

Jo Boaler's Fame, Stanford's Shame; Students' Gloom, America's Doom

Rooted in Profound Anti-intellectualism, Elitism, Racial and Gender Prejudice, the 2021 California Math Framework Threatens to Undermine Math Learning for All Students and Leave Disadvantaged Learners Permanently Behind.

June 16, 2021

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2021 Mathematics Framework Revision Timeline

Events	Date
Instructional Quality Commission (IQC) Approves Schedule of Significant Events (Timeline) and Curriculum Framework and Evaluation Criteria Committee (CFCC) Application	March 28, 2019
IQC Approves Draft <i>Mathematics Framework</i> for Initial 60-Day Public Review Period	January 20–21, 2021
Required 60-Day Public Review of Draft <i>Mathematics Framework</i> Prior to IQC Recommendation (pursuant to 5 CCR, Section 9515[a][3])	February–April 2021
IQC/Subject Matter Committee Analyzes Field Review Results and Revises Draft <i>Mathematics Framework</i>	May 19–20, 2021
IQC Action on Draft <i>Mathematics Framework</i>	May 19–20, 2021
Required 60-day Public Review of Document After IQC Recommendation (pursuant to 5 CCR, Section 9515[c])	June–July 2021
Placeholder: IQC/SMC Meeting to Discuss Public Comment if requested by SBE	August 17, 2021
SBE Action on <i>Mathematics Framework</i>	November 3–4, 2021

This presentation is to demonstrate that the 2021 Draft California Mathematics Framework (CMF) is a manifesto of **Reform Math/Fuzzy Math. Firmly rooted in profound anti-intellectualism, elitism, racial and gender prejudice, reform math stultifies all students and disproportionately hurts the disadvantaged learners, worsening the academic achievement gaps and threatening the future of America.**

Keynotes of the CMF 2021:

- A fundamental aim of this framework is to respond issues of inequity in math learning. The belief that “I treat everyone the same” is insufficient. **A “color-blind” approach allows systemic inequities to continue.**
- **Math pathways must open mathematics to all students, eliminating option-limiting tracking and ability-grouping.** This framework recommends that all students take the same, rich math courses in K–8, and take Algebra 1 or equivalent no earlier than in 9th grade. It is of paramount importance that high school students take math courses in common with their peers for multiple years; acceleration should occur only after 9th grade. Students can opt to take data science and statistics as an alternative to Algebra 2.
- Teachers should plan **complex instruction** around big ideas, not isolated standards or procedures. The focus is to create equity in heterogeneous classrooms by engaging students in **groupwork of multi-dimensional, open-ended tasks** in a variety of ways --visually, through touch or movement, through building, modeling, writing and words, through apps, games and other digital interfaces, as well as through numbers and algorithms.
- Traditional narrow tests produce racial and gender inequities in education and employment because they particularly disadvantage girls and women, language learners, minorities, and students with learning differences. A particularly damaging practice to avoid is timed tests because they prompt anxiety.
- Open, multi-dimensional tasks upend the conventional arguments for tracking and allow for **multi-dimensional formative assessments** -- including rubrics, teacher diagnostic comments, self and peer assessment, and portfolio assessment. Assessments should be flexible, allowing for multiple means of expression, such as talking, writing words, drawing using manipulatives or typing responses. Portfolios are particularly appropriate ways of assessing data science projects.

Wisdom from the 1990s: Reform Math = Whole Math = Fuzzy Math

Mathematics: The science of structure, order, and relation that has evolved from elemental practices of counting, measuring, and describing the shapes of objects. It deals with logical reasoning and quantitative calculation ...[Britannica Online 1995]

Math: A shortened version of mathematics.

New Math: A change in the perspective of mathematics education in the early '60s that emphasized set theory, and has nothing to do with the changes to math education today.

Whole Math: The current revolution in mathematics curriculum, akin to the Whole Language experiment, that **emphasizes group discussion, essays, calculators and guessing and de-emphasizes basic skills and direct instruction.**

New-New Math: Another term for Whole Math, used in the San Francisco Chronicle.

Reform Math: Another term for Whole Math, primarily used by the proponents of these changes.

Fuzzy Math: A reference to Whole Math, probably originating in Palo Alto, CA. (not to be confused with "fuzzy logic")

Placebo Math: A reference to Whole Math from the biomedical research community.

Source: <http://www.mathematicallycorrect.com/glossary.htm>

The 2021 Draft CMF significantly emphasizes group discussion, essays, calculators and guessing and de-emphasizes basic skills and direct instruction. It is more extreme than the notorious 1989 NCTM Standards and the 1992 CMF.

HOW EXPERTS DUMB DOWN MATH EDUCATION

by David Klein and Jerry Rosen, 1996

- The 1992 Mathematics Framework for California Public Schools governs, to a considerable extent, the mathematics curriculum in California's public schools. **It is a prescription for mediocrity.** The Framework recommends that **calculators** be issued to kindergartners and used in all K-12 grades; it **strongly discourages placing students by ability or achievement**; it advocates that teachers do more “**facilitating**” and less “teaching;” it **discourages testing**, and **promotes portfolios**, “**authentic assessment**,” and “**holistic scoring rubrics**;” it **de-emphasizes basic skills** and **promotes “cooperative work”** over individual responsibility. In short, **it is the “bible” of “fuzzy math.”**
- But, of course, the NCTM tells us it can all be cured with improved math pedagogy. And to be sure, the Titanic would have refloated if they'd poured a better brand of cognac!!

Like its 1992 predecessor, the 2021 CMF is also a prescription for mediocrity and the bible of Fuzzy Math.



The EdSpeaks (Terminology of Educational fads):

“learning by doing,” “experiential learning,” “critical thinking,” “higher-order thinking,” “problem-solving,” “teamwork,” “group work,” “conceptual understanding,” “personalized learning,” “project-based,” “discovery learning,” “constructivism,” “inquiry based,” “integrated,” “self-paced learning,” “student-centered learning,” “mastery learning,” “project-based learning,” “deeper learning,” “21st century skills” ...



The New EdSpeaks in the 2021 CMF:

Open tasks, rich problems, low-floor high-ceiling questions, big ideas, multi-dimensional learning, multi-dimensional assessment, formative assessment, authentic problems, real-world tasks, equitable math, problem-solving, culturally relevant pedagogy, culturally responsive teaching, culturally sustaining pedagogy, growth mindsets (misused by math reformers to justify no mistake correction, no timed tests, and so forth) ...

[Terminology Every Parent Must Understand](https://www.illinoisloop.org/lingo.html)

<https://www.illinoisloop.org/lingo.html>

<https://www.illinoisloop.org/buzzwords.html>

[Anna Stokke \(2015\):](#)

These phrases are often interchanged to avoid criticism of certain pedagogical techniques, an approach that was recently used in Alberta. After a well-informed journalist for the *Edmonton Journal* wrote about the lack of evidence for discovery-based instruction, education officials argued that Alberta Education was actually promoting inquiry-based learning.

Jo Boaler, the chief writer of the 2021 CME, is an influential math revolutionary, a Fuzzy Math expert, and a disruptor of real math.

Should we stop teaching Geometry and Algebra?

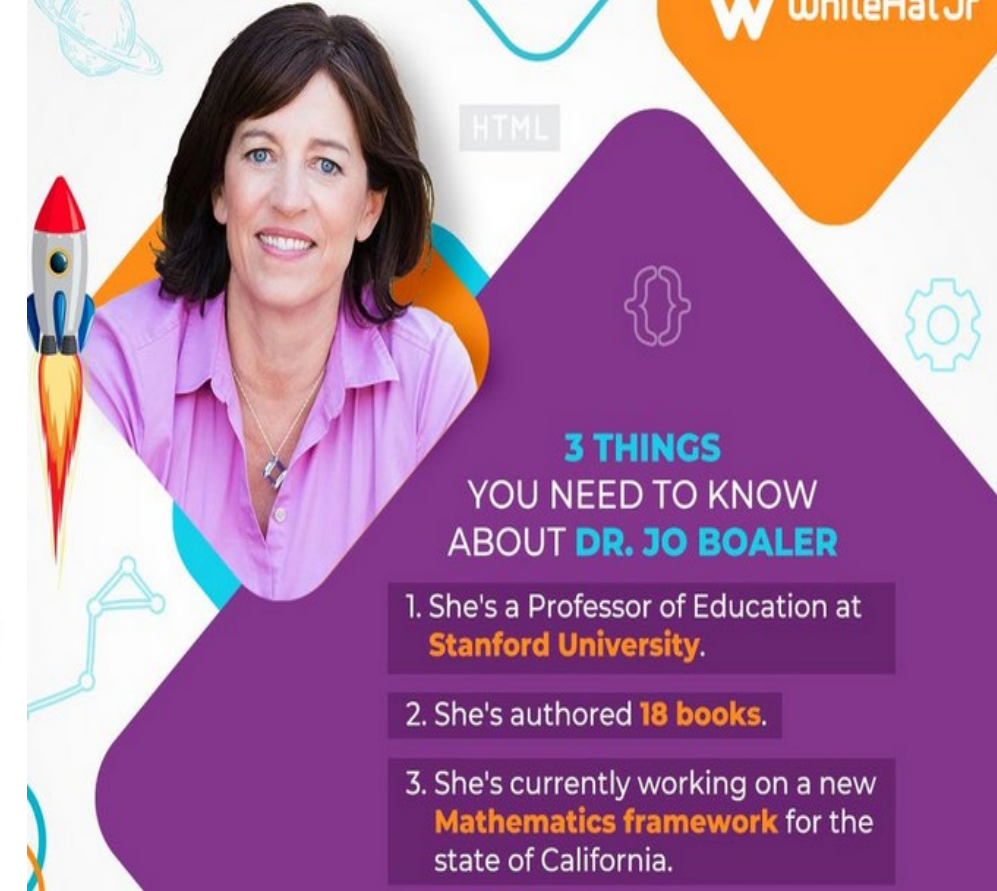
Collapse all (1) ^



Jo Boaler 06:18 PM

we are setting out intergrated pathways in the framwork, hoping to retire the alg-geom courses

- Jo Boaler guided SFUSD to ban algebra from middle schools, to adopt a controversial textbook in high schools, and to de-track since 2014.
- Jo Boaler leads current anti-algebra and anti-calculus campaigns and seeks to expand her SFUSD experiments nationwide.
- With an academic background in education and psychology, Jo Boaler dumbs down American K-12 math education through her unmatched influence on teachers, administrators, and policy makers.



Jo Boaler ✓

@joboaler

Stanford Professor, British Maths Revolutionary

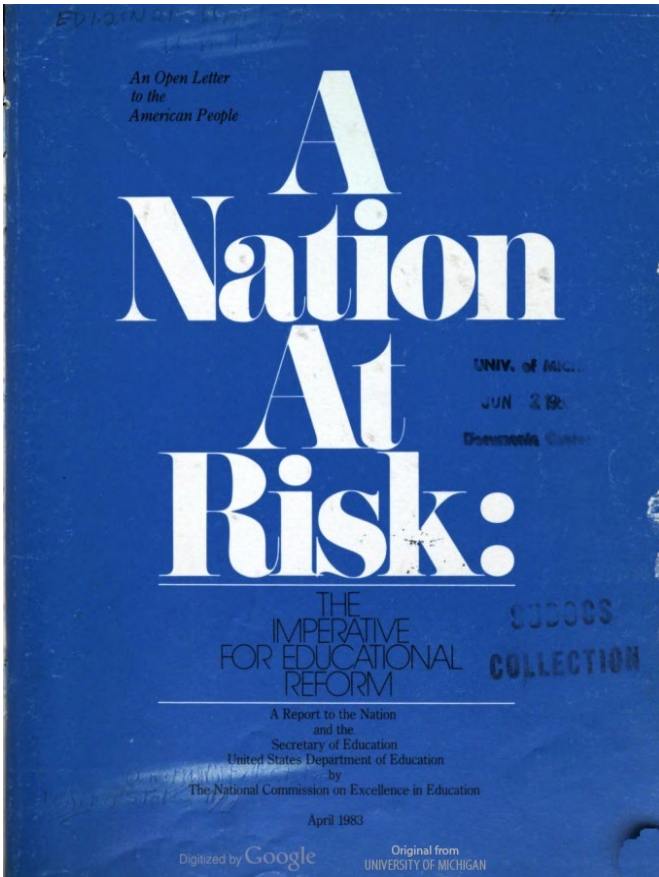
"If you are not getting pushback, you are probably not being disruptive enough."

"Viva la Revolution." -- Jo Boaler

The 2021 CMF = War Against Real Math = War Against America



It has been many years since I read the report, "A Nation at Risk", which contains the now-famous sentence, "If an unfriendly foreign power had attempted to impose on America the mediocre educational performance that exists today, we might well have viewed it as **an act of war.**" When I first read these words I thought of them as nothing more than hyperbole designed to evoke a reaction in the reader. **But the more I see of the education profession, the more I begin to believe that we are under some sort of attack.** If there is a "malevolent tyranny" in America, it has ironically taken the form of the benevolent educator who assures us that we're all already working too hard. **In my youth I couldn't understand how a great nation could ever fall, but now I understand perfectly.**



1983

-- Dave Ziffer, 2000

A PROGRAM for RAISING the LEVEL of STUDENT ACHIEVEMENT in SECONDARY SCHOOL MATHEMATICS

*A **statement** signed by 110+ mathematicians and scholars, including Jaime Escalante, E. D. Hirsch, Jr., former MAA president Henry L. Alder, former NCTM president Frank B. Allen, in April, 1996.*

- All students should be given the opportunity to master academic subject matter calibrated against world-class norms.
- It is the duty of teachers and parents to call upon the best advice obtainable (in this case, from mathematicians) to set standards of student performance and then demand that students meet these standards. **When standards are held firm and the student is required to adjust to them, we have a process that can be accurately described as *education*.** In recent years we have seen a distressing reversal of this process. Students don't listen very well? Adjust by downgrading oral exposition by the teacher, and, perhaps resort to **cooperative learning**. Students don't like the curriculum? Change the curriculum, perhaps by emphasis on ***practical* applications** in an effort to recapture student interest. Students don't do well on standardized tests? Try to **discredit these tests** by proclaiming that they are not and cannot be valid measures of student achievement. **This stultifying process** where changes take place in the system rather than in the student is **education turned on its head**.
- **It is destroying education in America, and it must be stopped.**

The 2021 Draft CMF advocates all the “stultifying” ideologies and practices condemned by this statement, let alone being calibrated against world-class norms.

If implemented, the 2021 CMF **will be destroying education in America, and it must be stopped.**

There is no greater threat to the future of America than the failure to educate our children. Please visit these websites --main source of this presentation-- for fact, truth, wisdom, and advice.

illinoisloop.org

On this page:

- Understanding the Battles
- Practice Leads to Insight
- Fuzzy Math Impedes Learning
- Manipulatives
- Spiraling
- Math Anxiety
- NYC HOLD
- Mathematically Correct
- Calculators
- Algebra
- Success in Low Income Schools
- More Resources

Other math pages:

- Specific Math Programs
- Math: Town by Town!

Other related pages:

- Practice
- Textbooks (in general)
- Are High Schools to Blame?
- Colleges and the Failures of K-12

Welcome to New York City HOLD National

Honest Open Logical Decisions on Mathematics Education Reform

Today's flagship web site for the mathematics education advocacy community

<http://nychold.com/>

Mathematically Correct


$$2+2=4$$

"There is a mathematically correct solution"

This web site is devoted to the concerns raised by parents and scientists about the invasion of our schools by the New-New Math and the need to restore basic skills to math education.

Mathematically Correct is the informal, nationwide organization that fights the Establishment on behalf of sanity and quality in math education. -- David Gelernter, NY Post

<http://www.mathematicallycorrect.com/>

Section A

The Origin and Development of Reform Math in America

The pioneer progressive educators left behind a lasting legacy of profound anti-intellectualism, racial and gender prejudice, elitism, and collectivism, which have fundamentally undermined the academic achievement of generations of American students.

Timeline:

1900-1920s: the Progressive Movement

1930s: the Activity Movement

1940s: the Life Adjustment Movement

1960s: the New Math Movement

1970s: the Open School Movement

1980s-1990s: the 1989 NCTM Standards, the 1992 CMF, and the math wars

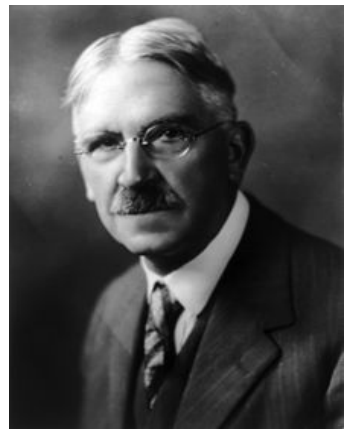
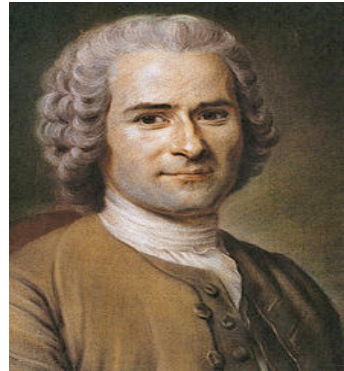
2010s: the Common Core State Standards

2021: the new CMF

The Reform Math Crusade: the origin

The 18th century (The Age of Enlightenment)

- **Jean-Jacques Rousseau**'s progressivism and progressive education ideologies are the origin and tenets of America's progressive education crusade.
 - **Radical Equality**: equality in outcomes (not in opportunities), which underlies today's calling for equal socioeconomic outcomes and equal academic achievements.
 - **Collectivism**: subordinating the individual to state interests.
 - **Child-centered education**: the Romantic notion underlying all sorts of progressive education doctrines -- children can and should learn all things naturally; let kids decide when, where, what, how they want to learn.
 - Rousseau's progressivism notions were influential on Robespierre during the Reign of Terror.



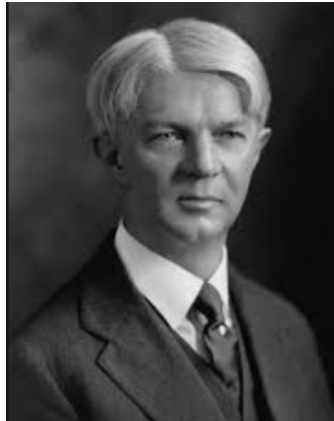
The early 20th century (1900s -1930s)

- **John Dewey**: schools are institutions for social change; education is to prepare students for associated living in the industrial society; student-centered, inquiry-based education; hands-on activities, and manipulatives.
- **Edward Thorndike**: his theories were cited to justify a slow-paced, fragmented (distributed) arrangement of subject matters and a spiraling curriculum structure.



The Reform Math Crusade: the origin

- **William Heard Kilpatrick:**
 - **Activity tables:** “activity leading to further activity without badness.”
 - **Project-based learning and the Activity Movement.**
 - **Critical thinking:** Knowledge is changing too fast to be transmitted usefully to students. Instead of teaching children dead facts and figures, schools should teach them "critical thinking.”
 - **Algebra and geometry are useless:** The study of algebra and geometry in high school be **discontinued** except as an intellectual luxury. Mathematics is **harmful** rather than helpful to the kind of thinking necessary **for ordinary living**. We have in the past taught algebra and geometry to too many, not too few. Nothing in mathematics should be taught unless its probable value could be shown.
- **David Snedden:**
 - Algebra...is a **nonfunctional** and nearly **valueless** subject for 90 percent of all boys and **99 percent of all girls**--and no changes in method or content will change that.
- **Edward Thorndike, Lewis Terman, Ellwood Cubberley:**
 - **Women and minorities are born with lower IQ than white males. They cannot master abstractions.** Instead, they can often be made into efficient workers through practical education.
- **John Bobbitt, David Snedden:**
 - To eliminate education “wastes” and maximize school efficiency, schools should put a small portion of college-bound students on the academic track and assign the majority students to lower tracks to learn mainly practical knowledge and skills.



The Reform Math Crusade: 1940s-1980s

The 1940s: The Life Adjustment Movement

- To prepare the majority students for everyday living, high schools should focus courses purely on **practical problems** such as consumer buying, insurance, taxation, and home budgeting, but **not on algebra, geometry, or trigonometry**.

The 1950s: The Bloom's Taxonomy

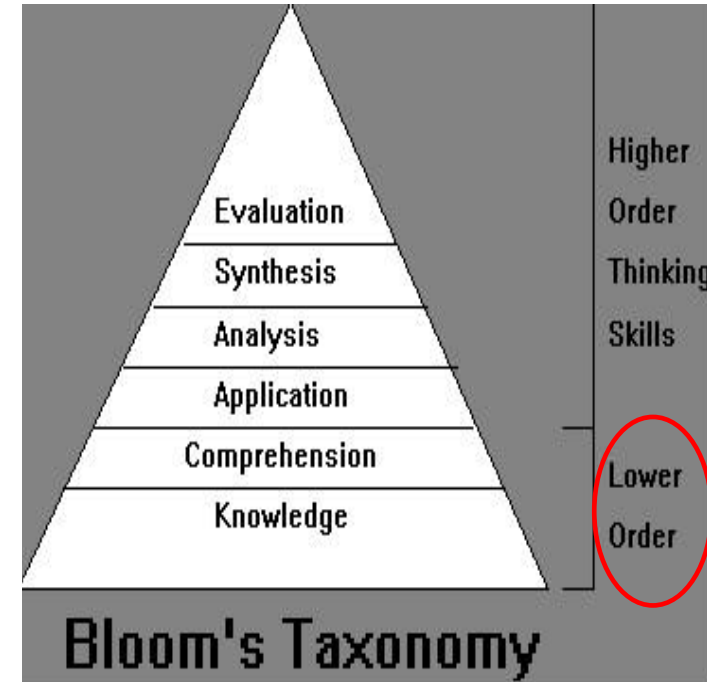
- Knowledge and basic skills belong to **lower-order thinking** and should be de-emphasized.

The 1970s: The Open Education Movement

- Let children decide each day what they should learn at activity tables, play corners, or reading centers.

The 1980s: Constructivism, Discovery Learning

- Only constructed knowledge--knowledge that one finds out for one's self--is truly integrated and understood. Therefore, schools should **discard traditional direct instruction** and embrace **student-centered education** methods, such as **inquiry-based learning, discovery learning, group project, and problem-solving**.



Over the 20th century, the progressive education doctrines had grown and spread rampantly, eventually dominating American schools since the 1970s.

The Reform Math Crusade: the 1989 NCTM standards and the raging 1990s

In the 1990s, NCTM and NSF teamed up to promote the Fuzzy Math programs under “**constructivism**.”

Guidelines from the 1980 NCTM's *An Agenda for Action*, the 1989 NCTM Standards, the 1992 CMF, and the NSF agenda:

- High school math programs should **de-emphasize the central role of calculus and its prerequisites – algebra 2, geometry, and trigonometry**.
- **Problem solving** should be the focus of school mathematics; difficulty with paper-and-pencil computation should not interfere with the learning of problem-solving strategies.
- The new technology not only has made calculations and graphing easier, it has changed the very nature of mathematics. Appropriate **calculators** should be available to all students at all times.
- **Team efforts in problem solving** should be commonplace in elementary school classrooms.
- The use of **manipulatives**, where suited, to illustrate or develop a concept or skill.
- All children can learn by using and manipulating scientific and mathematical ideas that are meaningful and relate to **real-world situations** and to **real problems**.
- **Inquiry-based** learning and **hands-on** learning more effectively engage students than lectures.
- **A wider range of measures** than conventional testing. **Multiple forms of assessment activities**, such as student demonstrations, rubrics, self-reflections, observations, and oral and written work are used throughout the instructional materials.
- Items for de-emphasizing: “**Manipulating symbols**,” “Memorizing rules and algorithms,” “Practicing tedious paper-and-pencil computations,” “Finding exact forms of answers.”

The Reform Math Crusade: the Common Core revolution in the 2010s

In 2010, most states announced the adoption of the Common Core State Standards.

Marc Tucker, the chief architect of the Common Core revolution, asserts:

- What is essential is that we create *a seamless web from cradle to grave and is the same system for everyone — young and old, poor and rich, worker and full-time student.*
- Only **less than 5%** of jobs need knowledge of calculus; hence, the bar for high school diplomas should be **Algebra I, not Algebra II** (<https://bit.ly/3dVBjqp>).



11 November 1992

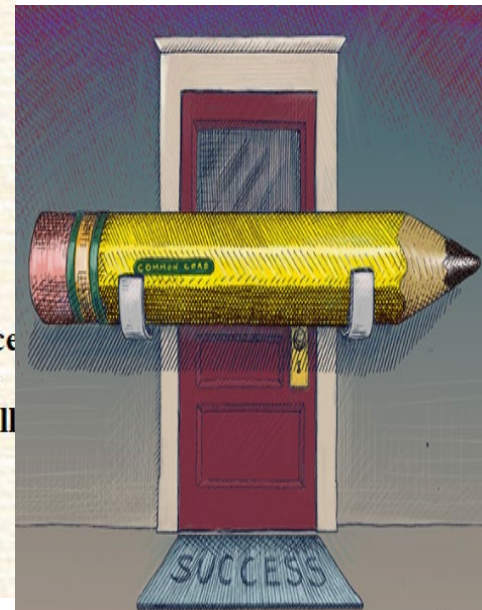
Hillary Clinton
The Governor's Mansion
1800 Center Street
Little Rock, AR 72206

Marc Tucker's "Dear Hillary" letter manifests his progressive conviction in collectivism and equal outcomes (not equal opportunities), which, joined by his progressive education beliefs, foreshadows the mediocrity of the Common Core.

Dear Hillary:

I still cannot believe you won. But utter delight that you did pervades all the circles in which I move. I met last Wednesday in David Rockefeller's office with him, John Sculley, Dave Barrab and David Haselkorn. It was a great celebration. Both John and David R. were more expansive than I have ever seen them - literally radiating happiness. My own view and theirs is that this country has seized its last chance. I am fond of quoting Winston Churchill to the effect that "America always does the right thing - after it has exhausted all the alternatives." This election, more than anything else in my experience, proves his point.

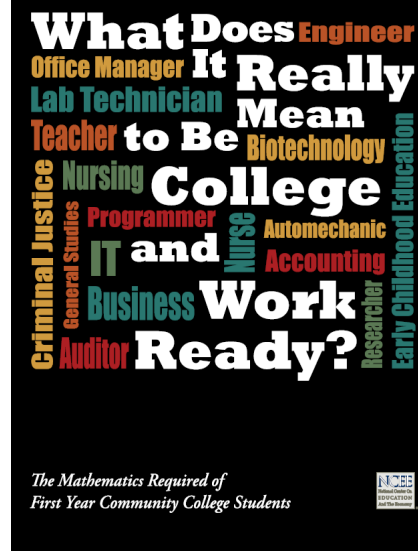
The subject we were discussing was what you and Bill should do now about education, training and labor market policy. Following that meeting, I



The Reform Math Crusade: the Common Core revolution in the 2010s

Algebra I as the bar for high school diploma

- Why focus on community colleges? About 45 percent of US college students are in these institutions...it is clear that for a substantial majority of high school graduates, being ready to **be successful in the first year of a typical community college program** is tantamount to being ready for both college and work.
- The high school mathematics curriculum is now centered on the teaching of a sequence of courses leading to calculus that includes Geometry, Algebra II, Pre-Calculus and Calculus. However, **fewer than five percent** of American workers and an even smaller percentage of community college students will ever need to master the courses in this sequence in their college or the workplace. For most of our students, those 'high' standards in mathematics constitute a requirement to learn material they will never need, either in college or later in their work, a bit like the requirement a century ago to learn Latin in high school.
- It makes no sense to rush through the middle school mathematics curriculum in order to get to advanced algebra as rapidly as possible. Given the strong evidence that mastery of middle school mathematics plays a very important role in college and career success, strong consideration should be given to spending more time, not less, on the mastery of middle school mathematics, and **requiring students to master Algebra I no later than the end of their sophomore year in high school, rather than by the end of middle school.**
- **Mastery of Algebra II is widely thought to be a prerequisite for success in college and careers. Our research shows that that is not so.** Judging by the tests community college teachers administer to their students in the introductory program courses in their career majors, their courses are typically pitched **to the lower set of expectations described by Bloom's hierarchy**—memorization of facts and mastery of procedures—and not to the kinds of analytical skills, writing ability, ability to synthesize material to put together solutions.



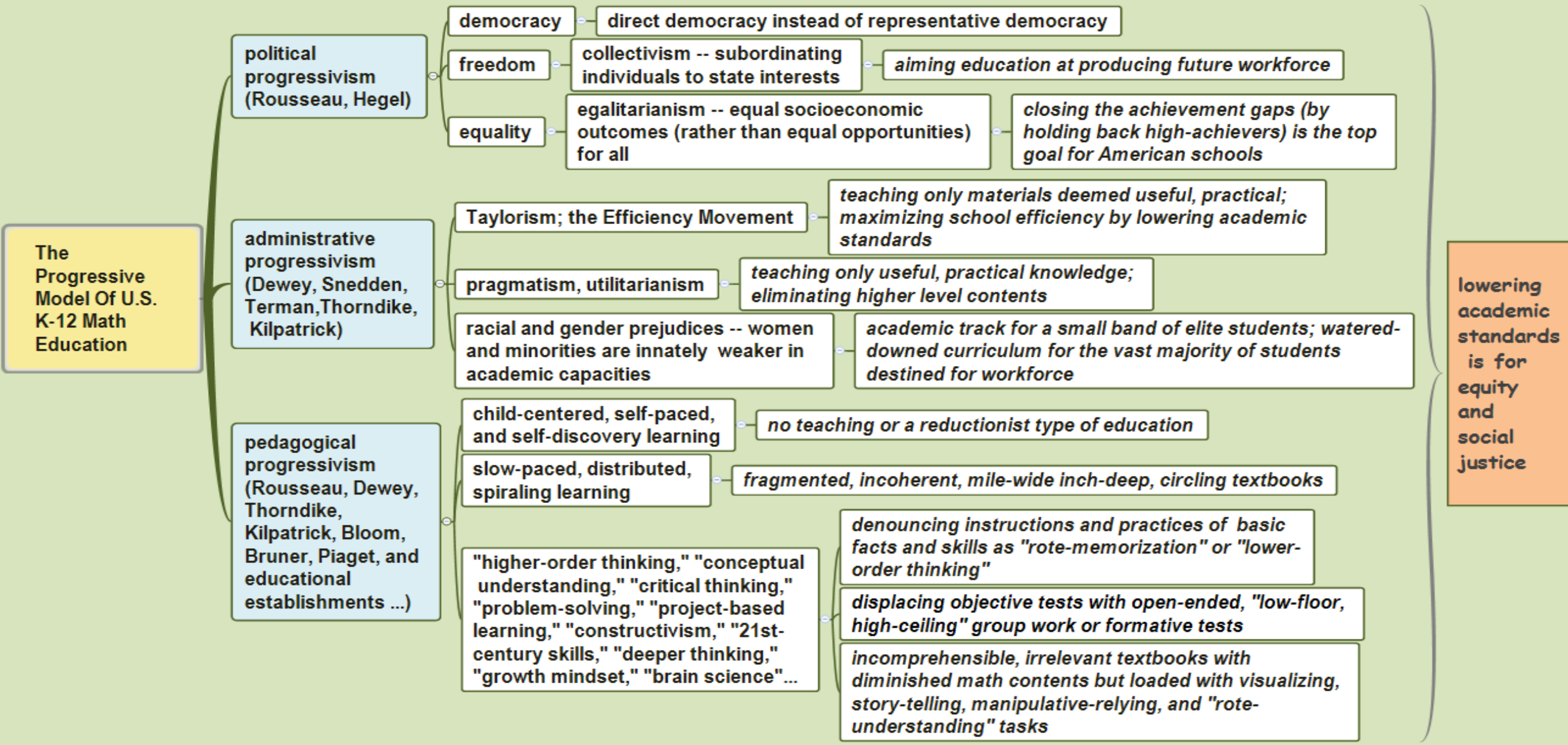
Ncee.org

The Reform Math Crusade: the 2021 CMF, Donning a String of New EdSpeaks, Poises to Promote Fuzzy Math to the Next Level

- **Open tasks** are those that enable students to take ideas to different levels. When tasks have a **low floor and a high ceiling**, it means that any student can access the task but the task extends to high levels.
- All students, regardless of background, language of origin, differences, or foundational knowledge are capable and deserving of depth of understanding and engagement in **rich mathematics tasks**.
- When students are **actively engaged**—when they are developing mathematical curiosity, asking their own questions, reasoning with others, and encountering mathematical ideas in **multi-dimensional ways**. This can occur through numbers, but also through visuals, words, movement, and objects, considering the connections between them.
- Algebra is often taught through symbols and symbol manipulation, but research from neuroscience shows that students benefit from approaching content in different ways. **Algebra that is approached visually** also enables students to see mathematics as a creative and connected subject.
- An authentic problem, activity, or context is one in which students investigate or struggle with situations or questions about which they actually wonder. In contrast, **an activity is inauthentic if students recognize it as a straightforward practice of recently-learned techniques or procedures**, including the repackaging of standard exercises in forced “**real-world**” contexts. Mathematical patterns and puzzles can be more authentic than such “real-world” settings.
- Open, multi-dimensional tasks upend the conventional arguments for tracking and allow for **multi-dimensional formative assessments** -- including rubrics, teacher diagnostic comments, self and peer assessment, and portfolio assessment.

The Reform Math Crusade: A Summary

The Genealogy Of Education Mantras And Rationale For Low Academic Standards



The Teaching of History, by Walter Karp

- The problem became inescapable, however, in the early years of the twentieth century, when, for the first time, Americans in large numbers began attending public secondary schools. This new turn of events, so far from being a source of pedagogical satisfaction, threw educators **into a panic and set off the greatest crisis in the history of American education**. The crisis was this: **the public secondary schools, which had catered chiefly to the well-to-do and successful, adhered to a traditional liberal arts curriculum** of “history, language, and literature—the “arts that liberate,” as Montaigne has called them. With the children of ordinary people attending high school, American educators found themselves face to face with a specter that had haunted Europe for a century: **the danger of educating people beyond their station**, or, as the National Education Association preferred to put it, **leading them “away from the pursuits for which they are adapted.”** The danger was largely political. By teaching the liberal arts to commoners, the new secondary schools might well become the spawning ground for popular tribunes, politically ambitious guttersnipes, and similar dangerous malcontents. **As J. E. Russell, head of Columbia University Teachers College, put it in 1905: “How can we justify our practice in schooling the masses in precisely the same manner as we do those who are to be their leaders?”**



The Teaching of History, by Walter Karp

- Educational leaders quickly worked out a solution. **Let the secondary schools teach the children of workers what was fit only for workers.** As **Woodrow Wilson**, president of Princeton, sternly advised the Federation of High School Teachers: **“We want one class of persons to have a liberal education and we want another class of persons, a very much larger class of necessity in every society, to forgo the privilege of a liberal education and fit themselves to perform specific difficult manual tasks.”** Since there was no way to stop “the masses” from entering high school, the only way to meet the crisis, in short, was to **prevent them from learning anything liberating when they got there.** Instead, the educational leaders said, the new secondary schools should offer vocational training in particular and something called industrial education in general. This, the influential Douglas Commission said in 1905, was a “new idea” in education, and in truth it was.
- The “new idea” must have been somewhat perplexing to schoolmarms of the old-fashioned sort. The public schools were supposed to train citizens, yet here were the country’s leading educators—“we”—insisting they regard their pupils not as future citizens but as future working hinds, whom Charles W. Eliot, president of Harvard, **urged teachers to “sort” by their “evident or probable destinies.”** If the schoolmarms were troubled, however, **a stalwart band of educational reformers stood ready to reassure them that training Americans for their industrial “destiny” was the heart and soul of “democratic” education.** By far the most important of the reassurers was **John Dewey.**

The Teaching of History, by Walter Karp

The “**Realistic**” Education of John Dewey

Neither the subtle reasoning, nor the ardent idealism of the famed educator mattered much in the history of American education. What proved important were a few of his salient principles. Suitably adapted, they have supplied educational leaders with **the lasting framework for a pedagogical system designed to prevent “the masses” from ever learning in a classroom what a free people ought to know.** For that purpose, Dewey’s most important contribution was his conviction that democracy has little to do with politics and government. **Democracy, according to Dewey, was “primarily a mode of associated living,” which for most Americans chiefly meant working together in factories.** Having stripped democracy of its political character, Dewey and his colleagues, who prided themselves on their “**realism**,” went on to **redefine it as “industrial cooperation.”** With this new, “**realistic**” definition, they effected **a permanent pedagogical revolution.** For one thing, it enabled the Deweyites (and more interested parties) to sever the venerable ties that bound the common schools to the needs and requirements of popular Government. The schools were to be adapted instead, Dewey wrote in 1897, “to the circumstances, needs, and opportunities of industrial civilization.”

The Teaching of History, by Walter Karp

Instead of the American Republic, the American economy would call the tune. The new “realistic” definition of democracy even stripped public education of **its theoretical republican objective, which was, as Jefferson had said, to teach future citizens “how to judge for themselves what will secure or endanger their freedom.”** Such knowledge was unlikely to enhance, and might well impair, “industrial cooperation.” **The new object of “democratic” education, Dewey said, was to teach every child “to perceive the essential interdependence of an industrial society.”** Thus instructed, the future citizen (i.e., factory worker) would develop what Dewey called “a socialized disposition.”

“Throughout history,” as Fitz Gerald rightly notes, “To replace political history with Deweyite social studies **the managers of states have with remarkable consistency defined good citizenship as a rather small degree of knowledge of, and participation in, public affairs** was the perfect means of meeting the educational requirements of the powerful.”

CMF 2021:

The class could not find problems involving **non-nuclear families (e.g., two moms, a single dad) or gender nonconforming characters (e.g., John cutting ribbon)**. Ms. Ross has students notice these patterns, but also asked students to question why certain items (e.g., toys, activities, careers) are perceived as being “for” only girls or boys, and the implications for these assumptions. She continues to engage her students by asking, “*Why does this matter? Who does this privilege? Who is silenced?*”

At the last stage, student groups collaboratively rework and reframe word problems into new scenarios that disrupt the taken-for-granted and expand possibilities, in this case, for **gender nonconforming and LGBTQ representations** that students chose to make visible: Juan is cutting ribbon to make a pink bow or Molly’s dad knits a scarf for his husband.

Hard Lessons, Diane Ravitch

At the outset of the twentieth century, Ravitch argues, American schools shared a commonly agreed upon mission of educating "all children to high standards" in academic subjects. But, as her new book shows, in the century's early decades a new emphasis on **free expression** and **group learning** led to **chaotic classrooms with vague lesson plans**. A new enthusiasm for curricular tracking and intelligence testing conspired to relegate a majority of students to **vocational, "nonacademic" programs**, and a cult of "**social efficiency**" aimed to **teach students only what they would need to know for practical living**: "useless" subjects like history were sometimes replaced by classes in cooking, driver education, and accounting. In short, Ravitch argues, **once the school's central purpose as a transmitter of humanity's accumulated knowledge and wisdom had been undermined**, "Every perceived need, interest, concern, problem, or issue found a place in the curriculum or provided a rationale for adding new specialists to the school's staff ... because all needs were presumed equal in importance."

Hard Lessons – Atlantic's Interview with Diane Ravitch, 2000

- In Ravitch's telling, the story of American public schools in the twentieth century becomes a fable about **an education system led astray by the far-fetched notions of anti-intellectual "progressive" educators**, and about the need to reinstate the rigorous standards and teaching methods favored by many traditionalists on the right.
- When I started the book in the late 1980s I intended to write a history of the teaching of the humanities -- history and literature -- in American schools in the twentieth century. As I worked on it, I realized that I had to figure out why "social studies" had replaced history and why "language arts" had replaced the teaching of language and literature. I realized that I had to explore larger issues, to try to understand and write about **the legacy of a constant drumbeat of criticism against the academic curriculum which resulted in limiting access to the academic curriculum only to college-bound students and created a culture of low expectations.**
- But significant committed individuals -- the leading progressive figures -- had a great deal to do with **shaping the ideology at the schools of education**. The leading progressives reflected changes in the national ethos, especially the romantic appeal of social science and the desire to make the schools socially efficient and rational; some wanted the schools to **serve society**, especially industrial society, and others wanted the schools to **transform society**. **Neither group had much regard for academic learning**. Progressive ideas dominated the discourse, and progressivism cornered the market on what it described as "modern science."

Hard Lessons – Atlantic's Interview with Diane Ravitch, 2000

- These leaders advocated dividing kids up into curricular tracks and allocating access to the academic curriculum, which many of them scorned. School districts that took their advice were hailed as being on the cutting edge of educational theory and practice. IQ testing, for example, was launched by progressive educators. IQ testing and curricular tracking were, in the first half of the last century, considered to be modern, progressive, and scientific. School systems that didn't use IQ tests and that **tried to give all kids a common academic experience were considered very backward and reactionary**. There are all sorts of ironies in looking at this history afresh.
- The schools that had large percentages of immigrant children were very quick to adopt industrial education and vocational programs **starting at a very early age**. The junior high school was invented, for example, as a way to start the vocational sorting of children at the age of twelve -- which is really very early for deciding what a young person's career should be. This did not happen because immigrants were demanding vocational training, or because immigrant parents wanted their kids prepared for factory work, but because **the progressives were wedded to the idea of social efficiency, and they thought that the schools could make their best contribution to society by preparing immigrant children for industrial jobs**.



Hard Lessons – Atlantic's Interview with Diane Ravitch, 2000

- Progressive educators talked about immigrants being different: they said immigrants were more interested in manual occupations, whereas the most advantaged native-born American white children should be prepared for college because they could handle what they called "a bookish education." It was surely **social-class snobbery**, and the documentation of that snobbery is overwhelming in the writings of such leading progressives as Ellwood P. Cubberley of Stanford University.
- So then the question is, At what point should students choose their own courses? Certainly for the first eight years, ten years, or eleven years, students should have a very rich and full academic education in which what is available for the most advantaged students is also available for the most disadvantaged students. If at some point toward the end of their high-school career students want to prepare for jobs, that's fine, but it should not become a reason to deny them the same opportunities that are available for more advantaged students, long before they are able to make an informed choice. Otherwise we end up with a very inequitable system...
- The fundamental **progressivist antipathy toward knowledge** that got a foothold in education colleges in the 1920s (sometimes even earlier) continues to be a problem in the field of pedagogy.
- I expect that the education journals will be less friendly because the book is largely a criticism of the progressive tradition in education, which is a sacred cow in some precincts.
- Progressives today will be better off if they can understand their history and distance themselves from **the elitist, anti-intellectual tradition** that my book describes.

The Fourth R, by Sara Mosle

- For more than a century, writes Diane Ravitch in her new book, "Left Back," the "in" crowd has been the "progressive" educators, the inheritors of a tradition that began with John Dewey.
- Still, there is no denying that Ravitch is a fierce opponent of what she perceives as **a virulent anti-intellectual strain** in the teachings of dozens of educators whom she describes, somewhat reductively, as "progressive." The history of their ideas is the subject of "Left Back." Ravitch sees the past through the present, and her lens is the current debate over standards and a national curriculum. Her thesis is that as public school enrollment surged in successive waves after 1900, **progressive theorists -- like Edward L. Thorndike, William Heard Kilpatrick and James B. Conant -- repeatedly sought to water down the curriculum by creating "undemanding vocational, industrial, or general programs" into which women, blacks and poor immigrants were shunted, all in the name of "democracy" and "meeting the needs of the individual child."**
- Although these progressive ideas took different names and different forms -- the "child-centered" movement, the "social efficiency" movement, the "life adjustment" movement -- they all **shared a mistaken belief**, Ravitch writes, that **the vast majority of students couldn't master the rigorous pre-college curriculum previously offered exclusively to elites. Instead of reducing educational inequality, she argues, such reforms actually served to aggravate racial and social stratification in the nation's schools** at just the moment when universal education was becoming a reality. As Ravitch says, practices now viewed as anathema by progressive educators -- I.Q. testing and grouping children by ability into "tracks" -- began as liberal reforms, designed to sort kids into the academic haves and have-nots.

From [William C. Bagley](#)



While at Teachers College, Bagley entered into some of the most heated educational discussions of his career. Sometimes with, and often against, his **colleague Kilpatrick**, Bagley engaged in debates about the relative weight that should be given in educational theory to academic subject matter, on the one hand, and to the interests and needs of students on the other. Bagley never denied the importance of designing a curriculum that met the interests and needs of students.

He often argued, however, that **the emphasis that theorists such as Kilpatrick placed on the individual needs of students often eclipsed the necessity for academic subject matter in the curriculum.**

Importantly, Bagley sought a reasonable view of professional education that **balanced the needs of students with a rigorous academic curriculum.**

While at Teachers College in the 1920s, Bagley also entered into educational discussions about the role of intelligence testing in the schools. In *Determinism in Education: A Series of Papers on the Relative Influence of Inherited and Acquired Traits*, Bagley argued against **the determinist viewpoint, held by people such as Thorndike, that education played little or no role in the improvement of a person's intelligence.** Instead, Bagley asserted that the recently created intelligence tests actually measured the educational opportunity experienced by students **rather than their innate ability.**

Section Summary:

The pioneer progressive educators bestowed the following legacies on American schools:

- 1. Anti-intellectualism:** algebra, geometry, and calculus are largely useless to the majority.
- 2. Racism, sexism, elitism:** women and minorities are innately incapable of learning abstract, advanced materials originally reserved for native-born white male elites. Schools should teach the ordinary masses only what they would need to know for practical living.
- 3. Collectivism:** closing the achievement gaps through a watered-down curriculum, mixed-ability classrooms, cooperative learning, group work, and soft assessments.
- 4. Child-centered education:** eschewing direct instruction and letting children decide when, where, what, and how they want to learn.

After successive waves of progressive education movements since the early 20th century, progressive education gradually took root and now prevails in American schools, significantly undermining the academic achievement of generations of American students.

Inheriting all these legacies, the 2021 CMF aims to promote reform math to the next level.

Section B

What Is Wrong With American K-12 Math Education?

Why Is Reform Math Disastrous for All Learners?

Reinventing math is an old tradition in this country... Today the original New Math is old hat, but many folks in the education world are hawking yet another reform.
-- [WSJ Editorial](#)

Again the Liberals have come forward with many good and new ideas. Unfortunately none of the good ideas is new and none of the new ideas is good.
-- Lord Stockton

CMF 2021:

- Complex Instruction is a pedagogical approach, that provides an example of the ways student discussions can provide teachers with **formative assessment**. **Complex Instruction centers upon three principles for creating equity in heterogeneous classrooms through groupwork.**
- The first principle involves students **developing responsibility for each other, serving as academic and linguistic resources for one another.**
- The second principle involves students **working together** to complete tasks. To realize this principle, teachers must manage **equal participation in groups** by valuing and highlighting a wide range of abilities and attending to issues of status amongst students.
- Underlying these two principles is a third: the implementation of **multi-dimensional, group-worthy tasks**, which are challenging, **open-ended**, and require a range of ways of working. As teachers work to manage **heterogeneous groupwork** and assign competence they will encounter opportunities to listen to student thinking and to **assess formatively**.
- All mathematical ideas can be considered in different ways—**visually, through touch or movement, through building, modeling, writing and words, through apps, games and other digital interfaces, as well as through numbers and algorithms**. **Fingers** have been shown to be particularly important as a visual and physical representation for students, enabling the development of important brain areas.

CMF 2021:

- Using **open tasks** represents **a shift in instructional practice, away from a traditional “lecture” approach.**
- **Open tasks** are those that enable students to take ideas to different levels. When tasks have a low floor and a high ceiling, it means that **any student can access the task** but the task extends to high levels. When questions are narrow and focused, only some students are cognitively challenged at an appropriate level, and the questions are often not very interesting.
- Open, multi-dimensional tasks offer authentic opportunities for all students to contribute their unique perspectives. This start can engage all students and draw them into mathematical conversations **on an equal footing.**
- Tasks that offer multiple ways to engage with and represent mathematical ideas also **support students with learning differences.**
- **Open, multi-dimensional tasks upend the conventional arguments for tracking;** rich classroom discussions at both the whole-class and small-group levels rely on the different strategies students bring and the ensuing approaches they take to articulate their thinking.
- **Ability grouping has been shown as unnecessary, particularly when math instruction is designed to offer open tasks students can engage with at different levels and feel supported in appropriate ways as they work.**
- **Alternative activities can be used that develop mathematics fact fluency through engaging, conceptual, visual activities, instead of anxiety producing, speed tests.**
- Open tasks provide teachers with opportunity to listen carefully, to make sense of student thinking, and **to assess formatively** as the lesson progresses.

- **What is Changing in Math Education?** from Mathematically Correct

One of the philosophical components is the idea of *Constructivism* or discovery learning. This notion holds that students will learn math better if they are left to discover the rules and methods of mathematics for themselves, rather than being taught by teachers or textbooks. This is not unlike the Socratic method, minus Socrates. One of the problems with this approach is that teachers must be extremely skilled in these methods. Another is that **"discovery" takes so long that considerably less material can be covered. A third problem is that the children sometimes "discover" the wrong "rules" and teachers don't always catch the error.**

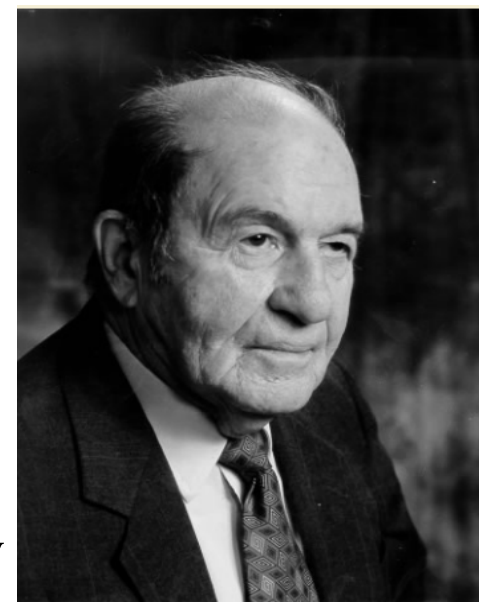
- **Twenty Years Before the Blackboard**, by Michael Stueben

Discovery lessons, students writing to learn mathematics, the teaching of so-called general problem-solving concepts, field trips, math lab lessons, alternative assessments, collaborative partner tests, student presentations, and **open-ended** problems should all be used sparingly. I use some of them, but **they have limited value**. Pencil-and -paper analytic solutions are the heart of mathematics education.

What Has Happened to Mathematics Education? by Mathematically Correct

- Across the country, the way mathematics is taught in the classroom and in textbooks has been changing notably. Classrooms are often organized in **small groups** where students ask each other questions and the teacher is discouraged from providing information. Students may even **take tests in groups**, if they have tests at all. The use of blocks and other **"manipulative"** objects has extended well beyond kindergarten and can now be found in many algebra classes. Meanwhile, the students practice their fundamentals less and less. Time consuming **projects and essays that involve very little mathematics** are the rage. **Calculator** use is growing and taking away expectations for student learning. Textbooks, if the students have them at all, are full of color pictures and stories, but not full of mathematics. The books often don't even give explicit definitions or procedures. That would be "telling" and the new idea is for students to discover all of mathematics for themselves. Many of these programs don't even teach the standard algorithms for the operations of arithmetic. Long division is a devil that is to be beaten into extinction - and if they manage that, multiplication will be next.
- Along with the emphasis on non-traditional methods, we are offered a lot of **rhetoric about higher order thinking and problem solving**. There have been countless diatribes that rant about the evils of repeated practice and remembered facts and a steady stream of self-endorsements of the new directions. The selling of the so-called *reform* has been well-rehearsed by its proponents over the last decade. Replete with glossy promotions, the *new new math* is **long on salesmanship but short on mathematics**.

Repairing school mathematics in the US, by Frank B. Allen



NCTM leaders must admit that they have urged the application, on a national scale, of highly controversial methods of teaching before they have been adequately debated or even understood and before researchers have verified them **by well-controlled and replicated research studies**. Should the FDA allow a new drug to go on the market under such circumstances? Under NCTM domination, **our entire school system has become a laboratory for the testing of untried methods**. Consider just a few examples:

The highly retentive memory of youth which has been used for centuries for learning the number facts and the fundamental operations (algorithms) of arithmetic, is being supplanted by the use of calculators in the early grades. **This destroys the foundation on which the understanding of mathematical concepts can be built**. Countries that score highest on the TIMSS tests do not allow such early use of calculators.

There has been widespread application of the doctrine of "**constructivism**" which asserts that students understand and remember only those concepts that they "construct" or discover for themselves. No longer should teachers (or even books) disseminate information. Instead, students are often placed in "*cooperative learning*" groups without direct instruction from the teacher who is relegated to the role of "*facilitator*." This requires students to reconstruct the great ideas of the past, starting at ground zero and aided only by their equally uninformed peers. Many well-informed people view this new classroom situation with alarm. They say that **it destroys the cumulative nature of knowledge**, strikes at the very heart of the education process and, according to the TIMSS test scores, is not working very well. Yet, **group learning is spreading like wildfire in our nations mathematics classrooms and teachers are becoming facilitators on a wholesale basis**. Lacking support in either research or experience, these NCTM-based programs **are worse than just fads -- they are mistakes that have been systematized**. They impair the quality and content of the mathematics our students are expected to learn. California, perhaps having suffered the worst from these fads.

Repairing school mathematics in the US, by Frank B. Allen

The new math "*facilitators*" are now using **"authentic" assessment (grading) systems which minimize the importance of correct answers and often include deliberately ambiguous questions (prompting the use of the term "fuzzy math")**. They use subjective and inaccurate grading techniques that lack the reliability of objective tests. Worse yet are group tests, which often follow cooperative learning. They destroy the validity of course grades, mask individual performance levels, and make the assignment of individually prescribed remedial work impossible.

There has been a downgrading of proof in plane geometry almost to the point of elision. The older geometry texts contained many challenging, highly instructive "*originals*" and construction problems requiring proof. During recent years the NCTM has watched, without protest, while these have virtually disappeared from the glossy 800-page "*coffee table*" books that pass for geometry texts in the US. At the same time **they were speaking frequently about "*mathematics as reasoning*" and "*higher thinking skills*."** This is an example of the vast discrepancy that exists between what NCTM says and the reality of NCTM-based programs.

Social engineering has crept into the math curriculum, including irrelevant material about student attitudes and social issues and misguided efforts to build self-esteem. **Under the guise of opening the door to higher level math for all students, we now have algebra and geometry students who are not prepared.** This sends students the wrong message and hampers instruction. Recall that Jaime Escalante, of "Stand and Deliver" fame, showed us how students can earn their self-esteem and triumph when properly taught and motivated.

Education Schools: Helping or Hindering Potential Teachers?

by George K. Cunningham, Ph.D. in educational psychology.

- Most people believe that the purpose of schools is to ensure that young people learn the skills and knowledge they will need to succeed in life. Accordingly, they expect teachers to impart skills and knowledge to their students. ... That view, however, is not generally accepted in schools of education, where the great majority of teachers receive their training. **The philosophy that dominates schools of education ... stresses the importance of objectives other than academic achievement, such as building self-esteem and multicultural awareness.**
- The dominant '**progressive/constructivist**' philosophy in education schools leads to teacher training that prescribes a student-centered classroom where the teacher's role is to serve mainly as a facilitator for student-directed learning. Under that philosophy it is regarded as bad practice for teachers to actually do much teaching. They are supposed to act as 'the guide on the side' rather than 'the sage on the stage.'
- Unfortunately, the progressive/constructivist approach is **markedly inferior** to traditional, 'teacher-centered' pedagogy, particularly when it comes to teaching students important skills like reading and math. Most students do better if they are taught with traditional methods, such as 'direct instruction.'

Which Teaching Methods Work Best?

Excerpt from *Facing the Classroom Challenge: Teacher Quality and Teacher Training* by Lance T. Izumi with K. Gwynne Coburn.

- The experimental research evidence **overwhelmingly shows that teacher-centered methods are more effective** in improving student achievement. For example, Jere Brophy of Michigan State University and Thomas Good of the University of Missouri examined dozens of methodologically-rigorous studies and concluded that 'students learn more efficiently when their teachers first structure new information for them and help them relate it to what they already know, and then monitor their performance and provide corrective feedback during recitation, drill, practice, or application activities.' Brophy and Good also say that 'Students achieve more when they spend most of their time being taught or supervised by their teachers rather than working on their own (or not working at all).' Further, according to the late famed Harvard researcher Jeanne Chall, 'the traditional teacher centered-approach generally produced higher academic achievement than the progressive student-centered approach.' Chall also found that **'the evidence on the superiority of structured, teacher-centered methods for low socioeconomic- status children is so consistent over the years that it would be difficult to reject.'**



Project Follow Through:



A Case Study
of Contingencies
Influencing
Instructional Practices
of the Educational
Establishment

Cathy L. Watkins

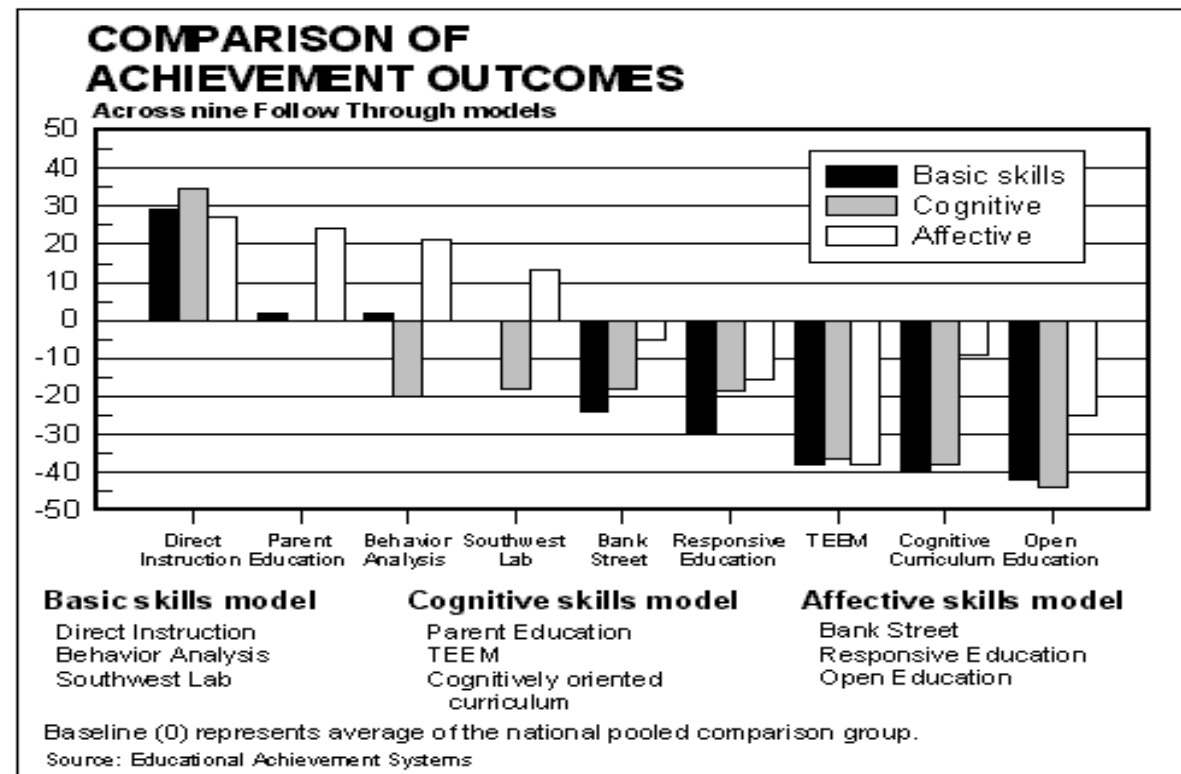
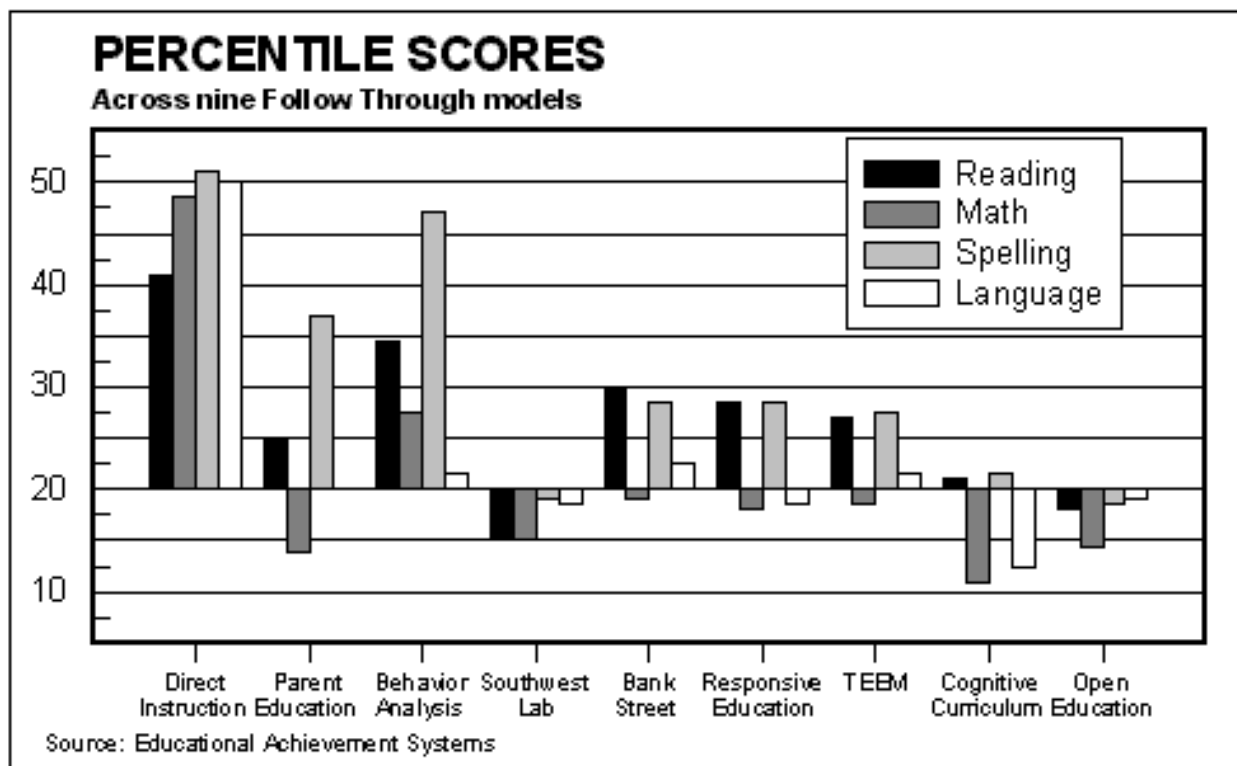
Project Follow Through, originally conceived in 1967 as a social action program to extend Head Start into the primary grades, became an educational experiment aimed at finding effective methods for educating disadvantaged children. Follow Through, in effect, created a national learning laboratory, providing a unique opportunity to study the effectiveness of a variety of educational methods. **The results indicated that the Direct Instruction model and, to a lesser degree, the Behavior Analysis model provided viable solutions to the problem of teaching disadvantaged children. Yet the results of the Follow Through evaluation have been virtually ignored by the educational establishment.** This paper presents a case history of Project Follow Through and examines the factors that have led **the educational establishment to ignore teaching methods that are effective** in raising the academic achievement of disadvantaged children.

Evidence From the Billion-dollar Study

In the [January, 1998, Notices of the American Mathematical Society](#), Allyn Jackson reports her interview with Gail Burrill, President of the NCTM.

Notices: *Starting in 1968, the government funded a huge study called **Project Follow-Through**. It cost a billion dollars and ran almost thirty years. The purpose was to examine how different teaching methods or philosophies affected student performance. **What they found was that the traditional, "direct instruction" method was the most effective.** Are you familiar with this study?*

Burrill: *I have never heard of it.*



Progressive educators disfavor and eschew direct instruction, memorization, individual achievement, testing for knowledge, and traditional textbooks. The best paper debunking these progressive, constructivist teaching pedagogies is:

Why Minimal Guidance During Instruction Does Not Work: An Analysis of the Failure of Constructivist, Discovery, Problem-Based, Experiential, and Inquiry-Based Teaching [Paul A. Kirschner](#), [John Sweller](#) & [Richard E. Clark](#)

Article in Educational Psychologist · June 2006

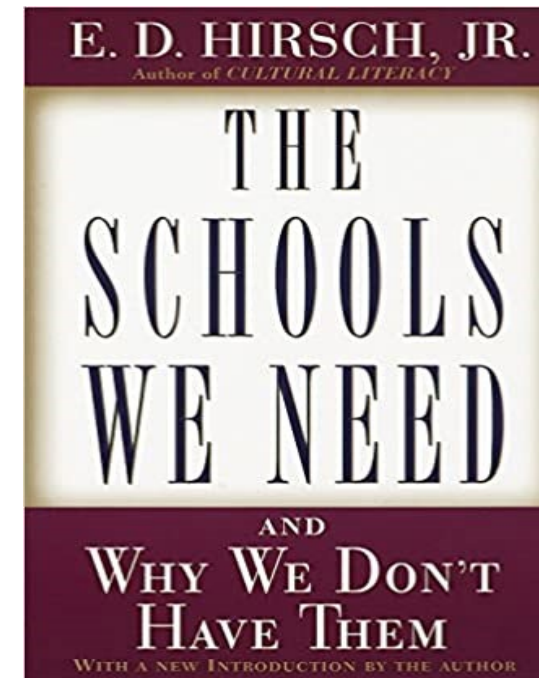
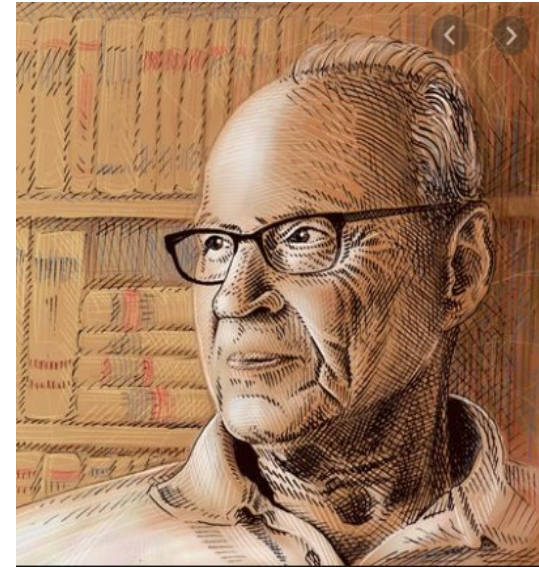
Abstract: Evidence for the superiority of guided instruction is explained in the context of our knowledge of human cognitive architecture, expert-novice differences, and cognitive load. Although unguided or minimally guided instructional approaches are very popular and intuitively appealing, the point is made that these approaches ignore both the structures that constitute human cognitive architecture and **evidence from empirical studies over the past half-century that consistently indicate that minimally guided instruction is less effective and less efficient than instructional approaches that place a strong emphasis on guidance of the student learning process.** The advantage of guidance begins to recede only when learners have sufficiently high prior knowledge to provide "internal" guidance.



From <http://www.illinoisloop.org/read.html>:

In 1996, over 100 leading educators, mathematicians, scientists and reformers signed a letter to President Clinton, saying, in part,

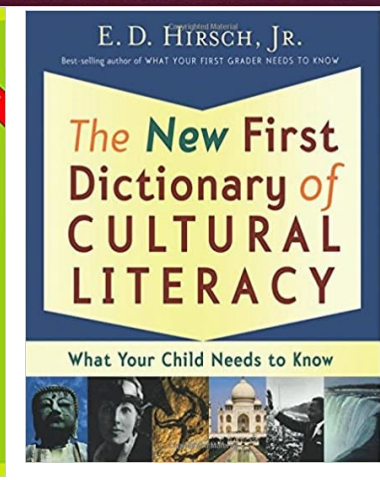
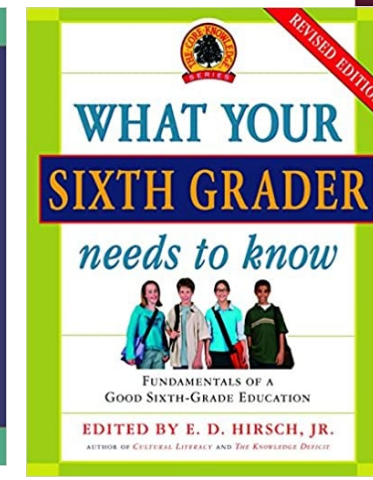
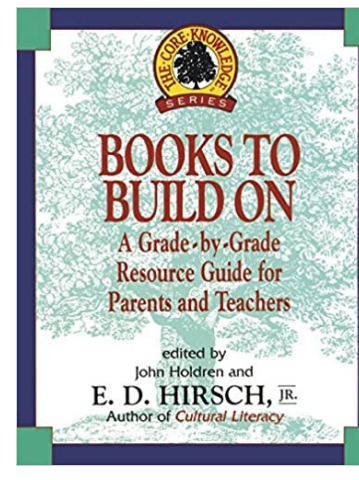
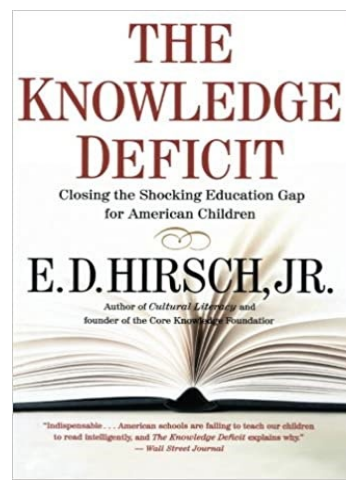
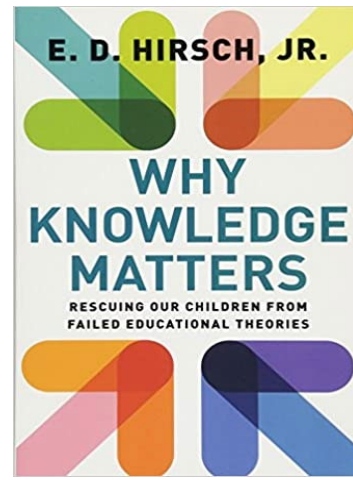
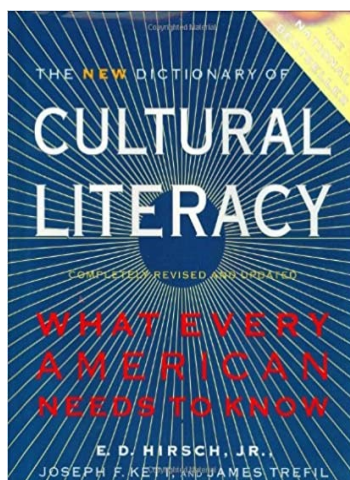
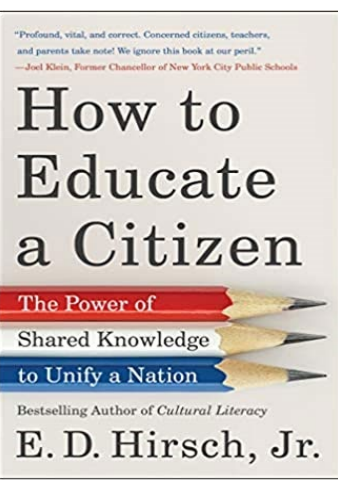
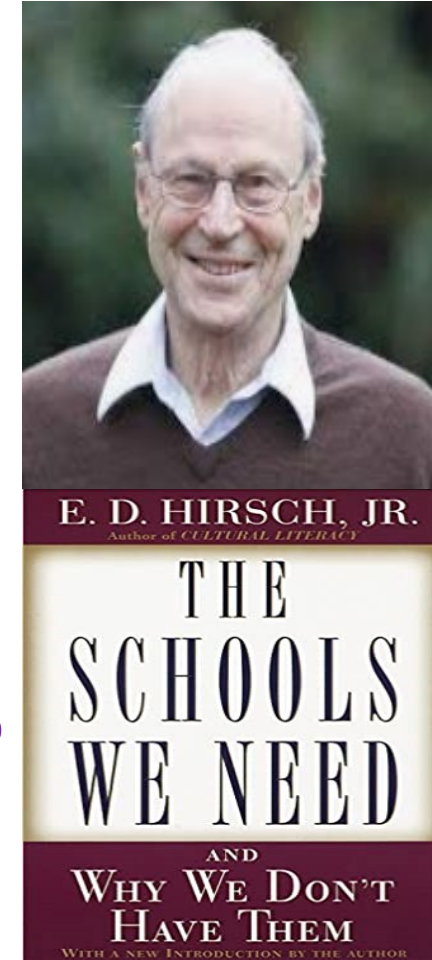
- **Dear Mr. President:**
- **There is no greater threat to the future of America than the failure to educate our children.** Yet, the output of our educational system continues to deteriorate. ...
- The current national outcry for standards of learning reflects the need for our educational system to **focus on content and academics**. Unfortunately, these simple ideas are not compatible with the reform efforts of the last fifty years, and there is every reason to believe that standards based on content and academics will be subverted before they ever reach the classrooms of America.
- This letter is not a plea to eliminate the Department of Education nor a request for the removal or restructuring of the Goals 2000 program. We ask but one simple thing. **Think of it as a favor from the President of the United States to the children of America. All we ask is that you, personally, read The Schools We Need and Why We Don't Have Them by E. D. Hirsch, Jr.**
- It is our belief that in reading this book you will gain important insight into the gravity of the problem and realize why we are pessimistic about the current prospects for revitalizing education in America. We believe that you will see the need to make the repair of American education a top priority for your second term. We even believe that you will come to feel, as we do, that it is imperative that you bring E. D. Hirsch into your service to advise you directly on these matters.



From amazon.com:

This is the indispensable guide for teachers, administrators and knowledgeable parents who want to make their school strong and substantive, rather than **a trendy and progressivist mess**.

The book's write-up says, "For over fifty years, American schools have operated on the assumption that challenging children is bad for them, teachers do not need to know the subjects they teach, that the learning "process" should be emphasised over the facts taught within it. Yet, as renowned educator and author E. D. Hirsch shows in *The Schools We Need*, this establishment ideology is a tragedy of good intentions gone awry. Hirsch argues that **in eschewing content-based curricula for abstract--and disproved-- theories of cognitive development, the educational establishment has done irreparable harm to America's students**, and instead of preparing them for the country's highly competitive, information-based economy, **the process-oriented curricula the establishment practices has severely curtailed their ability, and desire, to learn.**"



Applications and Misapplications of Cognitive Psychology

by John R. Anderson, Lynne M. Reder and Herbert A. Simon

- The argument that knowledge must be constructed is very similar to the earlier arguments that discovery learning is superior to direct instruction. In point of fact, **there is very little positive evidence for discovery learning and it is often inferior.** Discovery learning, even when successful in acquiring the desired construct, may take a great deal of valuable time that could have been spent practicing this construct if it had been instructed. Because most of the learning in discovery learning only takes place after the construct has been found, when the search is lengthy or unsuccessful, motivation commonly flags.
- Situated learning commonly advocates practices that lead **to overly specific learning outcomes** while **constructivism** advocates **very inefficient learning and assessment procedures.**



Herbert A. Simon earned the prestigious A.M. Turing Award for his work in computer science and won the 1978 Nobel Prize in Economics.

[Address to California State Board of Education](#), by E.D. Hirsch, Jr.

- The premier journal of educational research is Educational Researcher. Recently, an article was submitted that refuted the claims of situated learning. (**Situated learning is the supposed scientific basis of such teaching methods as project learning, integrated learning, and thematic learning**). The article also refuted the claims of **constructivism**, which is a supposedly scientific foundation for such teaching methods as **inquiry learning, discovery learning and hands-on learning**.
- After a so-called peer review, Educational Researcher turned down the article, and agreed to print only a section of its critique of situated learning. This decision would have been unremarkable except that the three authors of the article happened to be among the most distinguished cognitive scientists in the world, John Anderson and two other colleagues at Carnegie Mellon, Lynn Reder, and Herb Simon. The latter happens also to be a Nobel prize winner.
- Over the past decades, **educational Lysenkoism** has created a conflict between the conclusions promulgated widely in education and those that are accepted in mainstream psychology. Of several such conflicts I shall choose three of the most important -- testing, math, and early education. I intend to be blunt, since forthrightness will be more useful to you than tact.



Address to California State Board of Education, by E.D. Hirsch, Jr.

- I was forced to conclude that in the field of psychology, which is the key field for education research, much of what is accepted within the educational community has been required to conform to a so-called "**constructivist**" ideology that does not represent the consensus in mainstream psychology, and is almost certainly **incorrect**. One distinguished psychologist who receives grants from the education division of the National Science Foundation (NSF) expressed dismay at the ideological, anti-empirical sermons, as he called them, which he hears at the education division of NSF meetings in psychology.
- This is a situation that is reminiscent of what happened to biology in the Soviet Union under **Lysenkoism, which is a theory that bears similarities to constructivism**. In Stalin's day, Lysenko was the powerful bureaucrat-scientist who controlled Soviet biological research, and declined to fund any that didn't conform to the received ideology, which consisted in the view that nurture can transform nature. During the Lysenko period, the dominance of this ideology over disinterested research **not only retarded Soviet biology, it caused mass starvation. There are analogies lurking in that history. Over the door of every board of education should be posted the watchword: "Remember Lysenko."**

Address to California State Board of Education, by E.D. Hirsch, Jr.

- ...varied and repeated practice leading to rapid recall and automaticity is necessary to higher-order problem-solving skills in both mathematics and the sciences. ... lack of automaticity places limits on the mind's channel capacity for higher-order problem-solving skills. ... **only intelligently directed and repeated practice, leading to fast, automatic recall of math facts, and facility in computation and algebraic manipulation can one lead to effective real-world problem solving.** ... [These conclusions are based on] reliable facts, figures, and documentation ... not just from isolated lab experiments, but also from large-scale classroom results.“

The authors praise the current consensus on these 'child-centered' principles for being 'progressive, developmentally appropriate, research based, and eminently teachable.' These claims are not, however 'research based' in the way the authors imply. Quite the contrary. No studies of children's learning in mainstream science support these generalizations. With respect to effective learning, **the consensus in research is that their recommendations are worst practice, not 'best practice.'**



Garth Gaurdy

The Northridge Chronicles *A Virtual Play*

In Australia there was a huge mobilization against math education practices very similar to those our math educators have proposed and instituted. I am in contact with an **Australian Mathematician, Garth Gaurdy**, who was one of the leaders in the fight. **They got 750 mathematicians to sign a petition condemning what has been called "fuzzy" math here.** Recently the Prime Minister said on National TV that he agreed and mandated that Australian schools stop watering down the curricula and return to teaching fundamental skills needed by all children. Here are some quotes from Gaurdy which you may find interesting:

We have been having problems in Australia very similar to the ones which you outline . . . **It seems that a disease is sweeping the Western World, particularly the English-speaking part.** I conducted an outspoken campaign in the press and TV in Sydney about the proposed new Years 9-10 Advanced Mathematics course for NSW.

- I am pleased to say that the Sydney Morning Herald, and, to a lesser extent, the XYZ and SBS TV channels, supported me strongly. **The proposed syllabus did away with what I understand to be mathematics, and replaced it by button pressing on calculators, cutting up paper etc. No concepts. Lots of misconceptions masquerading as relevance, etc.** Fortunately, my campaign succeeded, even to the extent of it becoming a front-line election issue in the recent State election. There has been a change of government from Liberal(conservative) to Labor. The new Premier has been outspokenly critical of developments in curricula. He is an intellectual (historian by original training), and approached me for advice some time ago. **He and I share the view that good quality education is an essential ingredient of social progress and personal advancement.**
- The US context is quite different, I realize. We have an advantage of sorts in that the State Government mandates curriculum. **Nevertheless, I am utterly convinced that professional mathematicians can regain some of the ground which we have lost over the years to the education gurus, in each of our countries.** Is there any such initiative in the US? **Here, the professional mathematicians have been very united.**

Reform Mathematics Education: *How to "Succeed" Without Really Trying*

by Paul Clopton

- Since the 1980's, there have been substantial efforts nation wide to weaken mathematics education in America, and these efforts have largely been successful. This is not a communist conspiracy. It flows from an honest desire to help the less fortunate. This effort is based on the misguided notion that weaker mathematics will be helpful to the traditionally disadvantaged groups in our society. It is this effort, curiously known as *reform*, that is the root cause of what has come to be known as the *math wars*.
- You won't find many *reformers* who will openly admit that they favor "dumbed-down" mathematics. In fact, the reform movement is characterized by a plethora of rhetoric to the contrary. The diatribes are extensive and frequent and are laden with phrases like **"higher order thinking" and "conceptual understanding" and "real-world problems"** while shy on terms like "arithmetic" and "algebra." Reformers have learned their scripts well, and the rhetoric comes gushing forth with little provocation.
- The conditions that prompted this movement are obvious. Poor people, minorities, and women are under-represented among those who reach high levels of mathematical achievement. Those who cannot master arithmetic and algebra are unlikely to achieve a decent college education.
- One way to deal with this problem is to make the mathematics easier. This means **less rigor, less emphasis on arithmetic and algebra, more reading and art and creative projects, less emphasis on correct answers, more calculators, and a host of other reform-minded solutions. Stylish pedagogical methods combined with rhetoric about higher order thinking while downplaying or condemning outright both computation skills and mathematical proof complete the package. This is *reform mathematics education*.**

Reform Mathematics Education: *How to "Succeed" Without Really Trying*, by Paul Clopton

- **Pedagogical Fads** - The reform movement places great emphasis on classroom methods, such as those that involve groups, calculators, activities and projects, manipulatives, explorations, artwork, and non-mathematical themes.
- The heavy emphasis on style quite naturally **takes attention away from mathematical content**. As teachers attend to implementing these processes, their evaluations of students become biased toward process and away from content.
- **Mathematical learning will often take a back seat to artistic ability, cooperation, or even political correctness again blurring the distinctions between success and failure when it comes to learning mathematics.**

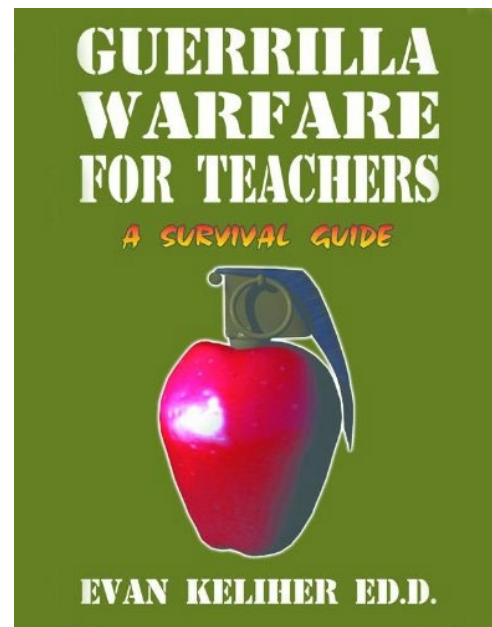
Testimony at School Mathematics Education Hearing, by Stanley Ocken

- K-12 educators should prepare their students for success, not failure. Unfortunately, much of the "reform" movement is moving in the wrong direction. In influential circles, including those with decision making power at the DOE, **the reigning buzzwords are "higher order thinking", "focus on real-life problems" , and "conceptual understanding."** These are Mom-and-apple-pie desiderata, but in the context of mathematics education discussions, they should be recognized **as disingenuous code phrases** that in practice **signal abandonment of fluent and automatic symbol manipulation skills** as the most critical goal of college preparatory mathematics.

Forget the Fads—The Old Way Works Best by Evan Keliher

What will fix public education? A teacher, a chalkboard and a roomful of willing students.

When Ptolemy I, the king of Egypt, said he wanted to learn geometry, Euclid explained that he would have to study long hours and memorize the contents of a fat math book. The pharaoh complained that that would be unseemly and demanded a shortcut. Euclid replied, “**There is no royal road to geometry.**”



We should stop using students as lab rats and return to a more traditional method of teaching. If it was good enough for Euclid, it is good enough for us.

There wasn't a shortcut to the learning process then and there still isn't. **Reform movements like new math and whole language have left millions of damaged kids in their wake.** We've wasted billions of taxpayer dollars and forced our teachers to spend countless hours in workshops learning to implement the latest fads. Every minute teachers have spent on misguided educational strategies (like building kids' self-esteem by acting as “facilitators” who oversee group projects) is time they could have been teaching academics.

The only way to truly foster confidence in our students is to give them real skills—in reading, writing and arithmetic—that they can be proud of. One model that incorporates this idea is direct instruction, a program that promotes rigorous, highly scripted interaction between teacher and students.

Coping with Math Reform by Gregory Bachelis

- **Beware of *fixes*.** The problem with this is that **the new approach - modeling and simulation, heavy use of graphing calculators, emphasis on real world problems, lots of subjects mixed together, cooperative learning - is in many ways antithetical to the classical approach** - mathematics as a deductive discipline, theory before applications, mastering subjects one-by-one, students working individually. So trying to have these approaches presented **side-by-side can create confusion, if not chaos**. It is better to have the two approaches separate but both available.
- **Beware of claims of higher order thinking and problem solving.** The claim is made that algebra drill is merely rote learning and that the new methods promote thinking as a means of problem solving. The problem with this is that the baby is being thrown out with the bath water. Algebra is needed precisely so that it can be used as a tool in solving problems. Solving problems in the abstract can be quite time consuming. There needs to be a context, and that is what algebra provides, once it is mastered.
- **Beware of claims that these new programs are a better preparation for college math than the traditional ones.** There is reform math at the college level, to be sure, but it is a much different animal. While there is cooperative learning and an emphasis on real world problems, there is no integration of subjects - in fact reform calculus has fewer topics than the standard variety - and algebra is not jettisoned in favor of graphing calculators. I should add that graphing calculators are fast becoming a staple in almost all college calculus courses, but in their appropriate place as a tool, not as a substitute for thinking.



Forget The Fads--The Old Way Works Best by NEWSWEEK STAFF, 2002

- I've never claimed to have psychic powers, but I did predict that the \$500 million that philanthropist Walter Annenberg poured into various school systems around the country, beginning in 1993, would fail to make any difference in the quality of public education. Regrettably, I was right.
- BY APRIL 1998, it was clear that the much-ballyhooed effort had collapsed on itself. A *Los Angeles Times* editorial said, "All hopes have diminished. The promised improvements have not been realized." The program had become so bogged down by politics and bureaucracy that it had failed to create any significant change.
- How did I know this would be the result of Annenberg's well-intentioned efforts? Easy. **There has never been an innovation or reform that has helped children learn any better, faster or easier than they did prior to the 20th century.** I believe a case could be made that real learning was better served then than now.
- Let me quote TheodoreSizer, the former dean of the Harvard Graduate School of Education and the director of the Annenberg Institute for School Reform, which received some of the grant money. **A few years ago a reporter asked him if he could name a single reform in the last 15 years that had been successful. Sizer replied, "I don't think there is one."**
- I taught in the Detroit public-school system for 30 years.

HOW EXPERTS DUMB DOWN MATH EDUCATION, by David Klein and Jerry Rosen

- The 1992 Mathematics Framework for California Public Schools governs, to a considerable extent, the mathematics curriculum in California's public schools. **It is a model of mediocrity.** The Framework **recommends that calculators be issued to kindergartners and used in all K-12 grades; it strongly discourages placing students by ability or achievement; it advocates that teachers do more "facilitating" and less "teaching;" it discourages testing, and promotes portfolios, "authentic assessment," and "holistic scoring rubrics;" it de-emphasizes basic skills and promotes "cooperative work" over individual responsibility. In short, it is the bible of "fuzzy math."**
- Why is this kind of mediocrity promoted by so many education professors and education experts? **We suggest that it is simply good intentions gone awry, resulting in institutionalized "liberal racism."** Liberal education experts fear that minority students can't learn real math because of "cultural differences." They recognize that it would be preposterous to lower standards only for those students while maintaining high standards for other groups. Thus, the education experts lower standards for everyone, **with "authentic assessment" replacing hard-core, standardized tests, and so-called "higher order thinking" supplanting basic skills.**

HOW EXPERTS DUMB DOWN MATH EDUCATION

by David Klein and Jerry Rosen

- As with "Whole Language Learning," education professors will indoctrinate pre-service teachers in the "new new math." As time goes on, it will be harder to undo the damage. A component of this "fuzzy math" approach is to encourage **unearned self-esteem** and some students, parents, and even teachers may be misled into **a false sense of achievement**.
- More than 2,000 years ago, Ptolemy asked Euclid if geometry could not be mastered by an easier process than by studying the Elements. Euclid gave his oft quoted reply, "There is no royal road to geometry." **Though education experts might wish it otherwise, learning mathematics requires hard work and hard work has no substitute.** Teachers and students in other countries understand that time-tested principle better than we do and this bodes ill for our future. For the sake of our children and our society, for the sake of our future, it is time to demand real standards in our schools and universities.



New-age Math Doesn't Add Up by Bruce Ramsey

- **It's called reform math, discovery math, constructivist math, fuzzy math.** I think of it as new-age math, and **believe it is one reason why last year nearly half the 10th-graders in Washington public schools failed the mathematics portion of the high-school graduation test. It is also one reason American kids do so poorly when measured against kids from Europe and East Asia. ...**

New-age math ... came packaged with a garden basket of fragrant thoughts. ... It tends to introduce topics in a roundabout way that aims for a eureka moment. **That is the 'discovery' part.** It introduces many subjects early, focusing on concepts rather than calculation. **That is the 'constructivist' part.** It sometimes wants the student to estimate an answer rather than find the right one. **That is the 'fuzzy' part.** It demands written explanations of how an answer was arrived at, often in 'math journals.' ... New-age math uses games, colored blocks, dice, poker chips and other [manipulatives](#). It requires working in groups. 'The idea is that if you let them struggle and come up with their own solutions, they'll learn it better,' ... None of these things is necessarily bad. ... But there are drawbacks. ...

[A teacher] at Ballard High, says, 'Supposedly, reform math is heavier in concepts but weaker in skills. **But in my experience, kids are weaker in both.**' He says the weakness is most noticeable in 'B' and 'C' students. ... And after high school? At community colleges, half the students take [remedial math](#). At the University of Washington, [a professor] says, 'I saw a **profound drop** in math skills starting in the mid-'90s.' New-age math, he says, has **created 'a whole generation of students who can't do fractions.'**

Toward a Cease-Fire in the Math Wars Mathematically Correct

Guidelines to promote a more efficacious mathematics education:

- Refrain from promoting any theory of learning or method of teaching

Diversity in the student population is no excuse to promote methods such as constructivism or cooperative learning over methods such as direct instruction. The well-prepared teacher is skillful in a variety of approaches and in deciding which approach to use in specific classroom situations. Any guiding document on mathematics education should avoid promoting one approach over others.

- Encourage frequent objective tests to monitor student progress

The use of objective tests of student knowledge and skills has been much maligned. Regardless of whatever other measures are used, students should also be able to do well on these more traditional, objective indices of achievement. The importance of frequent measures of student progress necessitates the use of these valuable tools.

- Keep the focus on mathematics

The key to success is not just making mathematics fun and interesting -- mathematics achievement will continue to require hard work. Diverting time and attention away from the mathematical focus with projects and activities that contain little mathematics is self-defeating. Similarly, skipping among unrelated topics in a misguided effort to increase interest destroys the mathematical focus.

- Refrain from promoting heterogeneous grouping or repudiating homogeneous grouping

The use of **heterogeneous grouping** and disdain for homogeneous grouping is without empirical basis and may detract from the learning potential for all students. Any guiding document on mathematics education should avoid these issues.

Toward a Cease-Fire in the Math Wars Mathematically Correct

Guidelines to promote a more efficacious mathematics education:

- Admit that arithmetic and algebra are the key elements of the early curriculum

Arithmetic and algebra have continually been stumbling blocks for many students. Rather than a reason for mathematics education to shy away from these areas, this is a reason for increasing the emphasis on and attention to these subjects. The putative changes in mathematics have been used to justify broadening the scope of math education to the point of detracting from these important areas, and their rightful emphasis must be restored.

- Include symbolic skill-building, abstract mathematics, and repeated practice

Not all learning in mathematics must or should be based in applications. **Even when the ultimate objective is real-world application, the acquisition of skills and knowledge may often require more abstract and fundamentally pure mathematical material along the way.**

- Reinstate an emphasis on proof and mathematical justification

The de-emphasis on proof and the casual approach to mathematical reasoning have been harmful to this important feature of mathematics. The gradual development of formal logic and proof must begin earlier in the curriculum and be given greater emphasis.

- Emphasize that algorithms should be taught, understood, and used

Algorithms and operations are not evil, but in fact are techniques to be taught, understood and then used to make processes more efficient and thus make room for further advancement.

- Indicate that calculators and computers should be used sparingly

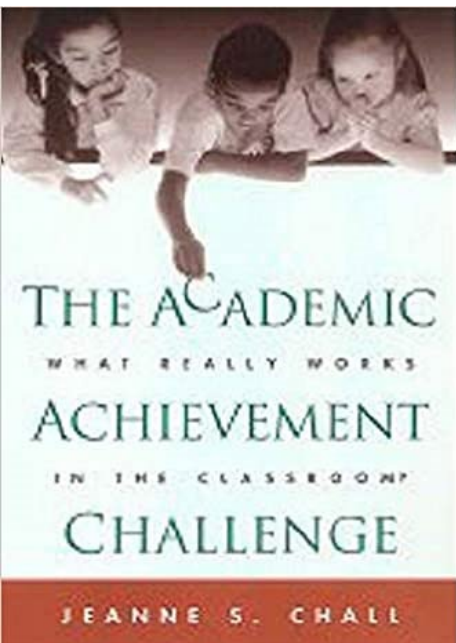
The advances of technology proceed at an alarming rate, making it all but impossible to evaluate their impact on education. Introduction of these has to be assumed to place learning at risk unless it is done conservatively, including a large portion of class/curriculum/tests that do not allow technology.



The Academic Achievement Challenge: What Really Works in the Classroom? by Jeanne S. Chall

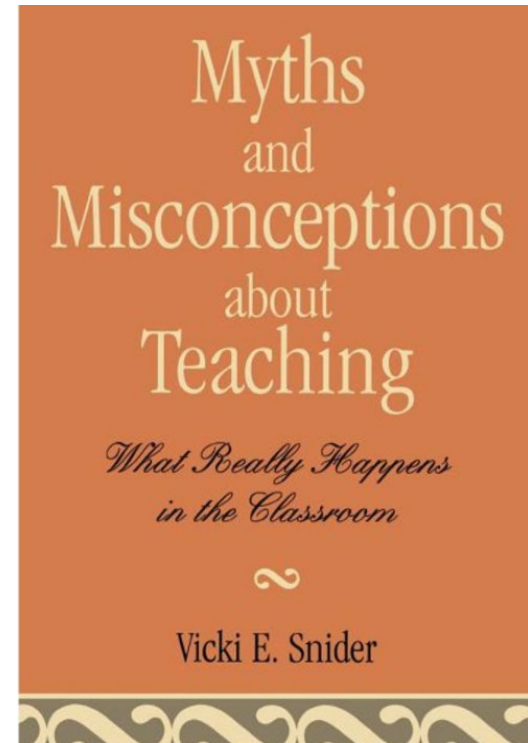
- From the late Jeanne S. Chall, Professor of Education at Harvard University and a leading figure in American education, the book reviews and evaluates the many educational reforms and innovations that have been proposed and employed over the past century. Systematically analyzing a vast body of qualitative and quantitative research, Chall compares achievement rates that result from traditional, teacher-centered approaches with those resulting from progressive, student-centered methods. Her findings are **striking and clear**: that teacher-centered approaches result in higher achievement overall, with **particular benefits for children of lower socioeconomic status and those with learning difficulties**. Offering cogent recommendations for practice, the book makes a strong case for basing future education reforms and innovations on a solid empirical foundation.
- This is a gentle, pleasant, inviting book with a blockbuster message: that **the best way for kids to learn is with a structured, teacher-centered approach**.
- **The capstone work of a great scholar, this book synthesizes all the relevant research to show that student-centered teaching does not live up to its education-school billing. Rather it is teacher-centered education which leads to greater excellence and fairness.**

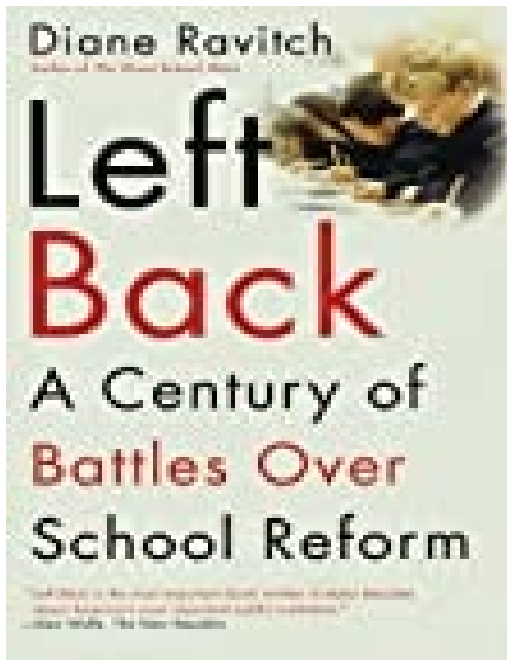
— E. D. Hirsch, Jr.



From amazon.com:

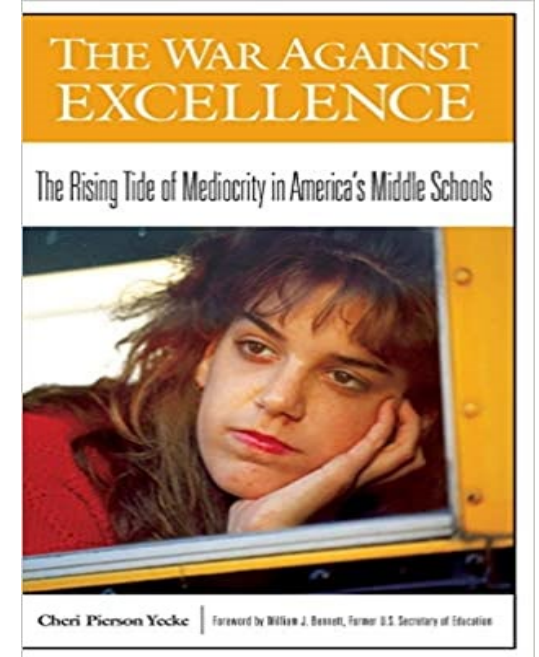
- Vicki Snider's book, *Myths and Misconceptions About Teaching: What Really Happens in the Classroom*, challenges whether regular classrooms with holistic, discovery-oriented and democratic philosophies are appropriate teaching environments for any students. Snider suggests that the most effective teaching methods are direct instruction, explicit teaching, and highly structured curricular environments.
- Snider proposes that many teaching strategies have come from theories of learning that have not been empirically tested, such as multiple intelligence, and that student failures to a large extent can be explained by the fact that education systems do not empirically test teaching methods and curricula. She argues that the trend toward whole language, discovery-oriented, and experiential approaches to learning hinders learning at best, and at worst, actually causes some students to have learning difficulties.





Left Back charges that American schools have been damaged by three misconceptions. The first is the belief that the schools can solve any social or political problem. **The second is the belief that only a portion of youngsters are capable of benefiting from a high-quality education. The third is that imparting knowledge is relatively unimportant, compared to engaging students in activities and experiences.**

Radical activists do not see the American middle school as an organization to impart academic knowledge, but as an instrument through which they can **force social change**. Yecke, an experienced teacher and administrator, shows how these activists have implemented their plans and **endangered the education** of all middle school children—especially those who are gifted.



Dr. Kozloff is even more emphatic about DAP in his essay, *Fad, Fraud, and Folly in Education*:

The phrase "developmentally appropriate" is a rhetorical device by which **self-styled "child-centered"** educators and publishers try to convince gullible education students, teachers, and parents that what they sell ("**inquiry learning,**" "**discovery learning,**" "**constructivism,**" "**whole language**") is good, and that direct instruction, practice, and teaching elemental skills first are bad. There is no serious research whatever to support claims about what is developmentally appropriate. Instead, the validation is nothing more than repetition of this vapid phrase -- a chant. The pernicious side is that advocates of "developmentally appropriate practices" believe that preschool and early elementary age children (even young children with known disabilities) should not be taught language and reading in a systematic fashion because this would be unnatural. Consequently, advocates of "DAP" either do not know (are so blinded by their beliefs that they do not care) that **disadvantaged students and students with disabilities will be denied exactly the sort of instruction they need to catch up with advantaged peers.** (See Hart and Risley's Meaningful differences .) **This is how "educational philosophy" means the same as "the higher immorality."**

Mathematics Education In The Eighties And Nineties, by Wayne Bishop

- An alphabet soup of curricula is now being used that have been designed to meet the goals of these documents and the philosophy, called **constructivism**, that generated them. The mathematics educational leadership of the state and nation are in almost unanimous support of the method and materials which claim concurrence, e.g., **lengthy investigation of realistic problems by groups of students working together with a minimum of direct instruction and with calculator assistance at all times. Reduction or elimination of problems that admit algorithmic solution approaches** is another aspect of the philosophy. **Elimination of traditional testing** is also recommended along with elimination of the usual efforts to **group students according to mathematical experience and ability**. The argument is that the **single dimensionality of testing** versus the **multiple intelligence factors** of students of mathematics should not be allowed to exclude some students from the benefits that completion of a college preparatory mathematics program would offer.



The "death spiral" of fuzzy math education (from <http://www.illinoisloop.org/math.html>)

- Many of the new fuzzy math programs embrace a concept called "**spiraling**" in which the same material is presented multiple times. The intention is that brighter students get a look ahead, while providing slower students an extra opportunity to catch up. But unlike reinforcement strategies, **spiraling does not seek mastery first, so successive presentations give children numerous wonderful opportunities to experience total, humiliating, discouraging failure.**

Educational Aspects of Mathematics Disabilities by Susan Miller and Cecil Mercer

- The typical basal curriculum uses a spiraling approach to instruction; in other words, numerous skills are rapidly introduced in a single graded book. The same skills are reintroduced in subsequent graded books at higher skill levels. **Basal instruction using this spiraling curriculum approach is supposed to add depth to the math topics taught, but in reality the result seems to be superficial coverage of many different skills. Skill mastery is unlikely, because new skills are introduced too quickly in an attempt to "get through the book."** The primary concerns regarding basal programs are the lack of adequate practice and review, inadequate sequencing of problems, and an absence of strategy teaching and step-by-step procedures for teaching problem solving (Wilson & Sindelar, 1991). **Research has demonstrated that the basal approach to teaching mathematics is particularly detrimental to students who have learning difficulties** (Engelmann, Carnine, & Steely, 1991; Silbert & Carnine, 1990; Woodward, 1991)."

- **Things Don't Add Up In B.C. Math Classes** by Bill Hook and Karin Litzcke

British Columbia's elementary math curriculum is **crippling learning, especially among disadvantaged students**. B.C. has used what is **called a "spiral" curriculum since 1987, following a tradition of emulating U.S. educational practice**. A spiral curriculum runs a smorgasbord of math topics by students each year, the idea being that they pick up a little more of each with every pass. In reality, the spin leaves many students and teachers in the dust. ... Presently, teachers face having Grade 4 classes who still cannot add $567 + 942$ nor multiply 7×8 because the **Grade 1, 2, and 3 teachers were forced to spend so much time on graphing, polygons and circles, estimating quantity and size, geometrical transformations, 2D and 3D geometry and other material not required to make the next step**, which is 732×34 . And **because elementary math fails to provide a solid foundation, many basically capable students simply give up when faced with the shock of high school algebra**, which would be the doorway to advanced technical training at all levels. ... **[T]eachers cannot make up Grades 1 to 7 while teaching Grade 8.**

But for those that struggle with math, the pacing [of spiraling] is horrible. If you fail to get basic step one, you are then unprepared for basic step two, and so on and so forth. So, it appears that the kids fall further and further behind and by the time they appear in the upper grades they are lost and convinced they cannot understand math at all.

The 1st and 2nd grade teachers are frustrated by the fact that they are expected to introduce algebra ideas and the 5th and 6th grade teachers are frustrated as they are reteaching multiplication facts instead of their core content standards.



Barry Garelick
@BarryGarelick

Barry Garelick:

<https://traditionalmath.wordpress.com/>

<https://www.youtube.com/watch?v=RIbXZOoAMU>



TRADITIONAL MATH

An effective strategy that teachers feel guilty using.



Math Education in the US: Still Crazy After All These Years

A presentation by Barry Garelick;
At SAR, San Luis Obispo, California

Feb 17, 2018
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