

**A Nation at Risk:
The Imperative for Educational Reform
National Commission on Excellence in Education
1983**

Why?

In the late 1970s and early 1980s, there was “widespread public perception that something [was] seriously remiss in our educational system” (p. 1). There was a general concern that the U.S. educational system was falling short of the implicit goal of keeping American students better educated than students in the rest of the world. Longtime U.S. industries were becoming challenged by high quality products produced less expensively overseas; many believed this was due to American students falling behind their foreign counterparts in learning the skills necessary to keep the American economy afloat. Consequently, the federal government initiated steps to examine the quality of the education students in U.S. schools were receiving.

What?

On August 26, 1981, then Secretary of Education T. H. Bell created the National Commission on Excellence in Education to investigate the quality of education in the United States and to make a report within 18 months of the first meeting. Research was commissioned and public hearings were held to gather information for the report.

Who?

Members of the commission:

David P. Gardner, Chair	University of Utah
Yvonne W. Larsen, Vice-Chair	San Diego City School Board
William O. Baker	Bell Telephone Laboratories
Anne Campbell	Former Commissioner of Education, Nebraska
Emeral A. Crosby	Northern High School, Detroit, MI
Norman C. Francis	Xavier University of Louisiana
Charles A. Foster, Jr.	Foundation for Teaching Economics
A. Bartlett Giamatti	Yale University
Shirley Gordon	Highline Community College, Midway, WA
Gerald Holton	Harvard University
Robert V. Haderlein	National School Boards Association
Annette Y. Kirk	Kirk Associates
Margaret S. Marston	Virginia State Board of Education
Albert H. Quie	Former Governor, Minnesota
Francisco D. Sanchez, Jr.	Superintendent of Schools, Albuquerque, NM

Glenn T. Seaborg
Jay Sommer
Richard Wallace

University of California, Berkeley
New Rochelle High School, New Rochelle, NY
Lutheran High School East, Cleveland Heights, OH

What was produced?

A report entitled *A Nation at Risk* was published based on information distilled from commissioned research papers and public hearings. The report contains summaries of the papers and hearings; a list of findings in content, expectations, time, and teaching; a set of recommendations; and aspects of implementation related to content, standards, and expectations for time, teaching, leadership, and fiscal support.

The commission authorized the research behind the 41 documents that were summarized in the full report. Many of the documents were general in nature and covered a range of topics in education. Of special interest to mathematics educators were two reports:

“A Comparative Review of Curriculum: Mathematics and International Studies in the Secondary Schools of Five Countries,” by Eckstein, Shafer, and Travers. This report compared the curriculum and teaching methods of the United States, West Germany, Japan, Canada, and the USSR.

“A Study of High School Transcripts, 1964–1981,” by Adelman. This report investigated the patterns apparent in the transcripts of high school students over this 27-year period and found that less time was being spent in classrooms to earn the same number of academic credits.

The Commission also held six public hearings across the United States during 1982. The first, on March 11, covered science, mathematics, and technology education with five invited speakers. In addition, 17 members of the invited audience and 11 other members of the general audience also spoke. “The testimony noted that science and technology have increasingly become the engine for change and progress . . .” The U.S. had fallen behind Japan, West Germany, Eastern Europe, and Russia (USSR) in the production of engineers and scientists.

Specific problems in U.S. science and mathematics education included the following:

- Critical shortages of physics, mathematics, and chemistry teachers exist at the secondary level.
- The average salary of a beginning math teacher with a bachelor’s degree is now only 60% of the beginning salary offered by private industry to bachelor degree candidates in mathematics.
- Substantial numbers of unqualified persons are teaching science and mathematics in secondary school.
- Even certified science and mathematics teachers at the secondary level are in need of in-service training.

- New sequences of science and math courses and materials are needed which match stages of intellectual development of children.
- Elementary and secondary schools need access to microcomputers, low-cost supplies, and other resources. (p. 54)

The other hearings covered:

Language and Literacy: Skills for Academic Learning
Teaching and Teacher Education
College Admissions and the Transition to Postsecondary Education
Education for a Productive Role in a Productive Society
Education for the Gifted and Talented

Findings

Findings were divided among content, expectations, time, and teaching.

Regarding content, it was found that “curricula have been homogenized, diluted, and diffused to the point that they no longer have a central purpose.” Students have stopped taking college preparatory courses in favor of “general track” courses. “We offer intermediate algebra (algebra 2), but only 31 percent of our recent high school graduates complete it. . . . Calculus is available in schools enrolling about 60 percent of all students, but only 6 percent of all students complete it” (pp. 61–62).

Regarding expectations, it was found that time spent on homework had declined as well as average student achievement despite the fact that grades were improving. It was also found that in many other industrialized countries, “courses in mathematics (other than arithmetic and general mathematics) . . . start in grade 6 and are required of *all* students. . . . The time spent on these subjects, based on class hours, is about three times that spent by even the most science oriented U.S. students. . . . Thirty-five states require only 1 year of mathematics” (p. 63).

Regarding time, the evidence presented to the commission pointed out three disturbing trends: “(1) compared to other nations, American children spend much less time on schoolwork; (2) time spent in the classroom and on homework is often used ineffectively; and (3) schools are not doing enough to help students develop either the study skills required to use time well or the willingness to spend more time on school work.” It was also found that “in many schools, the time spent learning to cook and drive counts as much toward a high school diploma as the time spent studying mathematics” (pp. 64–65).

Regarding teaching, “the commission found that not enough of the academically able students are being attracted to teaching; that teacher preparation programs need substantial improvement; that the professional working life of teachers is on the whole unacceptable; and that a serious shortage of teachers exists in key fields” (pp. 65–66). Too many teachers were coming from the bottom quarter of high school and college

graduating classes. The shortage of mathematics and science teachers was particularly severe with shortages reported in 43 of 45 states surveyed in 1981. Half of the new mathematics teachers were unqualified and only a third of high schools offered physics taught by someone who was qualified.

Recommendations

Regarding content:

We recommend that State and local high school graduation requirements be strengthened and that, *at a minimum, all* students seeking a diploma be required to lay the foundations in the Five New Basics by taking the following curriculum during their 4 years of high school: (a) 4 years of English; (b) 3 years of mathematics; (c) 3 years of science; (d) 3 years of social studies and (e) one-half year of computer science. For the college-bound, 2 years of foreign language in high school are strongly recommended in addition to those taken earlier. (p. 70)

Specifically relating to mathematics:

The teaching of *mathematics* in high school should equip graduates to: (a) understand geometric and algebraic concepts; (b) understand elementary probability and statistics; (c) apply mathematics in everyday situations; and (d) estimate, approximate, measure and test the accuracy of their calculations. In addition to the traditional sequence of studies available for college-bound students, new, equally demanding mathematics curricula need to be developed for those who do not plan to continue their formal education immediately. (p. 71)

Additionally, “the curriculum in the crucial eight grades leading to the high school curriculum should be specifically designed to provide a sound base for study . . . [and] foster an enthusiasm for learning” (p. 72). Also the Commission encouraged “the efforts by . . . the National Council of Teachers of Mathematics, to revise, update, improve, and make available new and more diverse curricular materials” (p. 73).

Regarding standards and expectations:

We recommend that schools, colleges, and universities adopt more rigorous and measurable standards, and higher expectations, for academic performance and student conduct, and that 4-year colleges and universities raise their requirements for admission. This will help students do their best educationally with challenging materials in an environment that supports learning and authentic accomplishment. (p. 73)

Regarding time:

The Commission recommended that more time be devoted to the learning of the Five New Basics. They felt this could be accomplished by any number of methods and left the method for accomplishing that goal up to individual schools and districts; one suggestion

was a 7-hour school day for 200–220 days per year. One notable further recommendation was that high school students should be assigned far more homework.

Regarding teaching:

The Commission suggested that school districts move to an 11-month contract to give teachers adequate time for preparation for each new year and to allow for more inservice time. This would also include a requisite increase in teacher salaries. They also suggested that teachers in mathematics and science could be recruited from the ranks of non-educators with degrees in science and math, especially those who had been in the workplace already and knew what students' future needs would be.

The Commission also made recommendations that teachers be held responsible by their communities for providing leadership in attaining these reforms. Subsequently, communities were to be held responsible for providing the fiscal support necessary to see these reforms through as well.