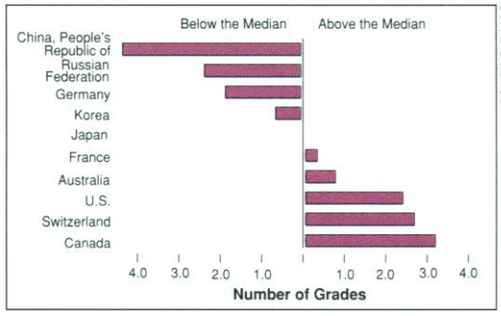
SCIENCE EDUCATION

Global Review Faults U.S. Curricula

It's a student tradition to blame a bad grade in science or math on a teacher who didn't spend enough time explaining the material. Although most parents don't buy that excuse, a new international study suggests that U.S. elementary- and secondary-school students may have a point. Being taught from a syllabus that's "a mile wide and an inch deep," says one report, could be one reason why U.S. students do relatively poorly on international achievement tests.

The Third International Mathematics and Science Study (TIMSS), which this week released its first set of four reports, is a 5-year international project to compare curricula and achievement in 50 countries. It grew out of SIMS, the Second International Mathematics Study, which compared student achievement in math. The new reports examine the international teaching of science as well as mathematics, offer in-depth case studies from six countries, and compare the U.S. results to the rest of the world. The first student achievement results and reports on curricula in many other countries will be released in November.

The first report reveals marked differences in the way math and science are taught around the world, says William Schmidt, a statistician at Michigan State University and U.S. coordinator for the study. The U.S. curriculum, described in a report entitled "A Splintered Vision: An Investigation of U.S. Science and Mathematics Education," attempts to cover many more topics in a single year than the international average. Teachers respond by attempting to teach a topic a week, says education professor Marcia Linn of the University of California, Berkeley, an adviser to the TIMSS study, but that approach "denies students the opportunity to find out what it is like to have a deep understanding of any subject." That approach may be reflected in the lower scores of U.S. students on standardized math and science tests, Schmidt says.



More is less? Topics such as geometry, fractions, and functions linger for years in the U.S. math curriculum, leaving too little time for in-depth coverage.

In recent years, standards issued by the National Council of Teachers of Mathematics, the American Association for the Advancement of Science (publisher of *Science*), and the National Research Council have tried to address the problem, which includes broad, unfocused textbooks. While the standards are on the right track, Schmidt says, they end up as part of a "babble of voices," sending conflicting messages about which topics to cover. Local school authorities, in attempting to please everyone, add to existing teaching guides without dropping anything, he notes.

The decentralized U.S. educational system compounds the problem, say the authors. Although the system has many advantages, they cite the need to win consensus at the local level as a further source of curriculum overload. Linn agrees. "It's a lot easier for a committee to add topics than to drop them from the curriculum," she says.

Schmidt says the report calls for making tough choices on what to omit. "We leave the debate over how to do that to the public and to Congress," he says. "But there are no magic bullets."

–Gretchen Vogel

ELECTION '96

Clinton Pushes Internet Initiative

In his first campaign speech focused on science and technology, President Bill Clinton last week pledged a sharp increase in funding for a fledgling high-speed computer network that will allow researchers to bypass the overcrowded Internet. "Let's give America Internet II," Clinton told a cheering crowd in Knoxville, Tennessee, on 10 October. "This will enable universities to communicate with each other 100 to 1000 times faster than they can do today."

While Clinton provided the promises, his running mate, Vice President Al Gore, provided the partisan politics. Gore, standing alongside Clinton in his home state, attacked Republican R&D policies by saying they amounted to "unilateral disarmament" in the face of growing competition from abroad. He also criticized Republican presidential nominee Bob Dole for proposing massive cuts in Department of Energy spending that Gore said would eliminate much of the budget for nearby Oak Ridge National Laboratory. "Don't give us the mumbo jumbo that this will magically work out somehow," Gore said. "Closing the doors of Oak Ridge National Laboratory would be a sad step backward for the United States of America—President Clinton and I will not let it happen."

A Dole aide dismissed those charges, saying that the Republican nominee has emphasized his commitment to basic research. But he added that Dole would not criticize Clinton's proposal to improve the Internet. "Who can argue with it? It sounds like a good idea," the aide said. "I don't think Dole would object to it."

Clinton's announcement would boost a National Science Foundation project called the very high speed Backbone Network Service (vBNS), a system that holds promise as a next-generation commercial network. "We're very excited—this will give us a chance to develop this at a much more rapid rate," says George Strawn, head of NSF's networking division. NSF is now spending about $10 million annually on the project, and Clinton promised to request $100 million for it in his 1998 budget proposal to be submitted in February. The money would go to NSF and other agencies—but at the expense of existing technology efforts at the Defense Department and several civilian agencies.

The new backbone, which today connects 13 universities, is being developed by MCI Corp. under a cooperative agreement with the foundation. NSF officials say they expect to have about 30 universities connected by the end of the year and a total of 100 within 3 years. Unlike the current Internet, which is subject to information traffic jams, vBNS would boost capacity from 45 megabits per second on a typical Internet backbone to about 622 megabits per second. "This kind of service is not [currently] for sale," says Mark Luker, director of the foundation's NSFNet program.

In his Knoxville speech, the president also praised a host of federal research programs, from the Commerce Department's Advanced Technology Program to AIDS research. He said the Human Genome Project, in which Oak Ridge is a participant, is "one of my favorites." Clinton also reiterated his support for R&D, despite a long-term budget plan that would reduce funding for civilian science-related agencies. "Cutting back on research at the dawn of the new century," he said, "would be like cutting our defense budget at the height of the Cold War."

–Andrew Lawler