# An Easy Way Out

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Why the United States ranks near the bottom in international comparisons of science and mathematics achievement was a question Iris C. Rotberg, then a program director of National .Science Foundation (NSF), set out to answer in her paper ***"I Never Promised You First Place"*** (1990) [1]. She seemed to subscribe to the view that the U.S. educated more students, thus, bringing down the U.S. scores. This rather commonly accepted view, however, was dismissed by the U.S. Department of Education as follows:

> "Critics charge that international assessment results are skewed because the United States educates a larger portion of students, which lowers the American rankings. But the indicators cited here compare America's top students with top students overseas, and our youngsters still rank at or near the bottom in all subjects tested." (1993) [2, p.10].

And, Rotberg realized that "The question is likely to receive even more attention in the context of *the* ***fourth national goat.*** *"* The goal she referred to was set in **1989** which says:

> **"By the year 2000, U .S. students will be first in the world in mathematics and science achievement"** [3, "The Future Is Now," 72, also http://nces.ed. Gov/timss/97198-html].

One wonders whether **President Bush and 50 governors** meeting in Charlottesville, Virginia in 1989 would have declared that Goal, ***if*** they had reviewed the nation's education history -- ***where we have been;*** or reviewed the circumstances which led to the founding of the NSF. **In 1990**, I got involved in our math education *for the first time*, and I was stunned by the magnitude of the problems. It was so incredible that I thought I was on another planet; it could not, I reasoned, be in the U.S.--*the world leader in science and technology!* Deeply puzzled by the problems, I, turned to the history of the nation's education for an answer. I was stunned, again, to discover that many of the problems are actually over a century old. They have been part of the educational landscape for a long time! Since 1990, I have talked with hundreds of students (2nd grade to college) individually and in small groups about math education, and I believe our education problems *lie more* with the educational leaders *than with* the students. ***Instead of exploring the possible causes and taking the time to correct them, they tend to choose "an easy way out." The following examples give us a glimpse of how our educators solve problems.***

## Example I. The Problem of Math Failure

In 1911, the committee, which was appointed to prepare a report for the International Commission on the Teaching of Mathematics (1912), found that "from 40 to 50 percent of all students pursuing mathematical work in secondary schools do not complete their work satisfactorily" [4, p.96]. Then, the committee criticized rather harshly the solution considered by an Association of Mathematical Teachers:

> "(This) general dissatisfaction referred to above has induced some alarmists ***to put mathematics on the list of elective subjects.*** How characteristic a blunder! As if mathematics, the foundation per excellence of our scientific ear, could by a mere stroke of the pen **become an optional study**, *merely because many teachers do not know how to make it palatable, or because our ill-arranged curricula cannot accomplish wonders, or because so many of our boys and girls have been allowed to follow the line of least resistance* " [4, p.97].

## Example 2. The Problem of The Three R's

The following is an excerpt from the speech A. H. Lauchner, principal of a Junior High School in Champaign, IL, gave to the National Association of Secondary-School Principals in 1951. The speech triggered a controversy in the 50s and you see why.

> "Through the years **we've built a sort of halo around *reading, writing,* and *arithmetic*.** We've said they were for everybody... rich and poor, brilliant and not-so-mentally-endowed, ones who liked them and those who failed to go for them. Teacher has said that these were something' everyone should learn.' The principal has remarked, 'All educated people know how to write, spell, and read.' When some child declared a dislike for **a sacred subject**, he was warned that, if he failed to master it, he would grow up to be a so-and-so."
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> "The Three R's for All Children, and All Children for the Three R's! That was it."
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> "**We've made some progress in getting rid of that slogan.** But every now and then some mother with a Phi Beta Kappa award or some employer who has hired a girl who can't spell stirs up a fuss about the schools... **and ground is lost**."
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> "**Math has not been the all-important subject they told me it would be.** The facts I learned in history have for the most part passed by the boards. The algebra I didn't learn hasn't been needed."
>
> "Not everyone needs all this. Especially is it true since we are being called upon to keep all the children of all the people in school until they are sixteen years of age."
>
> "Furthermore, **not all children can get these subjects.**"
>
> "When we come to the realization that **not every child has to read, figure, write and spell….** that many of them **either cannot or will not master *these chores***… then we shall be on the road to improving the junior high curriculum."
>
> "Between this day and that **a lot of selling** must take place. But it's coming. We shall someday accept the thought that it is just as **illogical to assume that everybody must be able to read** as it is that each one must be able to perform on a violin…"
>
> **"If and when we are able to convince a few folks that mastery of reading, writing, and arithmetic is not the one road leading to happy, successful living, the next step is to cut down the amount of time and attention devoted to these areas in general junior high-school courses"** [5, p.299] (Dots are original. Bold, underlined added.)

## Example 3: The Problem of Division

In 1936, Gertrude Hildreth of Teachers College, Columbia University, pointed out that, **"The fact that long division and fractions are *seldom mastered by most children at the time of leaving school (8th grade)*** should be proof enough that the learning was beyond the child's comprehension" [6, p.454]. Here are two attempts to solve that **chronic division problem.**

In the 30s, The Committee of Seven [7] tried to solve the problem **by Postponing arithmetic instruction until Grade 3**. It is known as **"stepped-up curriculum,"** in which, for example, children learn the addition and subtraction facts at Grade 3 instead of Grade 1; and the multiplication and division facts at Grade 4 or 5 or 6 instead of Grade 2 or 3, etc. **In 1945**, *after the US. Army had loudly complained of the arithmetic incompetence among inductees during the WW* II, the Commission on Post-War Plans realized that it is time to put the house in order. They rejected, among others things, this generally accepted curriculum:

> "(a) ...Postponement of arithmetical topics can by itself be only *a questionable device* for removing learning difficulties. (b) (By postponing systematic instruction in arithmetic), ***the earlier years (Grades* 1-3) *are wasted.*** Children are deprived of ideas and skills which could give them surer control over their environment and their activities. .." [8, pp.202f.]

History shows that "*In general there has been no royal road to improved learning in the past, only slow, careful and hard won progress."* But, in **1970s**, with "***the advent of the calculator,***" **our educational leaders saw *a royal road to U.S. math education*!** A savior had arrived! Finally, they could say, "The division/computational problem has passed away, behold, the new day for the U.S. math education has come!" -- a general optimism among educators was reflected in these words:

> "The calculator has been lauded as a means through which adults as well as children can **by-pass the *drudgery* of math…** One of the more obvious assets of the calculator is **the speed by which *awkward* and *tedious* computations** are done and this time saved could be spend on more complicated word problems or on extended study of arithmetic theory" [9, pp.18f.].

So, **in 1989**, with "calculators" as its center-piece, **the National Council of the Teachers of Mathematics** (NCTM) launched ***a nation-wide math education reform*** which prescribes "calculators" to be used in classroom instructions K-12 nationwide. With a sense of ***liberation from the bondage of the standard algorithm, pencil-and-paper computation,*** **Thomas Romberg,** the architect of the NCTM math reform exclaimed **in 1990:**

> *"What exactly is **the value of long division, or any of the rudimentary arithmetic skills, in the age of computer and pocket calculator? 'What is it we expect students to learn?'*** asks Thomas Romberg, a professor of curriculum and instruction at the University of Wisconsin at Madison. *'If we're preparing them to be Victorian clerks with quill pens and green eyeshades, we're not doing our job. There isn't anyone out there anymore who makes his living doing long division' "* [3, p.16] (Italics, bold added)

But, has calculators wrought 'WONDER for our math education? Read what our college students said about the "calculator-miracle-drug" prescribed by the NCTM Standards [10]. Again, The Third International Math Achievement {1996) has found U.S. students ranked near the bottom. Should we blame our students? ***"(Secretary) Riley Urged Students to Take Tougher Courses..."*** **[11] and *our educational leaders chose the "Easier Courses!?"***

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[1] "I Never Promised You First Place," Iris C. Rotberg, Phi Delta Kappan, December 1990, 296-303.
[2] National Excellence: A Case for Developing America's Talent, U.S. Dept. of Education, D.C., 1993.
[3] Newsweek, 1990 September Special Issue.
[4] Mathematics in the Public and Private Secondary Schools of the United States, International Commission on the Teaching ofMathematics, United States Bureau of Education, D.C., Bulletin 1911, No.16.
[5] "How Can the Junior High School Curriculum Be Improved?" A. H. Lauchner, Bulletin of the National Association of Secondary-School Principals, 35, (March 1951), 299-301.
[6] Learning The Three R's, A Modem Interpretation, Gertrude Hildreth, Ed. Publishers, Inc. 936. .
[7] "Mental Age and the Arithmetic Curriculum," Carleton Washbume, Journal of Ed. Research, 23: 210-231, 1931.
[8] "The Second Report of The Commission on Post-War Plans, The Improvement of Mathematics in Grades 1 to 14," Edited by William David Reeve, Mathematics Teachers, 38: 195-221, May 1945.
[9] "My Child The Math Whiz??? Or Buy Your Child A Calculator," Charles F. Kieil and B. Ann Harper… (Three question marks original.)
[10] "Part I: Learning 'The Effects ofCalculators' From Students Experiences," 1998 Survey of College Students About Their High School Math Education. And "A 'Check Up' on The NCTM Calculator Policy Ten Years Later," Ruth C. Sun, 1999.
[11] http:/ /nces.ed.gov/presslease/timss298.htm1

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