AWASH IN A SEA OF STANDARDS

by Robert J. Marzano and John S. Kendall

Only those who have no knowledge of education reform over the last decade could utter the words, "American education has no standards." In fact, according to a study conducted at the Mid-continent Research for Education and Learning (McREL) in Aurora, Colorado, one of the growing problems facing American educators is that far too many standards have been identified. In fact, if American educators were to adequately cover all of the knowledge identified in the current set of standards for the core subject areas, it might take as much as 22 years of schooling (literally!) within the current structure. To fully understand how this situation has evolved, it is useful to briefly consider the modern standards movement.

Where Did We Get Our Standards?

Most educators cite the 1983 report *A Nation at Risk* (National Commission on Excellence in Education, 1983) as the starting point for the current emphasis on education standards. Who will soon forget the chilling words often quoted from that report: "The educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a nation and a people. . . . We have, in effect, been committing an act of unthinking, unilateral educational disarmament" (p. 5). The concern about the viability of our education system engendered by *A Nation at Risk* eventually led to the first education summit in September, 1989, during which President Bush and the nation's governors agreed upon six broad goals under the title *The National Education Goals Report: Building a Nation of Learners* (National Education Goals Panel [NEGP], 1991). (The initial set of goals was expanded to eight goals in 1994.) Implic it and explicit in these goal statements was the mandate for American educators to identify rigorous standards regarding what students should know and be able to do in core academic areas. Subject-matter organizations quickly mobilized to establish content standards in their respective areas. Most groups looked to the National Council of Teachers of Mathematics (NCTM) for guidance, given the success of their document, *Curriculum and Evaluation Standards for School Mathematics*. Many of the subject-matter groups were funded by the U.S. Department of Education. To date, standards documents have been published by virtually every national subject-matter organization. Exhibit 1 lists those documents considered the official standards documents in their subject areas.

The assumption that educators need only consult the documents in Exhibit 1 to gain a comprehensive review of the subject-matter knowledge considered essential for students to learn is incorrect. In fact, some subject areas have multiple documents that purportedly address the same content. Unfortunately, these documents often differ significantly in format and content. To illustrate, consider science.

The "official" effort to identify science standards was led by the National Committee on Science Standards and Assessment (NCSSA) and published in 1996 by the National Research Council (NRC) as *National Science Education Standards*. The document contains some 200 pages of standards written at three levels: K–4, 5–8, and 9–12. Twenty-five standards are articulated at the K–4 level, 28 standards at the 5–8 level, and 34 standards at the 9–12 level. A second science standard document was produced by Project 2061 of the American Association for the Advancement of Science (AAAS): *Benchmarks for*

Science Literacy (1993). It contains 60 standards (called "literacy goals") across four levels: K–2, 3–5, 6–8, and 9–12. In addition to these documents, the National Science Teacher's Association has published the *Scope, Sequence, and Coordination of National Science Education Content Standards* (Aldridge & Strassenburg, 1995) as an addendum to *Scope, Sequence, and Coordination of Secondary School Science, Volume 1: The Content Core: A Guide for Curriculum Designers* (Pearsall, 1993). One might ask which document contains the definitive listing of content standards in science, especially since these documents differ significantly in structure, level of generality, and content.

Exhibit 1. Official Standards Documents

Subject Area	Documents
Science	National Research Council. (1996). *National Science Education Standards*. Washington, DC: National Academy Press.
Foreign Language	National Standards in Foreign Language Education Project. (1996). *Standards for Foreign Language Learning: Preparing for the 21st Century*. Lawrence, KS: Allen Press.
Language Arts	National Council of Teachers of English and the International Reading Association. (1996). *Standards for the English Language Arts*. Urbana, IL: Author.
History	National Center for History in the Schools. (1994). *National Standards for History for Grades K-4: Expanding Children's World in Time and Space*. Los Angeles: Author. National Center for History in the Schools. (1994). *National Standards for United States History: Exploring the American Experience*. Los Angeles: Author. National Center for History in the Schools. (1994). *National Standards for World History: Exploring Paths to the Present*. Los Angeles: Author. National Center for History in the Schools. (1996). *National Standards for History: Basic Edition*. Los Angeles: Author.
Arts	Consortium of National Arts Education Associations. (1994). *National Standards for Arts Education: What Every Young American Should Know and Be Able to Do in the Arts*. Reston, VA: Music Educators National Conference.
Civics	Center for Civic Education. (1994). *National Standards for Civics and Government*. Calabasas, CA: Author.
Economics	National Council on Economic Education. (1996). *Voluntary National Content Standards in Economics*. New York: Author.
Geography	Geography Education Standards Project. (1994). *Geography for Life: National Geography Standards*. Washington, DC: National Geographic Research and Exploration.
Physical Education	National Association for Sport and Physical Education. (1995). *Moving Into the Future: National Standards for Physical Education: A Guide to Content and Assessment*. St. Louis: Mosby.
Mathematics	National Council of Teachers of Mathematics. (1989). *Curriculum and Evaluation Standards for School Mathematics*. Reston, VA: Author.
Social Studies	National Council for the Social Studies. (1994). *Expectations of Excellence: Curriculum Standards for Social Studies*. Washington, DC: Author.

The matter of multiple documents is compounded when one considers the state-level effort to identify standards. Perhaps because of the independent spirit of the American populous, 49 of 50 states have developed (or are in the process of developing) their own standards, independent of each other and the national documents. This spirit was articulated by Fred Tempes, associate superintendent in the California Department of Education, who noted: "I guess like most states we'd like to feel that we can set our own standards" (in Olson, 1995). Unfortunately, the state efforts have not stood up well under critical analysis.

In a 1997 study of state standards by the American Federation of Teachers (Gandal, 1997), the following conclusions were reported:

- Most states still need to improve some of their standards in order to provide the basis for a common core of learning.
- States continue to have difficulty setting strong standards in English and social standards.

However, in spite of the weaknesses of some state-level efforts, state departments of education all across the country are moving rapidly ahead to complete and implement their standards.

How Many Standards Do We Have?

Just how many standards have been identified as a result of these many efforts? In an attempt to answer this question, researchers at McREL analyzed 116 documents at the national and state levels. (For a detailed discussion of this study, see "The Process of this Work.")
They found that the content in these documents could be organized into 200 separate standards that address 3,093 more specific topics, commonly referred to as *benchmarks*, at various grade levels. The number of standards and benchmarks in each subject area is reported in Exhibit 2.

Exhibit 2. Summary of Standards and Benchmarks by Subject Area (Classroom Implementation Set)

Subject Area	Number of Standards	Number of Benchmarks	Benchmarks/Standards
Mathematics	9	226	25.11
Science	16	265	16.56
History	31	407	13.13
Historical Understanding	2	48	24.00
K–4 History	4	54	13.50
U.S. History	10	135	13.50
World History	15	170	11.33
Language Arts	8	274	34.25
Geography	18	238	13.22
The Arts	25	269	10.76
Connections	1	13	13.00
Dance	6	62	10.33
Music	7	80	11.43
Theatre	6	72	12.00
Visual Arts	5	42	8.40
Civics	29	427	14.72
Economics	10	159	15.90
Foreign Language	5	84	16.80
Health	10	136	13.60
Physical Education	5	105	21.00
Technology	5	94	18.80
Behavioral Studies	4	100	25.00
Thinking & Reasoning	6	121	20.17
Work Skills	19	188	9.89
Working with Others	5	51	10.20
Self-Regulation	6	59	9.83
Life Work	8	78	9.75
Total	**200**	**3,093**	**15.47**

As Exhibit 2 shows, the 200 standards are not distributed evenly across the various subject areas. In addition, standards for different context areas vary in the number of benchmarks they encompass. Language arts has the highest number of benchmarks per standard (34.25); lifelong learning has the fewest number of benchmarks per standard (9.89). For this reason, the number of benchmarks (as opposed to the number of standards) is the better measure of the amount of content in a given subject area. Civics and history have the most benchmarks (427 and 407, respectively) and foreign language has the least (84).

What is the feasibility of addressing 200 standards and 3,093 benchmarks within the present education system? Certainly, one factor that must be considered if one wishes to adequately cover the content identified in the various national and state reports is time. Stated differently, those who seek to implement the standards as identified by the many standards documents must ascertain how much time is available in the current system and how much time it would take to cover the content that has been identified in the standards.

How Much Time Is Available?

A number of studies have been conducted on how time is spent in American education, revealing some strong tendencies. One of the most stable aspects of time usage is the number of days in the school year — probably because of state law mandates. The common assumption is that all schools operate on a 180-day calendar. Studies have found some significant variations, however. For example, in a 1983 study, Karweit found that days scheduled for school across the United States ranged from 175 to 184 days, for an average of 179. A more recent study by the National Education Commission on Time and Learning (1994) entitled *Prisoners of Time* reported that, as of 1994, 11 states permitted school terms of 175 days or less, and only one state required more than 180 days.

The time actually spent in a school, although fairly stable, exhibits more variation than days in school. In an early study, Reuter (1963) found that the length of the school day varied from four to six hours. A large-scale study known as the Beginning Teacher Evaluation Study, or BTES, found that second graders were in school 5.5 hours, whereas fifth graders were in school for six hours (Fisher et al., 1978). Harnischfeger and Wiley (1978) found that the length of the school day within the same district could vary by as much as 45 minutes. The 1994 study by the National Education Commission on Time reported that, on average, schools offer a six-period day with about 5.6 hours of classroom time a day (1994).

A critical question when considering the feasibility of covering the 200 standards and 3,093 benchmarks identified in the McREL study is, How much time is actually available for instruction? If we accept the estimate of 5.6 hours of classroom time per day and assume that the school year is 180 days in length, then we can calculate that 1,008 hours (5.6 x 180) are available in a school year, and that 13,104 hours (13 x 1,008) are available in 13 years of schooling — grades K–12. In all, then, teachers have a maximum of 13,104 hours to work with students to teach and reinforce the knowledge identified in the standards documents. One might assume that 3,093 benchmarks can easily be covered in 13,104 hours. However, not all of the time that is available for instruction is used for instruction.

Those who study the use of school time commonly think of the school day as divided into two categories of time: instructional time and noninstructional time. Noninstructional time includes such activities as lunch, recess, passing between classes, and the like. Estimates of how much time is actually devoted to instruction vary widely. Conant (1973) reported that only 31 percent of the school day is devoted to instruction. Park (1976) reported that between 21 percent and 69 percent of the school day is used for instruction. Marzano and Riley (1984) found that 66 percent of the school day is used for instruction. Finally, the National Education Commission on Time and Learning (1994) reported that 41 percent of the school day is devoted to core academic work in U.S. schools. (We should note that the National Education Commission on Time defines core academic subjects as English and language arts, mathematics, science, civics, geography, the arts, and foreign language.) If we take the estimate of 69 percent as the upper boundary of the amount of time that can be allocated to instruction within the current system, then we can conclude that of the 13,104 hours of school involved in K–12 education, 9,042 hours (.69 x 13,104) are available for instruction in the best of circumstances, or about 695.6 hours per year. In the most optimistic scenario, then, educators have a total of 9,042 hours within which to teach and reinforce the 200 standards and 3,093 benchmarks. The next critical question is, How much time would it take to cover the standards and benchmarks?

Covering the Standards and Benchmarks

McREL researchers have conservatively estimated that, on the average, it would take about five hours to adequately cover the content in a single benchmark. (For a detailed discussion of McREL's study of the time needed to address the content in the benchmarks, see Marzano, Kendall, & Cicchinelli, 1998). Simple arithmetic tells us, then, that it would take 15,465 hours to cover all 3,093 benchmarks. Quite obviously, 15,465 hours of time *necessary* for instruction do not fit into the 9,042 hours *available* for instruction. Stated differently, educators would have to increase the amount of time available for instruction by about 71 percent. This means that within the current structure, schooling would have to be extended to kindergarten through grade 21— twenty-two years of schooling as opposed to 13. What, then, are educators to do to meet the requirements of the various standards documents? It appears that there are two primary options: (1) increase the amount of instructional time or (2) decrease the number of standards that must be addressed.

Increase Instructional Time

As we have seen, simple arithmetic tells us that to cover all of the standards and benchmarks, schools would have to significantly increase the amount of time available for instruction. It appears that from the start of the standards movement, the subject-matter specialists assumed more time for instruction would be needed. To illustrate, when the National Education Commission on Time and Learning (1994) held a hearing to discuss the needed changes in instructional time, the following comments by subject-matter specialists were recorded:

- *Arts.* "I am here to pound the table for 15 percent of school time devoted to arts instruction," declared Paul Lehman of the Consortium of National Arts Education Association.

- *English.* "These standards will require a huge amount of time, for both students and teachers," Miles Myers of the National Council of Teachers of English told the Commission.
- *Geography.* "Implementing our standards will require more time. Geography is hardly taught at all in American schools today," was the conclusion of Anthony DeSouza of the National Geographic Society.
- *Mathematics.* "The standards I am describing are not the standards I received as a student or that I taught as a teacher," said James Gates of the National Council of Teachers of Mathematics.
- *Science.* "There is a consensus view that new standards will require more time," said David Florio of the National Academy of Sciences. (p. 21)

One of the major recommendations of the National Commission on Time and Learning is that schools allocate at least 990 hours per year of instructional time to core academic subjects. This would represent an increase of 42 percent from the 695.6 hours per year currently dedicated to instruction.

One technique for acquiring this additional instructional time would be to lengthen the school day. An example of this option, offered by the National Education on Time and Learning, is Thomas Jefferson High School for Science and Technology in Alexandria, Virginia, which has lengthened the school day by one period. Another option is to lengthen the school year. The National Commission describes Beacon Day elementary and high schools in Oakland, California, as an illustration of this option:

> At Beacon Day School (elementary) and Beacon High School in Oakland, California, the school year never really ends. At these private schools, the school day is over ten hours long. There is no set vacation period; parents plan vacations to fit family needs; students work in teams by achievement level, not age; letter grades are unknown in the elementary school; and students spend six to eight hours a week on art, music, dance, drama, or martial arts. "There's no summer vacation, so there's extra time to learn," 10-year-old Colin Gage told the commission. (p. 16)

Decrease the Number of Standards

Another option when addressing the issue of too many standards is to decrease the number of standards that students are expected to master. This option is strongly suggested by the Third International Mathematics and Science Study, or TIMSS. Fundamentally, the study found that U.S. schools try to cover too much content when compared to other countries: "The U. S. mathematics and science textbooks include far more topics than was typical internationally at all three grade levels analyzed" (Schmidt, McKnight, & Raizen, 1996, p. 6).

But how is a school district to approach the elimination of content? One option is to poll educators and community members within a district. Such a move truly operationalizes the historical role of the local community to set policy and establish curriculum. Specifically, education historian Diane Ravitch (1983) notes that local control has traditionally been a centerpiece of American education. Historian John

Pulliam (1987) echoes Ravitch's comments, noting that strong involvement of the local community in policy and curricular issues is imperative to effective education. Quite obviously, allowing teachers and community members to identify those standards that are most essential— and, by default, those standards that will not be addressed— is probably the ultimate manifestation of local control. We recommend the following process.

First, have teachers estimate the amount of time it would take to adequately cover the knowledge embedded in each of the 200 standards, or use McREL's estimates of the amount of time necessary. It is certainly much quicker to use the McREL estimates; however, if local districts poll their own teachers, the estimates surely will be more accurate relative to their particular situation. To illustrate, consider the following mathematics standard from in the McREL database: "Understands and applies basic and advanced properties of functions and algebra." McREL researchers have estimated that about 160 hours of instruction would be required to adequately address the content within this standard over a K–12 span of time. Thus, if a district identified this standard as one that would be addressed K–12, it could conclude that the teacher would have about 8,882 remaining hours (i.e., 9,042-160) in which to address other standards.

Next, develop a questionnaire that asks respondents to make a judgment as to whether students in the local district should be required to learn the knowledge associated with the standard prior to high school graduation. A questionnaire developed locally certainly will include information that is geared specifically to the culture of the local school district; however, questionnaire development is a time-consuming venture. McREL has developed a set of questionnaires that can be used by local schools and districts if they do not wish to develop their own. (In an effort to provide a prototype of how schools and districts might approach local community members relative to the issue of which standards should be addressed in the curriculum, McREL procured the services of the Gallup Organization to survey the American public regarding the relative importance of the standards in the McREL database. See What Americans Believe Students Should Know: A Survey of U.S. Adults, a report of the results of the Gallup survey. Some of the questions that apply to the mathematics standards in the McREL database are reprinted in Exhibit 3.

The questions for all 200 standards should then be given to a representative sample of local community members and educators. Based on responses, a school or district can rank order standards in terms of the cumulative perception of their importance. To illustrate, if the scale in Exhibit 3 is translated to a 4 to 0 numeric scale (4 = definitely, 0 = definitely not), a "local value" index can be computed for each standard by calculating the average response for each standard.

Exhibit 3. Sample Mathematics Standards Questions

For each proposed standard please indicate with an "X" in the box if you think it is definitely, probably, probably not, or definitely not a level of knowledge that students today should have by the time they graduate from high school. Mark "don't know" only if you really are in doubt whether or not it is an appropriate level of attainment for high school graduates.

		Definitely	Probably	Probably Not	Definitely Not	Don't Know
1.	Ability to effectively use a variety of approaches when solving mathematical problems, including creating models and using logic and mathematical arguments.	☐	☐	☐	☐	☐
2.	Ability to work with relatively advanced number systems (such as the real number system and systems other than those in base-ten), including understanding roots, exponents, scientific notation and characteristics of and relationships between various number representations.	☐	☐	☐	☐	☐
3.	Ability to work with a variety of procedures when computing numbers, including arithmetic operations on real numbers, adding and subtracting algebraic expressions, counting procedures, and understanding properties of operations.	☐	☐	☐	☐	☐
4.	Ability to use various strategies to estimate quantities and measurements, to check reasonableness of computational results, and to find sources of error.	☐	☐	☐	☐	☐
5.	Ability to apply the principles of measurement (such as use of appropriate tools, units, and formulas), solve problems involving dimensions (for example, the perimeter, area, and volume of objects and figures), and solve time, rate and distance problems.	☐	☐	☐	☐	☐

Next, rank order the standards using the local value index and keep a running total of the amount of time it would take to cover the rank-ordered standards. When the running total exceeds the total amount of time available for instruction (i.e., 9,042 hours), the district can assume that there is no time available in

the current structure of schooling to accommodate the remaining standards. Unfortunately, a district might find that it reaches the cut-point of 9,042 hours with a relatively small set of standards. To illustrate, we have found that the time it takes to cover some of the 200 standards in the McREL database exceeds 150 hours per standard, as is the case with the previously mentioned standard about functions and algebra. Assume that, on average, 180 hours per standard are necessary to adequately cover each of the first 40 standards a district has identified as essential. These 40 standards would require 7,200 hours of instruction, or approximately 80 percent of the available instructional time, obviously leaving time to cover only a few more standards. If a district wished to increase the number of standards it addressed without increasing the amount of instructional time, it would have few options but to delete some of the specific knowledge (i.e., benchmarks) embedded in each standard.

It's Time for Action

Some educators might take issue with the process recommended in this article on one or both of the following accounts: (1) the quantitative nature of our approach, and (2) the extent to which this approach involves local community members in decisions about content standards. Relative to the first issue, it is certainly true that we are heavily emphasizing the quantification of inherently complex variables — namely, the time available for instruction and the time necessary to adequately address content. In addition, it is an oversimplification of the issue to assume that if the amount of time available for instruction fits the amount of time necessary to cover content, then learning surely will result. We realize that there is far more to effective schooling than addressing the issues of content and time as described in this article. However, we believe that unless these very fundamental issues are addressed, virtually all other attempts to improve student achievement will have little chance of success.

Relative to the second issue — noneducator involvement in decisions about content — we believe that it is probably necessary to look outside of the field of professional education to resolve the problems generated by the modern standards movement. Subject-matter experts had an opportunity to identify a reasonable list of standards and did not perform their task well when considered as a group. Indeed, it was the work of education specialists that resulted in the 200 standards that would take 22 years to cover. Even while the standards documents were being developed, some saw the problems that were looming on the horizon. For example, education policy analyst Chester Finn, Jr., noted that "the professional associations, without exception, lacked discipline. They all demonstrated gluttonous and imperialistic tendencies" (in Diegmueller, 1995, p. 6). At the time of Finn's statement, the standards documents, taken together, weighed about 14 pounds, stood six inches tall, and contained 2,000 pages. Since then, significantly more documents, more pounds, and more inches have been added to the total mass of standards. Perhaps it is time for local educators and community members to take the lead in identifying and implementing essential knowledge organized as standards.

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