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INTRODUCTION

A 1983 report to the U.S. Secretary of Education, *A Nation at Risk,* drew attention to the poor mathematics and science achievement of American students relative to those in other economically advanced countries.[1] A 1998 report, *A Nation Still at Risk*, pointed out how little progress had been made.[2]

A response to these risks, the report *Goals 2000*, for better or worse, recommended centralizing the nation's school system in an effort to raise standards and measure achievement on a national level.[3] Additional research, reports, conventions, and policies spun out of *A Nation at Risk* and culminated in the 2002 federal legislation known as No Child Left Behind, which in principle required schools to meet new standards as indicated by achievement test performance.[4]

For the last half-century, however, higher spending and many

1. U.S. Department of Education, *A Nation at Risk* (Washington, DC, 1983).

2. William J. Bennett, Willard Fair, Chester E. Finn, Floyd H. Flake, E.D. Hirsch, Will Marshall, and Diane Ravitch, "A Nation Still at Risk," *Policy Review* 90, (1988): 23–29.

3. William J. Jeynes, *American Educational History: School, Society, and the Common Good* (Thousand Oaks, CA: Sage Publications, 2007).

4. Patrick J. McGuinn, *No Child Left Behind: and the Transformation of Federal Education Policy, 1965–2005* (Lawrence, KS: Lawrence University Press of Kansas, 2006).

reforms failed to raise achievement to the high levels of other economically advanced countries.[5] A recent international achievement study showed, for example, that among students in 30 countries, those in the United States ranked 25th in science, exceeding only Portugal, Italy, Greece, Turkey, and Mexico.

American students also do poorly in language. The 2008 report of the National Assessment of Educational Progress (NAEP), for example, showed that only an estimated 24 percent of 12th graders showed proficiency in writing as indicated by correct spelling, appropriate grammar, and the skills needed to write an essay and explain complex information.[6] Only 31 percent of 8th graders showed adequate reading skills. Language skills, particularly reading, are essential for further learning in school subjects and have important economic and social significance.

John Bormuth's unique reading survey of about 5,000 people aged 16 and over showed that 87 percent of those employed reported that they had to read as part of their jobs.[7] Typical workers read 141 minutes per day as part of their jobs, or about 29 percent of the workday. Since the national wage bill in 1971 was $859 billion, Bormuth estimated that U.S. workers earned $253 billion for on-the-job reading. Since there are more workers today who undoubtedly read even more at higher hourly wages, the amount paid for on-the-job reading must be substantially greater.

Arguably, U.S. workers receive more pay for reading than any other activity. Yet, American youth are ill prepared in reading as

5. Caroline M. Hoxby, "Are Efficiency and Equity in School Finance Substitutes or Complements?" *Journal of Economic Perspectives,* 10(4), (2007): 51–72. See also Organization for Economic Co-operation and Development, Program for International Student Assessment (PISA), 2006: *Science Competencies for Tomorrow's World* (Paris: December 2007).

6. Deborah Salahu-Din, Hillary Persky, and Jessica Miller, *The Nation's Report Card: Writing 2007* (NCES 2008–468). (Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, 2008).

7. John R. Bormuth, "Value and Volume of Literacy," *Visible Language* 12 (1978): 118–161.

well as mathematics and science for further education and work. Colleges and firms must provide costly remedial training to try to make up for prior years of lagging achievement.

Dropouts

The learning problem is also reflected in dropout rates. After World War II, the United States was notable for having comparatively large percentages of students entering and graduating from high school. But other countries have made rapid progress, and the United States now ranks poorly among other economically advanced countries. Between 1995 and 2005, for example, U.S. high school completion rates dropped from 2nd to 21st among 27 economically advanced countries even though U.S. per-student spending on schools was rising and had been (and still is) among the highest per-student school spenders of all economically advanced nations.

Only about 70 percent of American students graduate on time with a regular high school diploma and about 1.2 million students drop out annually. Seventeen of the nation's 50 largest cities have dropout rates greater than 50 percent.[8]

Poor achievement and less education deny young people prosperous, healthy lives. Adults with more education not only earn more but also live longer, save a larger fraction of their incomes, and invest more in their children. As noted by Gary Becker and Kevin Murphy in 2008, highly educated people excel in many aspects of life. "The education process itself leads people away from more harmful activities and toward better habits."[9]

Americans are deservedly concerned about the poor performance of K–12 students and the possible consequences for their

8. Christopher B. Swanson, *Cities in Crisis* (Washington, DC: America's Promise Alliance, 2008), http://www.americaspromise.org/APA.aspx.

9. Gary S. Becker and Kevin M. Murphy, "Inequality and Opportunity," *Capital Ideas* (May 2007): 4–7.

future and the nation's. As a result of inferior achievement, the United States grew at a lower rate than its potential,[10] reducing the quality of life at least insofar as purchasing power is concerned. For 2007 alone, the loss was an estimated $300 billion. Because we live in an information age of increasing global competition, knowledge and skill deficits could be far more damaging in the future. One consequence is growing job outsourcing to other countries, not only in manufacturing but increasingly in services such as radiological diagnosis and software development.

The Public's School Reform Views

The public appears to understand the learning problem and has astonishingly strong views about what to do about it. They favor much more accountability for schools, educators, and students. Many think students in repeatedly failing schools should be allowed to transfer elsewhere, and many see a need for replacing the faculty or closing such schools altogether.[11]

Only 11 percent of the public is against renewing federal legislation that requires states to set standards in mathematics and reading (or English language arts). They favor testing students each year to determine whether the standards are being met. More than 8 in 10 favor a policy of requiring students to pass an examination before they are eligible to move on to the next grade, and 85 percent support requiring a high school graduation examination.

Sixty percent of the surveyed public favors the publication of

10. Erik A. Hanushek and Ludvig Woessmann, *Education Quality and Economic Growth* (Washington, DC: World Bank, 2007).

11. William G. Howell, Martin R. West, and Paul E. Peterson, "What Americans Think about Their Schools." *Education Next* (fall 2007): 12–26. Though the public appears correct in their view that the schools are failing and that radical changes are called for, they may be naïve or rationalizing in saying that the schools their children attend are acceptable, a view similar to that in Lake Woebegone where it is joked that all the children are above average.

the average test scores of students in each public school. A similar percentage says that schools that fail to meet state standards for five consecutive years should be substantially reformed or closed, and only 4 percent of the public completely oppose teacher replacement; 3 percent completely oppose replacing the principal, and 14 percent completely oppose turning the school into a charter school. Only about one-fifth of the public completely oppose the use of government funds to pay the tuition of low-income students who choose to attend private schools.

Less than a third of the public opposes basing teacher salaries in part on students' academic progress on state tests. Sizable percentages of the population believe that teachers in challenging schools should get larger salaries, and that qualified teachers of mathematics and science, which are hard to recruit, should be given extra compensation.

Thus, the public favors both stricter enforcement of the present legislation as well as more radical reforms. Four decades after it became clear that U.S. students were falling behind those in other countries, and a quarter-century after publication of *A Nation at Risk*, citizens have come to hold radical views in contrast to those of the twentieth century.

Students' versus Educators' Views

Like the public, students—the direct clients of public schools—think their schools have been lax and should raise their standards. A Public Agenda national survey of high school students, for example, showed that three-fourths believe stiffer examinations and graduation requirements would make students pay more attention to their studies. Three-fourths said schools should promote only students who master the material. Almost two-thirds reported they could do much better in school if they tried. Nearly 80 percent said students would learn more if schools made sure they were on time and did

their homework. More than 70 percent said schools should require after-school classes for those earning Ds and Fs.[12]

In these respects, educators on average differ sharply from students and the previously described views of the public. Interviews with a national representative sample of elementary- and secondary-school educators and students revealed the following percentages agreeing with the degree of academic challenge in their schools:[13]

View/Percentage Agreement	*Principals*	*Teachers*	*Students*
The school has high academic standards	71	60	38
The classes are challenging	67	48	23
The teachers have high expectations of students	56	39	25

The apparent slack standards of many practicing educators may derive from views prevalent in the schools of education they attended. A national survey[14] of education professors showed that only 12 percent thought it essential for teachers to expect students to be neat, on time, and polite, compared to 88 percent of the public. Only about a fifth agreed with the public that teachers should stress correct spelling, grammar, and punctuation. Only 37 percent thought it essential for teachers to learn how to maintain an orderly classroom.

Teacher educators also differ from employers and other professions on measuring standards or even employing them at all. Employers use standardized multiple-choice examinations for hiring. So do selective colleges and graduate and professional schools

12. Ann Bradley, ''Survey Reveals Teens Yearn for High Standards,'' *Education Week* (February 12, 1997): 38–39, and J. Johnson and S. Farkas, *Getting By: What American Teenagers Really Think about Their Schools* (New York: Public Agenda, 1997).

13. Harris Interactive, *The MetLife Survey of the American Teacher 2001: Key Elements of Quality Schools* (New York, 2001).

14. S. Farkas and J. Johnson, *Different Drummers: How Teachers of Teachers View Public Education* (New York: Public Agenda, 1997).

for admission decisions. Such examinations are required for licensing in law, medicine, pharmacy, and other fields, because they are objective, efficient, and reliable. Yet 78 percent of teacher educators wanted less reliance on objective examinations.

Nearly two-thirds of teacher educators admitted that their programs often fail to prepare candidates for teaching in the real world, but only 4 percent reported that their programs typically dismiss students unsuitable for teaching. Thus, even starting with their undergraduate education, many prospective teachers are exposed to disparaging views of standards, incentives, and individual accomplishments.

As revealed by analysis of assigned readings in education courses, their preparation for teaching emphasizes:

- the notion that "authentic learning" only arises from "intrinsic motivation" in which student preferences rather than curriculum and course requirements dominate the choice of what and how to learn;
- an indifference or hostility to specifying objectives and measuring results;
- a view that children cannot learn until the "teachable moment" or until the "developmentally appropriate" time;
- a devaluing of knowledge (since "you can always look it up");
- an insistence that students should discover or "construct" their own understanding rather than being taught; and
- the idea that comprehension must be "socially constructed" in peer groups rather than taught or individually acquired.[15]

15. See J. E. Stone, "Developmentalism: An Obscure but Pervasive Restriction on Educational Improvement," *Education Policy Analysis Archives* 4, no. 8 (April 1996), http://epaa.asu.edu/epaa/v4n8.html. On student-centered learning, progressivism, and constructivism, see also Martin Kozloff, "Fad, Fraud, and Folly in Education," http://people.uncw.edu/kozloffm/fads.html and George K. Cunningham, "Education Schools: Helping or Hindering Potential Teachers," http://www.johnlocke.org/acrobat/pope_articles/cunninghameducationschools.pdf. For similar results from analyses of education course syllabi at elite schools of education, see David Steiner, "Skewed

These views may be characterized as "constructivism" rather than "instructivism." Instructivism implies that the teacher employs well-defined objectives, planned lessons, definite subject matter, explicit assessment of student progress, and, if necessary, re-teaching and additional practice until students master the objectives. Indeed, as documented in subsequent chapters, these views are corroborated by huge amounts of research on learning.

Impractical Educational Ideas

Instructivism descended from Aristotle, John Locke, Anglo-American pragmatic philosophy, and the findings of behavioral psychology. It is consistent with common sense and what most people think educators should do. The origins of constructivist views, on the other hand, may be traced to European Continental philosophy, including ideas that would seem absurd in modern empirical psychology. They include Plato's idea of "anamnesis," that the soul is immortal and repeatedly incarnated, implying that "all learning is but remembrance" requiring only maturation and possibly questions or reminders from teachers. Other odd views derived in the constructivist tradition are:

- Jean-Jacques Rousseau's notion of children born as "noble savages" only to be corrupted by adult society's influences;
- the Swiss child psychologist Piaget's view of developmental stages that proceed in a fixed sequence little influenced by teaching and practice;
- the followers of philosopher John Dewey who see schooling as social problem solving; and

Perspective" *Education Next* 5, no. 1 (Winter 2005), http://www.hoover.org/publications/ednext/3252116.html.

- British Marxists who think that the teaching of isolated knowledge and skills is bourgeoisie society's means of social class reproduction by denying the masses the big picture of social-class conflict.

Among highly influential contemporary descendents of the constructivist tradition is Alfie Kohn, who opposes education standards, homework, testing, and incentives. Another is Howard Gardner, who holds that various types of intelligence such as artistic, musical, and kinesthetic rather than direct teaching, practice, and incentives chiefly determine learning.[16] "Whole language" advocates dismiss the many studies that show that beginning readers greatly benefit from learning phonics (the sounding out of unfamiliar words from their letters). These language constructivists slight spelling, grammar, capitalization, and punctuation but emphasize student reactions and feelings about texts.[17]

Constructivists dismiss the practice of skills as "drill and kill." According to two eminent cognitive psychologists and a Nobel laureate in economics, however, the evidentiary basis of such constructivist theory consists largely of proponents who cite one another's values and opinions rather than rigorous evidence. But, as the psychologists write,

> Nothing flies more in the face of the last 20 years of research than the assertion that practice is bad. All evidence, from the laboratory and from extensive case studies of professionals, indicates that real competence only comes with extensive practice. By denying the critical role of practice, one is denying children the very thing they need to achieve competence.[18]

16. See, for example, Alfie Kohn's *The Case Against Standardized Testing: Raising the Scores, Ruining the Schools* (New York: Heinemann, 2000) and Howard Gardner's *Intelligence Reframed: Multiple Intelligences for the 21st Century* (New York: Basic Books, 1999).

17. Louisa C. Moats, *Whole Language Lives On: The Illusion of "Balanced Reading" instruction* (Washington, DC: Thomas B. Fordham Foundation, 2000).

18. John R. Anderson, L. M. Reder, and Herbert A. Simon, "Radical Constructivism and Cognitive Psychology" in *Brookings Papers on Education Policy, 1998,* editor

Much current education theory is ill informed about scientific psychology, often drawing faddishly on "pop" psychology. It contradicts well-evidenced behavioral insights. As the subsequent chapters show, the facts support the value of instructivism, which calls on educators to have clear goals, plan effective activities to attain them, and measure student progress.

Overview

Drawing on psychological and economic research, the subsequent chapters describe how students learn and the best conditions for their learning. Chapter 2, "Causes of Learning," explains the evidence. Chapter 3, "Learning Principles," defines the alterable factors that psychologists have found consistently associated with high levels of learning—child-rearing practices, and the amount and quality of instruction, which are explained in subsequent chapters.

Chapter 4, "Families," is devoted to parents because they exert such a powerful influence on learning. In the first 18 years of life, children spend only about 8 percent of their time in school. Therefore, psychological conditions in the 92 percent of the time for which parents are chiefly responsible greatly influence what students learn.

Chapter 5, "Incentives," points out that K–12 educators often assume that students' motivation and self-esteem are principal determinants of how much students learn. The evidence, however, indicates that incentives such as encouragement and praise, high standards, and even money can exert powerful influences on what students learn. Though definitive efficacy evidence is unavailable, incentives also appear to influence teacher behavior. Bonuses can be used to recruit teachers into hard-to-staff fields such as mathematics and science and into schools that may be difficult to staff

Diane Ravitch (Washington, DC: Brookings Institution, 1998), 227–255 (quote from page 241).

such as those in high poverty areas. More generally, policy makers are beginning to use bonuses as incentives for teachers to induce greater student learning.

Chapter 6, ''Teachers,'' summarizes the evidence on teacher credentials. Though most public school teachers are licensed and paid for education degrees and experience, these credentials have little or no effect on their students' learning. Their knowledge of subject matter appears more important.

Chapter 7, ''Classroom Practices,'' explains teacher's classroom practices that make a difference. In addition to research on classrooms, findings on adult and technical education are also summarized because research in these fields has been rigorous and appears applicable to K–12 schooling. Because the findings were obtained from research on adults, moreover, the principles are applicable to educators themselves who seem needful of new learning, particularly teaching by means of new technologies, which are playing an increasingly larger role in schools.

Chapter 8, ''School Policies,'' describes the psychological characteristics of safe, welcoming schools. Also described are the features that school principals and other leaders can incorporate into a school's organization, curriculum, and instruction to accelerate learning.

Chapter 9, ''New Technologies,'' describes promising new technologies. Computers have already begun to change schools and are likely to continue at accelerating rates. It is possible even now to identify computer-based technologies that facilitate more effective learning than conventional methods and that allow students to learn equally well but more conveniently while saving school costs and students' time. Internet-based repositories and teaching programs can provide appropriate content and instruction. New social technologies enhance cooperation among educators, parents, and students.

Chapter 10, ''Creative Destruction,'' ends the book with a look to the future. Effective instructional practices, school choice, and new ''disruptive technologies'' have separately produced better

learning gains; they are the keys to improved learning. Used together they have the competitive potential to force large, bureaucratic, and repeatedly failing public schools to reform or close.

Thesis

The status quo, public school establishment has long proven its incapacity for improving achievement; substantial and rising expenditures have led nowhere. Psychology supports neither the beliefs nor the practices prevailing in public schools.

The most promising step is to foster new, competitive school organizations that efficiently integrate technologies that enhance one another and embody effective psychological principles of learning. In the United States, for example, 24 state-level virtual charter schools already incorporated computer and Internet technologies. The most compelling example, however, lies in Sweden which, beginning in 1993, has provided vouchers for all parents to choose public, parochial, and independent schools, an innovation that raised national achievement.

Though unexpected, Swedish for-profit schooling firms arose and thrived. For families with different educational preferences, they provided a diversity of choices. By setting examples of new technologies and market competition, they drove status quo schools to improve. The largest firm, called Knowledge Schools, quickly expanded, undoubtedly because its 30 campuses provide well-designed, new technologies that incorporate variations of the psychological principles explained in subsequent chapters. It allowed a level playing field of financial support. A few dozen such firms in the United States seem likely to do wonders to advance student achievement.