovered America in 1492; for every action there is an equal and opposite reaction; and so on. The only vagueness arises from the learner's lack of clear understanding. But if the constructivist premise is true (and no one has suggested a way in which it could be false), then the initial vague intuition is all there is to start with. Learners have to build conceptual knowledge the same way scientists do, by following promising leads (more about this in the next chapter).

Skills. As with getting around in a physical environment, getting around in World 3 involves a multitude of skills. There are the cognitive skills involved in reading and research and the social skills involved in argumentation and collaborative problem solving. In a conventional curricular approach, one would try to itemize, teach, and test these skills, but that is not the direction implied by the idea of enculturation. Instead, we may assume a whole constellation of skills that develop through working in World 3 and only single out for attention those that prove problematic.

Regulative knowledge. Included here are all the habits that develop through working in knowledge domains and the norms of conduct and judgment that characterize different disciplines, some of which hold across disciplines. What constitutes an adequate explanation or a proof? What constitutes a novel idea as against a different way of representing an old idea? What is fair use of another person's work and what is plagiarism?

Enculturation, of course, involves more than can be captured in any list of elements. As with enculturation into a profession or a tribe, it involves the whole personality. The above list is only meant to convey the range of worthwhile learnings that may occur—all but the first category of which tend to be ignored in the conventional curriculum and to go unrecognized in discussions of educational alternatives. The range of learnings should not be overestimated, however. Even with a very wide-ranging curriculum and careful attention to all the varieties of learning, school learning can still make up only a very small part of the knowledge required to be a fully functioning member of adult society.

To overcome the limitations of school learning, there have been repeated efforts to bring more of the world into the school or to get students out into the world—in short, to make schools less academic. Whatever the merits of these efforts (and they have varied widely) they make it even less clear what schools might be best suited for. It is as if the ideal would be no school at all, just children growing up in society. Schools then become little more than a concession to practical requirements (much as it is with prisons) and the educational challenge is to make the best of an unfortunate necessity.

My proposal, consistent with proposals of Kieran Egan (1997) and Howard Gardner (1999), is the opposite. Instead of trying to make schools less academic, let us look more deeply into what 'academic' could mean and see if there is some core virtue that could be more fully realized. This is not to preclude field trips, work-study programs, or any other departure from the walled-in curriculum. It is only to try to pin down kinds of educational activity that schools are uniquely suited for, as distinct from the activities introduced to make up for schools' inadequacies.

That core activity, what I have called 'enculturation into World 3,' may be put into more familiar terms. The core activity of schooling throughout the elementary and secondary school years should be *to help students build a comprehensive and coherent understanding of the world*. Building such an understanding of the world was Aristotle's project and it remains the project of every thoughtful person growing up. It is a constructive project *par excellence*. Young people must do it for themselves; it cannot be done for them. Schools typically both help and hinder this project. They help by exposing students to the wealth of what is already known. They hinder by interposing all kinds of well-intended but often diversionary 'learning activities.' How schooling could help more and hinder less will be the topic of later chapters. For now the issue is whether this is an adequate conception of

the core function of schooling. In particular, is it adequate preparation for life in a knowledge-based economy?

Large-D and Small-d Diversity

Any attempt to define a role for schools quickly runs into two clusters of controversial social issues. One cluster of issues has to do with diversity. Another, which I will take up in the next section, has to do with equity and elitism, boiling down to the question of whether enculturation into World 3 is being foisted upon the masses for the benefit of the minority who will go into professional and managerial occupations.

'Diversity,' like 'equity,' has become a mantra and lost most of its meaning. Whenever a single objective is proposed for all students, alarm bells go off in many educators' minds, warning them that some kind of diversity is in danger. In its naive form, the worry is about schools becoming cookie-cutters that turn out students who are all alike. If there is anything to this fear (and history would suggest there is very little), it ought to be allayed by teaching for understanding. It is ignorance and rote learning that oblige people to act alike; understanding frees people to go their own way.

More sophisticated concerns include the following: That 'understanding,' as advocated by mainstream psychologists and science educators, is a particular kind of understanding favored by Western science—abstract, rational, contemptuous of traditional and commonsense knowledge; that an exclusively intellectual approach is being advocated, to the exclusion of feelings; and that individual cognitive styles and ways of learning are being swept aside in favor of purely verbal and logico-mathematical skills. All of these warrant extended discussion, but the main point here is that they can be discussed *within* a general commitment to teaching for understanding. It is not predetermined that the kind of understanding to be pursued is that of mainstream science; there is plenty of room for intuition and feeling (see the discussion of impressionistic knowledge in Chapter 5). As for individual styles, varieties of intelligence, and the like, we need to be clear whether we are talking about different ways of pursuing understanding or whether we are talking about understanding as an option suitable for certain kinds of students and not others. Only in the latter case is there a critical issue, which I will take up in the next section.

That, said, however, I think educators must face up to the fact that teaching for understanding is not culturally neutral. If it is to be undertaken seriously and in the light of a modern conception of understanding, then it is strong stuff. It is not about hatching baby chicks or showing off artifacts from your parents' homeland—although such things may go on as part of an inquiry. It is about the relentless effort to improve upon existing knowledge. That is not a culturally neutral idea. The advancement of knowledge is a modern notion and it goes against the grain of both premodern and postmodern beliefs. The idea comes easily to today's students, because it is all around them in a culture where progress is the normal expectation. It doesn't have to be taught. The improvability of understanding is implicit in the

practice of knowledge building in the same way that the improbability of musical performance is implicit in the practice of band rehearsal. But the inevitable result (and by inevitable I mean that it happens whether the teacher presses for it or not) is gravitation toward a kind of mainstream rationality and toward beliefs that stand up under that kind of rational process. The only way to prevent it is by suppressing or subverting inquiry.⁶

We may freely admit that there are other ways of knowing—through art, myth, and religion—and that these address important human needs, but they cannot possibly address the endless flow of *why* and *how* questions that will occur in any modern elementary school classroom where they are allowed to flourish. There is no alternative biology that explains what bruises are, how you can resemble your aunt more than you do your mother, why mosquitoes do not transmit AIDS, and why your nose runs when you have a cold. (Bereiter, et al., 1997, p. 330).

The likely effect of opening school doors to the pursuit of understanding is a decline in what I will call large-D diversity, that is, diversity at the level of culturally distinct bodies of belief and ways of knowing. All schooling—indeed, any kind of inclusive social activity—tends to have this effect, and so it would be astonishing if teaching for understanding were an exception. The positive side is that, with students actively and cooperatively engaged in building an understanding of the world, there is an enlarged possibility for them to work out a relationship to conceptual artifacts that is compatible with their personal and cultural bents. This is one reason why it is useful for educators to think of knowledge as having this artifactual character rather than as things stowed in people's minds. It makes it realistic to consider cultural and personal variations in ways of relating to the same objects. That seems to me a more promising way of dealing with diversity than the romantic way it is generally treated in schools, which has it that every culture houses its own precious store of ideas that are sufficient unto that culture and should in no wise be meddled with. Assimilating the radio into a culture may involve some stresses, but it has been done successfully the world around, without Arabs ceasing to be Arabs or Sumatrans ceasing to be Sumatrans. Why should assimilating a conceptual artifact be that different? Should adopting a biological theory that works better than a traditional one be categorically worse than adopting the snowmobile to replace the dogsled? Perhaps so, but it should be apparent that educators have no more business legislating on these matters than bureaucrats would have deciding that the Inuit must be protected from the snowmobile.

⁶ A standard complaint about schools is that teachers suppress inquiry by requiring memorization of textbook facts. With the younger generation of teachers, however, one is more likely to find that inquiry is subverted rather than suppressed. It is subverted by a kind of namby-pamby relativism that glorifies personal belief, discounts authority, and throws a cloud of indeterminacy around everything. This approach can be more deleterious than the old one, because it provides an easy way to avoid trying to solve knowledge problems. I fear that may be why it has caught on so well among university undergraduates and education professors.

Large-D diversity is diversity defined over very large categories—gender, race (with this variable sometimes reduced to only two categories, people of color and the rest), ethnicity, the five senses (used to categorize people according to their preferred sensory channel for learning), or the multiple intelligences (currently numbering seven or eight). These are important kinds of diversity, and for various reasons they are looming larger and larger in educational policymaking. At the same time, however, their significance in the actual business of the world—their economic significance, broadly defined—is declining. Furthermore, they tend to overshadow what I will call small-d diversity, the economic significance of which is beginning to count as never before.

The Declining Importance of Large-D Intellectual Diversity

There was a time when intellectual diversity was treated entirely in terms of differences in IQ or general academic intelligence. Since the early 1970's, however, a virtual holy war has been waged against this practice and the ideas associated with it, so that the very word 'intelligence' could not for some years be uttered safely in educational circles. Now, thanks largely to the work of Howard Gardner, the word may be heard again, but almost exclusively in its plural form. Drawing on a wide range of evidence, Gardner (1983) proposed seven distinct kinds of intelligence (recently increased to eight). Gardner pointed out that schools typically concentrate on only two of these—verbal-linguistic and logical-mathematical intelligence—ignoring or relegating to extra-curricular activities the exercise of visual-spatial, musical-rhythmic, bodily-kinesthetic, interpersonal, and intrapersonal types of intelligence.

All of these kinds of ability are of obvious value. Each has its geniuses. For each of them there are occupations that depend on that particular ability. And so Gardner's suggestion that schools should broaden the range of abilities they attempt to cultivate appears on its face to be quite reasonable. But are these 'intelligences' of equal social value? Assuming that trade-offs would have to be made, is it a good idea for schools to reduce the amount of verbal-linguistic and logical-mathematical activity in order to make room for the other varieties? In economic terms, at least, there is an unmistakable trend toward increasing importance of verbal-linguistic and logical-mathematical abilities and a corresponding decline in importance of most of the other abilities. The expanding job market is for those who qualify as what former Secretary of Labor Robert Reich (1992, p. 302) called "symbolic analysts." At the same time, technology is reducing the need for various special skills and replacing them by a general ability to work with programmable devices, an ability that is again largely symbolic—verbal-linguistic and logical-mathematical, in Gardner's terms. Of course, interpersonal skills are still important, but probably no more so than at other times in the history of the species; and it would be hard to claim that intrapersonal intelligence (wisdom in the conduct and cognizing of one's own life) counts for more now than it did in times that saw the rise of the great world religions. The 'intelligences' whose importance in the working

world seems to be declining are those that Gardner labels visual-spatial, bodily-kinesthetic, and musical-rhythmic.

I first wrote about this in 1969, taking photography as an example: “Whereas the photographer once needed the ability to judge depths and levels of illumination accurately in order to take a clear picture, he can now be quite deficient in these abilities providing he is intelligent enough to use his equipment properly” (Bereiter, 1969, p. 311). More striking now is the way image-processing software enables anyone who can master its complex functions to create photographic effects that previously took consummate skill in the darkroom—if they could be achieved at all. Of course, to be a great photographer you still need the special kind of visual-spatial intelligence that Alfred Stieglitz had; but Stieglitz also needed a number of other abilities that his present-day counterpart can do without. The limiting factor now amounts to symbolic analysis—how able one is to grasp, hold in mind, and translate into behavior the information contained in a large manual.

The same shift can be observed wherever technology has taken hold, and that includes just about everything from baking bread to flying an airplane. Shoshana Zuboff (1988) has documented the shift in the work of a pulp mill. Whereas earlier the pulp makers took handfuls of pulp coming out of the mill and relied on their feel to adjust the process, today they stand in front of a computer screen and analyze numerical data coming from sensors. There are really two trends, however. One is a general de-skilling, which means that tasks that once required special talent and training can now be done by anyone (or no one at all, in the case of automated tasks). The other is an increase in the customizability and flexibility of tools, which puts additional power into the hands of those with the ability to master and use them. And more and more those abilities are intellectual ones. The prime example, as I anticipated in 1969, is the personal computer. Interfaces keep getting simpler to allow more and more people to use computers, and computers are gradually eliminating the peripheral skills needed for competence in a domain. With spelling checkers, for instance, you no longer need to be able to spell in order to produce socially acceptable writing. At the same time, however, computation is putting increasing power in the hands of those who can comprehend instruction manuals and reason out applications to their purposes. Virtually every high-tech tool reduces the range of skills needed to accomplish tasks and puts more power into the hands of those with the general intellectual abilities that psychometricians identify as *g* or, more notoriously, as IQ.

This is bad news for multiple intelligences advocates, because it suggests that schools have been correct in focusing on verbal-linguistic and logical-mathematical abilities and that diversifying to a wider range of intelligences is the right strategy for the wrong century. Of course, there are still going to be artists, musicians, poets, and dancers, whose skills are distinctive and not interchangeable; and practical competence and social skills show no signs of diminishing in importance. But none of that alters the significance of the fact

that the bulk of the world's work is coming under the control of people who can read, figure, and reason.

What this analysis suggests to me, however, is not that intellectual diversity is passé but that it needs to be conceived of in much finer terms than the broad categories of Gardner's seven or eight intelligences. Moving from one kind of intelligence to seven or eight may be a refinement, but we are still in the realm of large-D diversity. Perhaps the most serious drawback of education's increasing emphasis on large-D diversity—whether in the form of multiculturalism or of multiple intelligences—is that it takes attention away from a kind of intellectual diversity that actually is rising in importance. This is small-d diversity, to be found within the verbal and logical constellation rather than outside it.

The Value of Small-d Intellectual Diversity

Small-d diversity is perhaps easiest to recognize in the arts. Large-D diversity in the arts comprises differences between cultures, epochs, schools, and movements. It is much of what art history is about. Small-d diversity has to do with differences—mainly individual differences—within these larger categories. One of the great things about art is that even within the most rigidly prescribed forms the hand of the individual artist can be discerned. Were it not thus, art would be pretty boring. For that matter, it is pretty boring for those who cannot discriminate.

Similar diversity can be found in intellectual realms. There is large-D diversity, to be sure. Many people boldly confess to being mathematical morons. Although self-proclaimed deficiencies in general verbal intelligence are much rarer, we probably recognize them among our acquaintances—unless we have been heavily indoctrinated against doing so. But from day to day we are likely to be more struck by subtler differences. Certain differences appear everywhere—the person who is good with details versus the one who has the big picture; the logical reasoner versus the intuitive leaper; the one with lots of knowledge versus the one with lots of questions. But if you press further you will get to finer differences. Observe what happens in a group working on a problem. One person introduces a distinction that changes how others see their task; one puts everything into a useful chart; another brings in an illuminating analogy; one draws people back to an idea that had been passed over. In each case the contribution might have been made by someone else but it is no accident that it comes from whom it does. Each person has a history within which their particular contribution forms part of an intellectual pattern. Thus there is diversity and it does not take a magnifying glass to see it, but it does have to be viewed close up. It is not discernible from the Olympian heights of theories of intelligence.

The result of this small-d kind of diversity is an increase in collective intelligence. Put together a lot of these subtly different minds and you have a capacity for creativity and problem solving that cloning of the best single mind could not achieve. Although the value of this kind of diversity is probably recognized and appreciated by practically everyone, it is not what diversity has been about in schools and we know very little about how to

nurture it. The following are only attempts at reasonable conjecture, with no research and little theory behind them: Not every kind of mentality contributes to the collective intelligence. People who are immune to reason, for instance, may be expected to bring down the intellectual level of every group they join, and when empowered they can become dangerous fanatics. Intellectual diversity of useful kinds develops through people working to solve problems, finding and honing talents and habits that work particularly well for them. Although the solitary genius may not be altogether a myth, people's distinctive intelligences are almost always developed interactively. It is a matter of finding one's niche in an intellectual ecosystem and evolving rapidly in accordance with the potentialities of that niche.

To have a culture that can reliably produce inventions and discoveries, you need not seven but thousands of subtly different varieties of talent encountering different helpful experiences and opportunities. There are going to be many potential Darwins and Edisons who never do anything remarkable because what they learn does not fit their talents or because the opportunities to reveal what they are capable of never arise. George Eliot wrote about this at a time when merely being born female was sufficient to rule out a vast range of possibilities. Describing St. Theresa as one who overcame this handicap, Eliot went on to say,

Many Therasas have been born who found for themselves no epic life wherein there was a constant unfolding of far-resonant action; perhaps only a life of mistakes, the offspring of a certain spiritual grandeur ill-matched with the meanness of opportunity; perhaps a tragic failure which found no sacred poet and sank unwept into oblivion. With dim lights and tangled circumstance they tried to shape their thought and deed in noble agreement; but after all, to common eyes their struggles seemed mere inconsistency and formlessness; for these later-born Therasas were helped by no coherent social faith and order which could perform the function of knowledge for the ardently willing soul. (Eliot, 1871/1965, p. 25)

If I understand what Eliot meant by a "coherent social faith and order which could perform the function of knowledge for the ardently willing soul," she was defining what a society must provide if it is to foster the proliferation of genius that everyone is looking for today. We must not rely on the rare match of talent, learning, and opportunity. The diversity of all three must increase if more favorable matches are to occur. But they must increase within a social order that provides developmental pathways leading to these fortunate matches and onward from there to accomplishments. A certain level of chaos may be desirable. George Eliot's 19th century village England was too organized, especially for women. In some American inner cities there is so much chaos that virtually the only developmental pathways available (apart from athletics and music for the exceptionally talented) are those maintained by organized crime and gangs. Schools, too, can be so highly regimented that they provide only a few developmental pathways or, in the manner of some schools in which project-based learning runs amok, they

may be so chaotic as to offer no developmental paths at all. Nothing leads anywhere.

If these conjectures are right, and they are so close to truisms that I do not think they can be altogether wrong, they provide a fairly definite direction for education to take. It is the direction I have already laid out in arguing for education as enculturation into the world of conceptual artifacts. By doing real work in the world of knowledge problems and ideas, students have a chance to develop their individual intellectual strengths. By doing a goodly part of this work collaboratively, they develop strengths that complement and work well with the strengths of others. The aim of intellectual diversity of course requires that the paths of knowledge building not be rigidly limited—certainly not limited to bookish study. There ought to be opportunities and encouragement for the kind of person who thinks best by building things and trying them out—building models, simulations, scenarios, or whatever. What we do not want to see, however, is the literate students reading, acting out, and discussing Shakespeare while the nonreaders build a cardboard model of the Globe Theatre (as I have seen happening in a progressive school in London). We want to help students develop their distinctive ways of contributing to knowledge work, not sort themselves at an early age into knowledge workers and nonknowledge workers.

Is World 3 for Everyone?

In education circles, as elsewhere, there is much talk about the prospect of increasing unemployment and of the partitioning of the work force into a highly paid minority of knowledge workers and a vast population employed, if at all, in low-level service occupations. Jeremy Rifkin's *The End of Work* (1995) is perhaps the best documented of the alarmist works on this topic. What is not talked about is the implication this prospect has for education. The last fourth of Rifkin's book is devoted to healthy ways that society could adapt to the decline of jobs, but there is no mention of schools and education.

Perhaps Rifkin's predictions will prove wrong, like the predictions of massive unemployment when the troops returned after World War II. But the possibility is surely too real to be ignored. One part of the schools' job remains clear, and that is the only part discussed. It is, for that matter, the only part I have discussed up to this point. The schools must do all they can to ensure that everyone has a chance. To put it negatively, which is perhaps the more accurate way, the people who end up in the ranks of the jobless must do so through no fault of the education system. That cannot be said today. Indeed, it represents a formidable educational challenge. But is it the whole challenge as far as education and jobs are concerned? If it should be true that a quarter or more of the children in school today face a lifetime of complete or partial joblessness, then schools ought in some way to prepare students for that eventuality rather than only preparing them for jobs.

How schools should prepare for the "post-market era," as Rifkin calls it, is a very large problem that needs a great deal of study and experimentation. It is

also a problem well beyond the scope of this book, except in one respect: Is the focus on knowledge building that I have been arguing for irrelevant or possibly detrimental to the mass of students who will not end up as knowledge workers, who may not end up as workers at all in the customary sense? Have I, in fact, been proposing an education geared to (a) training the elite class of knowledge workers and (b) sorting out who will and will not get into that class?

Our schools must produce high-level knowledge workers. Otherwise there will be even greater unemployment and we will not have the wealth-producing capacity to do anything about it. Training inevitably leads to sorting, because inevitably some students will demonstrate more promise than others.⁷ My argument has been that schools are poorly equipped for the job of producing high-level knowledge workers. The poorer the job that they do, the more will sorting be based on what students bring to school with them; and this means the perpetuation of existing inequalities. So, yes, schooling needs to be unabashedly committed to educating what will very likely constitute an elite class. But it does not follow that such education need be irrelevant or detrimental to those who will make up the rest of the population.

There are several grounds for arguing that an education centered on the construction of understanding is the right kind of education for people regardless of whether they end up as high-level knowledge workers or as jobless. Appreciating these grounds requires, however, giving up the stereotype that equates joblessness with squalor and inactivity. If, indeed, a declining need for labor in the private and public sectors becomes a fact of life, things will start to happen—are already starting to happen. The question is whether those most affected by the decline will have an active, constructive role in what happens or whether they will be its inert beneficiaries or victims as the case may be.

1. There will be political activity, which may range from Luddism to adventurous economic schemes to revolution. I recently received an announcement of a new political party being formed in Canada, whose platform is a radical change in monetary policy. Despite its being explained at length in a comic book, I found I could not understand it. To be intelligent voters or activists, people will need to understand a great deal more than most people understand today.

2. Eventually social forms and customs will evolve that make life livable for most people. Something will evolve that constitutes the 'normal' and that people may simply grow up in without thinking much about it. But there is bound to be a transitional period—and the urban zones of high unemployment may already be in it—when old forms and customs have

⁷ It should be needless to say that eliminating tests or grades will not eliminate meritocracy. However, a well-known political novel, *The Rise of the Meritocracy* (Young, 1961), popularized just that fallacy and it remains firmly entrenched in left-wing educationist thinking.

broken down and new ones that will make life livable again have not yet taken shape. During that transitional period, which may last a long time if conditions keep changing, people will have to work at making lives for themselves. They must find ways to make life meaningful, when old bases for meaning such as jobs no longer serve that purpose. I referred earlier to the idea of *careercraft*, the creative working out of a career that takes maximum advantage of one's personal assets and that is optimally adapted to some occupational niche. The need for *careercraft* will be even greater for those who must find a niche outside established occupations. Thus, the arguments in an earlier section for education that fosters intellectual diversity are highly applicable to joblessness.

3. Rifkin argues persuasively for developing what he calls the third sector, distinct from the familiar public and private sectors. The third sector is composed of formal and informal nonprofit organizations, sustained by a spirit of voluntarism. According to Rifkin, this sector in the United States is already half the size of the federal government in jobs and income. It offers a way to channel human capital no longer needed in the public and private sectors into the improvement of society. This need not be shovel and broom labor. There are possibilities for all kinds of rewarding work, but it is work that needs to be motivated by something more than economic interest. Here a serious obstacle looms. Robert B. Putnam (1996), while acknowledging the economic growth of the third sector, has documented a steep decline over the post-World War II decades in 'social capital' and civic engagement. Social capital he defines as "features of social life—networks, norms, and trust—that enable participants to act together more effectively to pursue shared objectives." He shows that there has been an intergenerational shift. The voluntary sector is maintained by people whose formative years came before 1970. The younger cohorts are not aging into civic engagement. Thus the social capital for the kind of cultural transformation that Rifkin urges seems to be running out. According to Putnam's research, education is an important correlate and presumably an important motivator of civic engagement, which is necessary to make the third sector a viable possibility.

4. We must get over the idea that the life of the mind is relevant only to the elite. It has not always been that way. Many people of my parents' generation were intellectuals even though they did manual work and had little formal education. They read books and liked to talk about ideas. It was only with the rapid postwar expansion of the middle class that people with intellectual inclinations could reliably find jobs that were also intellectually engaging. Now that is again ceasing to be the case. Education, accordingly, would do well to reset its values so that having a rich mental life becomes an educational purpose on a par with achieving employability.

In short, there are ample reasons why enculturation into a knowledge-building society is important for all students, not only those who will work with ideas professionally. The reasons all have to do with ensuring full membership in society regardless of occupational status. I must emphasize that I am not arguing for an exclusively intellectual education. The prospect

of a declining need for labor is grounds for heightening our concern with well-roundedness in education. But the academic curriculum is bound to continue occupying a large part of school time. That is the part that needs to be revolutionized, and it needs to be revolutionized for everyone.

Conclusion: Where This Argument is Heading

Before we can go much farther in articulating what enculturation into World 3 would consist of—before I can even make a very persuasive case for the general idea—a number of related ideas have to be developed in greater depth. One of these, an idea that is crucial to advancing educational thought beyond where folk theory of knowledge and mind can take it, is a distinction between *learning* (which is a World 2 phenomenon) and *knowledge building* (which may be thought of as taking place in World 3). The next chapter is devoted to those concepts. Also central to any consideration of the role of formal education is the concept of *subject matter*. Traditionally, subject matter has been the stuff handed down from the academic disciplines to the not overly receptive young. If we are to regard students as active participants in the world of knowledge, then the idea of subject matter needs to be not rejected, as some enthusiasts of constructivism would have it, but seriously rethought. That is the focus of Chapter 9.

Besides the acquisition of subject matter, enculturation into World 3, as I have already indicated, entails a constellation of skills and dispositions relevant to working with knowledge. There is a strongly held opinion among many people, including not only educators but distinguished scientists and captains of industry, that these are what really count—that teaching students to think is the main task for schools and that subject matter is at best a vehicle and at worst an impediment to the teaching of thinking. This is an issue that reveals folk psychology at its worst. In Chapter 10 I try to retrieve thinking from the dreamland of folk psychology and resituate it in the real world of human activity, where what people know has a powerful influence on how they think.

With that groundwork done, we can then turn to the profession of education itself—not just teaching, but the whole system of governance, administration, research, publishing, and teacher education that combine to constitute the education profession in its full sense. The question I pursue in Chapter 11 is whether this unwieldy system, resting on a foundation of solitary teachers practicing a traditional craft, can become a modern profession. Modernization, I argue, will require a radical transformation based on the fusing of what are now two separate cultures, the research culture and the practitioner culture. The final chapter, Chapter 12, deals with more immediate issues of reform, where I argue that instructional reform is being impeded and subverted by conceptual limitations that are not the fault of any particular group of players but are common to all the sectors that converge on instructional reform.