PART III
IMPROVING TODAY'S CURRICULUM

Eventually, say in a decade or so, all the pieces may be in place for schools finally to be able to undertake radical curriculum design in a thoughtful, informed, and systematic way, as described in Part II. But there is no need to ignore the present to serve the future. The work of Project 2061 is based on the premise that it is possible to make significant improvement in the current curriculum while pursuing a long-term reform strategy—as long as what is done right now is not a mere palliative. The greater danger is to ignore the future while serving the present.

The following three chapters suggest steps that a school district can take now to improve its K-12 curriculum. Because the recommendations for getting started involve teachers gaining experience in a variety of new strategies and techniques, and developing skills for making curriculum decisions in collaboration with other teachers, all three chapters can be characterized as "building professional capability" even though only the first chapter has that title.

Chapter 6: Building Professional Capability discusses kinds of professional enhancement that can put educators in a position to make meaningful improvements in the existing curriculum, using a set of tools already developed by Project 2061.

Chapter 7: Unburdening the Curriculum suggests how to make room for teaching the most important concepts and skills by eliminating less important topics, pruning topics of unnecessary detail, trimming technical vocabulary, and ending wasteful repetition.

Chapter 8: Increasing Curriculum Coherence outlines ways to improve a curriculum by taking into account the development of understanding over time and by connecting concepts within and between subject-matter domains.

The three chapters do not need to be read in the order given here; ideally, the kinds of reform activities described in them should all be under way at the same time. Moreover, after completing Part III, some readers may want to return to Part II to consider again how design in the future would depend on the getting-started activities described here.

For understandable reasons, educators want to get started on actually improving the instruction of the students they are now teaching. Their emphasis is on action now—doing something to the curriculum or some part of the curriculum, in contrast to deliberating about it. But action, without carefully drawn aims, without enough thought and information, without suitable preparation for those who must make change happen, and without a means to estimate its effects is unlikely to pay off in the long run—however satisfying it may be in the short run.

It is important, therefore, that careful thought be given to the process by which decisions are made and carried out before initiating lots of changes. In other words, it matters as much how reform is approached as what steps are taken. Suggestions for those approaches appear frequently in these three chapters and can be summarized briefly:

- Engage as many stakeholders as possible.
- Form cross-grade, cross-subject teacher committees to participate in curriculum design.
- Work toward a shared commitment to learning goals, but do not suspend action waiting for a complete consensus.
- Relate the local reform vision to national goals.
- Keep accurate records.
- Proceed in the spirit of science.

Below we offer a more extended discussion of each of these points. However, some readers may wish to go directly to Chapter 6 instead and then return to this discussion when it becomes relevant to their thinking about process.

Engage as many stakeholders as possible. This is a standard recommendation, but one that is easier to proclaim than to carry out. Though it can be a burden and slow things down, getting stakeholders involved is a price well worth paying. The reason most often cited for broad participation is that curriculum changes, however well conceived, are likely

In his book *Engineers of Dreams* (1996), Henry Petroski shows how important external reviewers can be when it comes to bridge design; external review cannot be less important in the more complicated business of curriculum design.

to remain isolated in a few schools, rejected out of hand by those teachers, administrators, and concerned citizens who are left out of the design process. All should at least be invited to participate whether they eventually elect to do so or not. But mere invitation is not enough. Participation will be much less convenient for some stakeholders than for others, and it is important to persistently encourage and facilitate participation by them as well.

There are, of course, reasons other than political strategy and democratic principles for seeking widespread engagement. Quality will be materially improved by having teachers, administrators, parents, students, and interested citizens in a school district participate in some way in the design process. Engagement requires everyone who is involved to reconsider what is fundamental in education and what is not, and it can help them to move away from slogans and easy generalities to more thoughtful notions of what students should learn. When so engaged, educators and scientists (and other scholars in the cases of other subject domains) learn to work together for a common cause; K-12 teachers learn to collaborate across grade levels and subject-matter boundaries; and the more individuals there are who understand and subscribe to the goals, the more chances there are that a design eventually can be agreed upon and followed. None of this is meant to guarantee that there will be no conflicts, but conflicts aired early tend to cause less trouble than ones that are ignored or deferred.

It is not likely to be practical to include members of the public in the more detailed aspects of design work. Rather, their engagement should be in advisory committees that generate enthusiasm and support, approve of plans for recruiting and organizing teacher teams, review progress, and eventually promote the results to their own constituencies.

Form cross-grade, cross-subject teacher committees to participate in curriculum design. To the degree possible, the committees should avoid grade and subject stratification, which almost always promotes piecemeal change. Making changes in the elementary grades without regard for the consequences in the middle grades is likely to lead to problems when students advance from one level to the next. Changing the content of science courses without taking advantage of changes made in mathematics courses could result in a lost opportunity to do a better job in both.

The fact that schools are geographically separated from one another by grade level makes K-12 collaboration difficult, but not impossible. In many urban school dis-

tricts, for instance, informal discussions can be set up among a high school and its feeder schools. And any number of schools in a district can be connected by a computer network that enables them to interact quickly and continually.

Work toward a shared commitment to learning goals, but do not suspend action waiting for a complete consensus. Except at the most abstract levels of generality, consensus on content goals is not easy to reach. Curriculum committees should use what agreement they have as a continuing reference point, asking themselves how any proposed action will contribute to those ends and requiring members to make arguments only in terms of likely effects rather than philosophical preferences. Dissension can arise, of course, but this process stands a chance of gradually enhancing everyone's understanding of goals and increasing the relevance of the conversation. This is not to suggest that school curriculum groups actually create specific learning goals from the ground up. They lack the resources to do a credible job of it, and it is not the best use of their time.

Relate the local reform vision to national goals. Fortunately, there is no need to start from scratch. In most fields, scholars and practicing educators have been convened at state and national levels and provided with resources—including the necessary time—to recommend what students should end up knowing and being able to do. Moreover, those efforts usually had to pass many levels of expert and public criticism. By starting with these, but still taking the time to argue their way through them, committees can get a head start on achieving consensus on learning goals. But beginning with carefully worked-out national goals is still not easy. Such goals in science, mathematics, and technology go considerably beyond mere lists of topics, to specify more or less precisely what is to be learned. Using them well requires careful study of their specific meaning.

Suppose, for example, a school district subscribes to the general notion that all students should become science literate by the time they graduate from high school. There is no need for it to try to decide on its own what constitutes science literacy, since *Science for All Americans* sets out a vision of science literacy that has been widely supported by scientists and educators and has helped to shape national and state standards. As participating teachers become familiar with that vision, they will want more grade-by-grade detail, for which they can turn to *Benchmarks for Science*

Literacy, the *National Science Education Standards*, the mathematics standards of the National Council of Teachers of Mathematics, and the technology standards undertaken by the International Technology Education Association—or to state frameworks that have been conscientiously based on these documents. Reference to national and state learning goals has been made easier by the item-by-item comparisons of them made available on *Resources for Science Literacy: Professional Development.* In every case, of course, some adaptation may be needed to meet local conditions.

Keep accurate records. When analyzing the existing curriculum or working on the new design, curriculum committees should be sure that the data collected, conclusions reached, and actions to be taken are recorded where they can be recovered later. The design process calls for testing the effectiveness of key ideas and components along the way. If something is important enough to be put to a test, it is worth the time to analyze the results critically, to inform the design effort. Tests and their results should be recorded in the school district's growing curriculum-reform database.

Proceed in the spirit of science. This means looking upon actions taken to change this or that aspect of the curriculum as experiments and as opportunities to understand the curriculum more deeply. There is no need for every action taken in the name of curriculum design to succeed. If actions and results are monitored carefully, as much may be learned from what does not meet expectations as from what does. New formats or styles can initially be puzzling to both teachers and students. If there is good reason to believe that some innovation will work—for example, if it has been successful in other schools—then some time of adjustment may have to be allowed to see its benefits.

Of course, students should not needlessly be put at risk of learning less or of learning less important things than they would learn otherwise, or of learning whatever they learn less well. But the current curriculum has its own risks; indeed, research on learning shows that students typically learn much less than their teachers believe they do. So the question is not of risk versus no risk but of trade-offs among risks.

The purpose of the approaches suggested here is not to add complexity to reform undertakings. It is, rather, to increase the likelihood that action will be well thought out and well supported. The tasks at hand—achieving significant professional devel-

opment, unburdening the curriculum to make room for the thorough study of the most important concepts and skills, and increasing curriculum coherence—are by their nature difficult. They simply cannot be successfully carried out quickly or by a few people. But in the long run—achieving sustainable curriculum reform is inescapably a long-run matter—more progress will be made by pursuing a systematic approach to curriculum reform.