School Finance Redesign Project

center on reinventing public education

MAKING RESOURCE DECISIONS AMIDST TECHNICAL UNCERTAINTY

James W. Guthrie
Vanderbilt University

Paul T. Hill
Center on Reinventing Public Education

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Daniel J. Evans School of Public Affairs
University of Washington

The School Finance Redesign Project

The School Finance Redesign Project (SFRP) encompasses research, policy analysis, and public engagement activities that examine how K-12 finance can be redesigned to better support student performance. The project addresses the basic question, "How can resources help schools achieve the higher levels of student performance that state and national education standards now demand?"

Check in with us periodically to see what we're learning and how that information may re-shape education finance to make money matter for America's schools. You can find us at www.schoolfinanceredesign.org.

Jacob Adams, Principal Investigator

The SFRP Working Paper Series

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Introduction

During the last half century, annual per-pupil spending in the United States has increased from $2,107 to $10,054 after controlling for inflation. In 2005, annual expenditures on public elementary and secondary education cost taxpayers approximately $454 billion or about $55 per pupil per day. Student achievement improved slightly in the early- to mid-1990s and has remained stagnant ever since.

Americans want and need their schools to be more effective, and they have shown themselves willing to spend money in search of better performance. However, in recent decades spending and performance have been de-coupled: spending increases, even dramatic ones as in the cases of court mandated reform initiatives in New Jersey, Kansas City, and Kentucky, have produced little.[1] Efforts to connect spending and performance by legislatively prescribing uses of funds thought to be effective have also not been consistently successful. Witness the billion-dollar effort in California to reduce primary grade class size, even when classroom space and qualified teachers were insufficient to fulfill legislated hopes (Bohrnstedt and Stecher 2002).

Politics and inertia, not evidence about what is productive, continue to drive spending. In the absence of clear connections between spending and outputs, legislators fund programs to satisfy interest groups and courts intervene to mandate equity. Much new spending (on special education, for example) is not even rationalized on grounds of effectiveness.

Why cannot we draw better connections between spending on public education and its outcomes? In this paper we will show that the ways we fund and govern education make it almost impossible to learn what works effectively and how much it should cost. Learning more about what educational practices work, under what conditions, for whom and at what cost is humanly possible, but we Americans have not put ourselves in a position to obtain the evidence we need.

In education policy discourse one frequently encounters the statement, "we know how to educate all children effectively, we just lack the (fill in the blank: money, political will, moral commitment, and so on) to do it." It is easy to accept that more money, political will, and moral commitment would be nice to have, but the assertion that we know what to do does not hold water. No state or district has succeeded in a sustained, coherent, or reproducible manner in closing, or for that matter significantly narrowing, the achievement gap between advantaged and disadvantaged groups. Though some schools have done much better than others, the best that can be said is that they narrowed the gap but came nowhere near closing it. School designs like KIPP (and the Catholic schools that KIPP resembles) have positive effects on student effort and persistence, and they give graduates a leg up on college admission. But nobody can claim that

[1] New Jersey's so-called Abbot Districts now annually receive in excess of $20,000 per pupil. Student achievement proficiency remains at half the state average. Kentucky has been the site of increased school spending since 1990, and its NAEP scores in reading, mathematics, science, and writing have remained stagnant (Clark 2003). For evidence regarding Kansas City and the absence of achievement gains despite the spending of literally billions in added resources see "Money and School Performance: Lesson from the Kansas City Desegregation Experiment" (Ciotti 1998).

their graduates have all the skills and knowledge normally expected of children leaving middle-class schools.

At the level of targeted instructional programs, methods like Success for All sometimes have measurable effects at the grade levels where they are applied but they seldom last throughout a student's remaining years in middle and high school. Similarly, rigorous summer programs can have positive effects on elementary students' learning reading and mathematics, but as Melissa Roderick's studies show these gains are often lost in the subsequent school year (Roderick et al. 2003).

We know this and that about how to make a little difference in the short run, but we do not know how to eliminate the differences in learning (and in consequent life outcomes) between economically advantaged and disadvantaged children, especially when economic disadvantage is combined with minority group status and central city residence.

Examples of at least partially successful programs, media stories, single shot case studies, and anecdotes about poor and minority children who perform as well as the most advantaged students suggest that we can do better.[2] But that is not the same thing as systematically knowing how to do better. We are in a position of primitive physicians who know that some people recover from a disease that is usually fatal: we know that the disease is survivable but we do not know by what mechanism.

Left and right disagree about virtually everything important connected with public education, but there is emerging agreement on one proposition: if it is not working now we need to try something different. The left, represented by Richard Rothstein, claims that new approaches to schooling are not likely to be effective without big changes in students' family lives and economic status. The right, represented by voucher advocates (and in company with charter school supporters on the left and right), claims that the educational opportunities now available to the poor and disadvantaged are substandard, and we can never know what education can accomplish until we try providing much better schools.

Neither side can prove its case. Antipoverty programs have been as messy and inconsistent as school reform efforts, and their links to student learning are unproven. Efforts to transform students' schooling experience have also had inconsistent effects and, as noted above, the best have fallen far short of eliminating student performance gaps.

Yet both sides have undeniable points in their favor. Chaotic families and neighborhoods surely interfere with children's learning, and programs to ameliorate these conditions or remove children from them make sense. KIPP and the Catholic schools might owe some of their success from the socially ameliorative facets of programs that immerse students in environments quite different from their neighborhoods and that model middle class values and behavior.

[2] Minority student achievement in Texas, as measured by both state and national examinations is an example of sustained academic improvement. However, the Texas improvements pursue precisely the model this paper advocates. The state in a sustained manner has tried new strategies, evaluated outcomes, reinforced effective practices, and moved forward with new ideas when old ones proved ineffective. It is noteworthy that Texas, as a state does not spend much money on a per pupil basis.

On the school reformers' side there is undeniable evidence that poor and minority children routinely are assigned the least experienced and lowest paid teachers and attend the most turbulent and unfocused schools. Surely the purely educational facets of their experience could be improved to good effect.

Left and right could come together on the proposition that initiatives to improve outcomes for the poor and disadvantaged should combine school improvement with efforts to reduce the effects of poverty and family disruption. However, even if they could so agree, those who would improve outcomes would face a great deal of uncertainty about how to proceed.

The truth is that we do not know how to provide effective schools for the millions of poor and minority youngsters served by our big city school systems. Public education is not well designed for solving new and unfamiliar problems, such as how to educate a constantly changing and disadvantaged urban and rural population. We do not know how much it costs to do the job or how best to allocate resources effectively. The point of this paper is to sketch a path for testing new and old practices and learning from the results.

Why Don't We Know

Americans have been schooling young people of many backgrounds and abilities for nearly two hundred years; why do we not know for sure what works?

The question can be answered two ways: First, our methods of education work well enough to produce the people needed by our professions, industries, small and large businesses, schools and universities, military, and (at least until recently) our scientific institutions. Under those circumstances we have not routinely found it imperative to ask whether we could educate everyone, even every middle class student, well.[3]

Second, our educational institutions are not constructed to support experimentation or continuous improvement. Though we now want and need to improve education for groups other than the elites who have been served satisfactorily, we do not have a systematic mechanism for doing it.

This paper focuses on explaining and suggesting alternatives to the second answer. The first answer, though valuable as an explanation of our history, does not apply well now. Americans are aware of harm done to millions of poor and minority students who are not educated well, and are coming to fear that we are not producing enough students that have the scientific and mathematical skills that will be needed in tomorrow's economy.

Why do our institutions overlook the need for continuous improvement and stifle efforts to optimize performance for all students? The basic answer is that the system is designed for stability not adaptability, and so is unable to adopt the classic problem solving approach that Americans pursue when they want to address a challenge like how to go to the moon or conquer cancer or AIDS. That approach—to go through several cycles of encouraging many forms of innovation, rejecting the least successful and investing further in the best—requires suppleness

[3] State programs and local district efforts make episodic attempts to operate so-called "Gifted and Talented" programs. However, these seldom receive any serious attention in policy or funding.

and adaptability. However, the United States public education system is not designed for adaptability but for stability. It is shaped principally through politics, in which groups, particularly groups at interest and groups with narrow interests, contend to control state legislation or school board policy.

In an environment where there are many different needs, where children with new needs arrive on our shores every day, and where we persistently fail to provide effective schooling for the majority of low-income and minority students, the system's stability is a problem, not an asset. The existing system renders it difficult to distinguish the effective from the ineffective. Here is an illustrative list of impediments.

Allowing Innovation at a Micro Scale But Resisting Widespread Implementation of Innovations

Teachers and principals are constantly experimenting with new ideas in their schools and classrooms. Though some of these experiments might be quirky or self-indulgent, some are probably smart and worth spreading.[4] However, there is no ready method for identifying these innovations, assessing their value, transmitting them to others, or combining several small ones into a broader innovation that might constitute a more productive way of teaching a whole course or grade level.

Teachers' isolation from one another and love of independence is one factor retarding the spread of innovation, but other sectors of the economy (e.g., medicine) overcome similar isolation. They do so by institutionalizing the search for new ideas, formally testing the most promising, and aggressively spreading information about them. The whole academic medicine establishment exists for this purpose, as do the knowledge management mechanisms inside innovative companies such as 3M. Nobody has this innovation and dissemination assignment in public education. This paper asserts that this is a crucial assignment, and suggestions are offered later regarding where to lodge the responsibility.

Resisting Innovations that Involve Tradeoffs Between Labor and Capital

The idea of education as a craft activity with a teacher directly instructing a group of students is firmly entrenched in law and policy. State laws controlling class size and teacher licensing ensure that the lion's share of spending will be on salaries and limit the amounts of money that can be spent on new instructional materials and other resources. Teacher hiring and compensation generally consume spending increases. Purchases of technology are possible only at the margin, as add-ons to existing budgets. As a result, even vendors of new instructional methods carefully avoid suggesting that fewer teachers could do the same work or that funds allocated to salaries could be deployed differently. These restrictions limit what can be spent on

[4] Others in the same localities—the school a few blocks away, the teacher in the next classroom, the school board—have few if any incentives to explore what is effective and imitate it. Teacher union leader Roger Erskine labeled this process "random acts of innovation." Former Xerox CEO David Kearns asserted the same argument when he founded the New American Schools Development Corporation, a $150 million nonprofit initiative to develop new designs for urban schools. He later discovered that innovative ideas were not sufficient: existing public education structures and practices can bend with new school designs, adopting their innocuous parts, rejecting the rest, and returning to the status quo ante.

new ideas and ensure that innovations will be constrained financially and by teachers' work style preferences.

Providing the Same Funding and Rewards for Unproductive Activities as for Productive Ones

Until recently, public schools were presumed permanent, regardless of how much children assigned to them learned. Standards-based reform initiatives including the No Child Left Behind Act have at least raised the possibility that unproductive schools would be sanctioned and productive ones rewarded. However, few states or localities have determined how to do this. School districts have not created the data bases on which such decisions can accurately be made, and they are still constrained by politics and tenure laws from making purely performance-contingent decisions. When it comes to particular programs, districts are similarly ill equipped to measure effectiveness (not to mention cost-effectiveness) or to act on performance data (Roza 2004). Though programs come and go and the stocks of schools in a particular locality change over time, transitions are caused more by funding availability and fashion than by judgments about effectiveness.

In public education, flows of people and money are sticky, and movements are seldom driven by the search for higher performance. Tenure and licensing requirements ensure heavy spending on permanent staff, and collective bargaining agreements and union political dynamics facilitate preferences of senior teachers and shape how funding is distributed within a district. The people most likely to seek more effective uses of finances and people, school principals and within-school department heads, do not control funds or have much to say about who works under them. Though states fund school districts on a per-pupil basis, the pupil-dollar link is broken at the district level, where money is allocated to programs and staff categories rather than to units whose productivity can be measured. Moreover, families in most districts have little say over which schools and programs their children will be assigned; even when parents can choose, issues of income or racial balance and enrollment capacity often constrain movement.

Remaining Ideologically Resistant to Experimentation

Education historians routinely chronicle the faddish waves that wash across the landscape of American schooling. Books such as David Tyack's *The One Best System*, David Tyack and Larry Cuban's *Tinkering Toward Utopia*, or Raymond Callahan's *The Cult of Efficiency* make clear that many of the fundamental activities and operating conditions characterizing our present day schools are a product of forceful advocacy, but seldom a result of systematic empirical research.

One does not have to bank upon historic hoaxes such as phrenology, efforts to convert left-handed students to right-handed practices, left/right brain instructional strategies, and Frederick Taylor's "Scientific Management" to make the argument. Within the lifetime of many readers of this paper, contemporary schools have been subjected to unproven, unproductive, unsustainable, costly, and sometimes harmful practices such as Classrooms Without Walls, School Mathematics Study Group Math, Individually Prescribed Instruction, the "Sixty-Five Percent Solution," Self Esteem Management, and small school and school district consolidation.

In the early part of the 20th Century, during the Progressive Era, reformers strove mightily to insulate schools from the alleged evils of excessive partisan politics. School boards in big cities

became appointed. Where elections were retained, school board positions were rendered nonpartisan and elections were held off cycle. Ironically, now, at the beginning of the 21st Century, mayoral takeovers of public schools is seen by some as a panacea for solving urban school problems.

In the same period, the number of America's school districts has been reduced from 127,000 to the approximate 14,000 that characterize today's governance landscape. The principal argument for such dramatic consolidation was that small schools were economically inefficient and denied students the full curricula offering of larger schools. In the 1960s, former Harvard president James Bryant Conant championed larger high schools, attributing the nation's low levels of academic achievement to diseconomies of high school scale. Now, the Bill & Melinda Gates Foundation has launched a major national policy initiative to persuade school districts to reduce the size of high schools and render them smaller and more personable.

Education policy and practice seemingly is trapped in a never-ending spiral, moving from one fad to another, and then back. One hundred years ago, student homework was widely touted by some education theorists as being bad for students. Indeed, claims were made that homework was injurious to student health, known to trigger disease. As recently as fifty years ago, the school board of Santa Cruz, California, banned homework, preventing teachers from making homework assignments. Alfie Kohn and others have raised the same flag again only this year. Another new book now asserts that homework contributes to childhood obesity (Bennett and Kalish 2006).

This vulnerability to fads persists because intellectual leaders of public education, including superintendents and researchers in central offices and schools of education, often resist the experimentation by which other fields sort out more- from less-productive methods. Educators generally resist the standardization of methods necessary to compare the productivity of one well-defined practice against another. To them, it is more important to respect the uniqueness of every student and teacher than to discipline practice even temporarily in order to allow rigorous tests. (Clinical trials, which in medicine both provide evidence on the efficacy of well-defined therapies, yet allow physicians in practice to balance scientific findings and patient uniqueness, have not been accepted in education.) Educators also resist random assignment to alternative treatments, a second requirement for experimentation, on grounds that they cannot assign a child to anything that might be risky. (This ethical position seems to assume that there is no risk of harm or failure in whatever treatments children would get absent a clinical trial.) Taken together these positions limit what can be tried and what can be learned.

These impediments to the natural process whereby better methods win out over worse ones are deeply seated. They force evidence about effectiveness to the margins and resist major public policy initiatives and foundation investments. Any effort to remove them will have to be comprehensive and bold.

The Consequences of Not Knowing

Elected officials and the public get little help from the research or practice communities in identifying or sorting advocacy pronouncements. Engineers, architects, physicians, pharmacists, and scores of other professionals and craft workers such as electricians, pilots, and plumbers

routinely are expected to adhere to high standards of research reliance and craft practice. Not to do so places them in substantial professional jeopardy and exposes them to charges of tort and product liability. Today, an engineering design for the new Tacoma Narrows Bridge (WA) has been subjected to careful technical review, and remedies for past aerodynamic and structural mistakes are incorporated amply into modern designs.

Education policy proposals seldom are subjected to the same intensity of technical review or held to rigorous standards of scientific evidence. Public officials cannot easily be expected to possess the scientific expertise to impose high standards on a specialized field. They must look to the professional field, itself, for the imposition of rigorous standards. Until recently, education has been insufficiently vigilant to police its own research and the proposals of advocates, hence, the vulnerability of education and education policy to fads.

The following is an illustrative list of currently unanswered, at least not yet scientifically addressed, but hugely consequential education policies issues:

- What is the nature of effective early childhood education, what long-term effect on academic achievement and other performance dimensions can it have, what are its relative costs and long-term benefits, and how much should be invested in its operation relative to other alternative reforms?
- What is an effective teacher, what training is necessary to prepare an effective teacher, and what should state credentialing expectations be to promote effective teacher training and recruitment?
- With what sustained professional development activities should teachers be supplied or mandated to obtain? Who should pay for such activities?
- What is an effective class size, for what grade levels, and for what kinds of students and what is the relative benefit of investing in this treatment compared to other possible investments?
- What is the optimum size of a school? What are the tradeoffs between operational economies of scale and individual student engagement? To what degree does school size influence student academic achievement? Does the school configuration or the size and condition of the physical facility itself matter?
- Are their any best or preferred practical means for instructing in mathematics, science, language arts, foreign language, art, and so on?
- What is the role, if any, for instructional supplies and materials? Can technology be deployed to enhance instruction or to dilute the labor-intensive nature of American public schooling?
- What are appropriate performance incentive systems? Should incentives be applied to individuals or to teams? Should incentives encompass administrators? By what means should student achievement or performance be gauged when designing incentive systems?

- By what means can education accountability systems best be designed? What is an effective governance system? What are the consequences of unfettered or even structured parental choice? What data system can best serve education policy?

Taken together these unresolved questions make it impossible to answer the underlying question that motivated this paper, that is:

- How much will it cost to educate all American children to high standards?

How Could We Have Tolerated So Much Uncertainty for So Long

But now, a reader reasonably might ask, can there be so little known regarding such important issues associated with formal education? Schooling is an endeavor that has taken place for thousands of years, and yet, the scientific base still is slender. Moreover, it is an endeavor on which the United Statues annually expends hundreds of billions of dollars. How can it not be subjected to careful scientific scrutiny?

Once posited, the answer is understandable. Medical science, something of a gold standard for rigorous applied professional research, has only a one hundred year history. It was not until the Flexner Report in 1910, *Medical Education in the United States and Canada*, that the United States began to undertake health related inquires in a truly scientific manner.

Education had its Flexner Report analog in 2002. It took the form of the Education Sciences Institute Act. This landmark federal legislation created the Institute for Education Sciences (IES) that, in its short existence, has systematically established remarkably high standards for the funding, conduct, and judging of education research. These standards have had a disquieting effect. Much that was previously accepted—anecdote, case studies, vignettes, jargon-laced journalism, thinly disguised advocacy, and so on—is now held in low professional regard. The effects of IES's new standards are beginning to be felt in terms of what increasingly is understood as the degree of rigor appropriate for education research.

One might still wonder why this development came so late. Here again, there is an answer. It is only recently, near the end of the 20th Century with the 1983 publication of *A Nation At Risk*, that all of American public education has become concerned with rigor. For most of America's 400-year colonial and national history, the United States operated its military, government, commerce, and universities off of the talents of a slender, educated elite. Before World War II most students did not attend, and certainly did not graduate from, high school. Still, there were relatively good jobs for those who were not well educated. Johnny could quit school, work on an assembly line, earn sufficiently, marry Mary, and pursue the American dream. This happy blue-collar era, as Peter Drucker has shown, is now over.

This manufacturing-based economy worked well, or at least sufficiently, until the last quarter of the 20th Century, when microchip technology and rapid transportation flattened the world and rendered national boundaries of far less consequence for purpose of capital movement, commerce, and manufacturing. High-paying jobs for poorly educated workers still exist, but few are located in the Untied States. The route to material, and possibly other forms of fulfillment, now more than ever necessitates an individual obtaining a good education.

Many American households understand this fundamental economic transformation, and the broader political system has honored their preferences for a more rigorous education system. The 2001 enactment of the No Child Left Behind Act symbolized this new condition. It has altered the centuries-long practice of judging schools by inputs, and now renders outcomes important. As outcomes count, then inquiry in search of means for elevating outcomes becomes important. A demand has been constructed for rigorous research. This is what is new, but it is still frustrating because the process is only now getting started, and the results are still slender.

How We Live with Uncertainty

What can decision makers do when there are no scientific answers to important education policy questions? Elected officials cannot ignore education simply because they lack good evidence about an issue. They are responsible for coercive government actions on behalf of public education, including levying taxes and compelling student attendance at school, so elected officials cannot just ignore questions about how much money schools should get and how it should be used. Officials are also constantly bombarded by complaints and demands from parents, school employees, business leaders, etc., each hoping to tilt policy in a direction favorable to themselves.

Needing some basis on which to make policy, elected officials rely on the following five processes that can lead to decisions, good or bad.

Political Bargaining

When in doubt regarding policy matters of substantial collective consequence, decision makers rely upon political processes for determining direction. Nobody thinks bargaining and arbitrage of interests can arrive at the most efficient solution to a problem. In fact, as Terry Moe demonstrates, political settlements routinely are inefficient because they involve payoffs to the groups needed to form a coalition and because today's winners establish bureaucratic strongholds that allow them to retain advantages even when needs change and potentially more effective uses of funds emerge (Moe 2003). However, political settlements are by definition widely acceptable and satisfy officials' need to take action, even when they do not know what the practical consequences will be. Here is a line from the British TV series "Yes Minister" about the politician's syllogism: *Something must be done; this is something; therefore this must be done. Yes. Let us do so.*

Political settlements are appropriate when there are clashes of values. Toward what societal ends and achievement purposes should schools be focused? What are the measures of school success (e.g., attendance, test scores, aesthetic performances, athletic events, college admission, adult voting behavior). To what degree should schools be instruments of broader social policy such as income redistribution, racial or gender equality, or employment engines? Where geographically should schools be constructed and to what degree should facilities be merely instructionally serviceable or more symbolic of a community's higher aspirations? Who should have access to schooling? Who should pay for schooling? Who, if anyone, should be excluded from schooling? Who gets to participate in decisions regarding schooling?

Questions such as these lend themselves less to empirical verification and more toward popular legitimation. These questions, while having some empirical coloration, are rooted principally in matters of values and collective preference. Under such circumstances, only the political system can create authoritative answers.

Judicial Processes

Starting in the mid-20th Century, Americans increasingly relied on courts to decide difficult school related issues. Courts can apply constitutional and common law principles and create solutions to problems that could not be arrived at through conventional electoral politics (e.g., ordering the white power structure of the old South to desegregate schools, an action white-dominated state governments would not have taken). However, courts are not institutions for scientific or economic analysis. They can decide an issue if they can find a controlling principle, but they are not equipped to resolve technical uncertainties and there is no reason to think that orders they issue will lead to efficient action toward a practical goal.

Courts are indispensable in deciding questions of whether government actions respect rights guaranteed by law. But they are vulnerable to litigants' actions. Litigants can stretch legal principles into new shapes to their own advantage, misrepresent facts, and make false claims about the efficacy of desired actions. The adversarial system allows opposing sides to rebut each another, but it does not guarantee that judges or juries will be sufficiently sophisticated to distinguish between well-grounded assertions and calculated nonsense.

Individuals will differ about whether Constitutional equal protection guarantees have been distorted to cover issues that should not be adjudicated at all, but no one can say they have not been stretched. In education, litigation has led to expanded rights and entitlements for women, handicapped, alien, non-English speaking, and disadvantaged groups, and it has also become a vehicle for efforts to reallocate public funds and compel higher levels of overall public spending—issues formerly resolved via direct political processes. Whatever their righteousness, judicial actions—to compel particular levels of spending on schools or order redistribution of public budgets in particular ways—are based essentially on advocates claims, not evidence linking actions to practical consequences.

Expert Processes

When nobody knows for sure what will work, elected officials often refer questions to expert panels. By assembling individuals who know a lot about different parts of a problem, officials can obtain the best available options and can estimate consequences. This process can improve policy and prediction in the face of uncertainty, as Norman Dalkey and others demonstrated in their efforts on a specific expert process called Delphi (1969). Rigorously managed, pooled expertise can be better than individual expertise.

Pooled expertise is far from perfect, however. Military planning, which almost always relies on expert processes, can place too much emphasis on lessons learned in the past war and pay too little attention to changes in alliances, power relations, military capabilities, and popular movements that will define the next war. In some circumstances, expert opinion might be the best of many bad sources of guidance.

Expert processes have played a part in education policy, particularly as judges and legislatures have sought guidance about how much to spend on public schools. Professional judgment panels, including educators and financial analysts, have been asked to estimate how much more must be spent in order to bring all public school students up to a set standard of achievement. Like expert groups convened in other fields, professional judgment panels in education have started with information about current spending and achievement levels and have tried to imagine a situation that does not exist. Also, like other groups, these panels have been forced to assume a future world based on the current one and have prescribed marginal changes in spending based on instructional methods and technologies quite like those now in use—that is, they have planned for the last war.

To date, there is no evidence that the spending levels prescribed by such panels lead to the outcomes sought. Under the best of circumstance, like war planners, professional judgment panels may base their conclusions on careful reasoning, but they are also forced to make heroic assumptions about the behavior of regulators, administrators, teachers, students, and parents, none of which is likely to be borne out in practice. Under the worst conditions, professional judgment panels have been unprofessional, biased, filled with advocates, and tinged with greed (Guthrie and Springer 2007).

Performance Incentives

A common approach to uncertainty is to create strong incentives for improved performance, assuming that individuals and groups will therefore work harder and seek ways of becoming more effective. Performance incentives import one market-like process into a system that is otherwise run bureaucratically.

Standards-based reforms enacted by most states, and the federal No Child Left Behind law, all try to create performance incentives. They threaten to close and replace low-performing schools and (vaguely) threaten the jobs of low-performing educators.

Such incentives might lead to innovation and new evidence about what works and what it costs. But educators have to believe they are real and unavoidable.

To date, accountability features of state standards-based reform laws have seldom been implemented, and interest groups are trying to pull the accountability teeth of No Child Left Behind. Whatever one thinks of such accountability provisions, it is clear that they do not create performance incentives as long as educators believe they are about to be neutralized or repealed.

Potential performance incentives are weak in the face of other incentives that are wired-in to our public education system. Thus, for example, incentives now dominating public schools encourage classroom instructors to leave teaching and become various kinds of specialists and administrators. Administrators are, themselves, incentivized to rise ever upward through the ranks of systems until reaching posts where they seldom if ever see students. The current education system provides higher pay, greater prestige, more discretion over one's time, and more interaction with adults the further one moves from day-to-day responsibilities for students and the harder it is to link an individual's work with student outcomes. Thus, like market processes, performance incentives have not yet proven to be sufficiently powerful to provide new information about effective methods or what they cost.

Competition

When confronted with uncertainty, government often decides to allow problems to be solved by individuals and groups acting in their own interest. The results might not conform to any particular set of values or seek a particular end as effectively as possible. But they do avoid the costly side-payments characteristic of political decisions, and they do not create bureaucracies that make it difficult subsequently to reverse a particular distribution of benefits.

Americans differ in their views on the appropriate role of markets. Some argue that competition should resolve all issues except those that require authoritative action (e.g., rationing use of airwaves, creating transportation infrastructure, and making foreign policy). Others argue that market-based decision making is appropriate only when the issues at stake are weighted toward individual significance but are of relatively minor collective consequence (e.g., a family's choice of a piano teacher or a soccer coach) or when issues are so freighted with conflict that no negotiated solution is possible (e.g., in the Netherlands, whether a child attends a Catholic or Protestant school).

Though the U.S public education system is governed through electoral politics and regulation, some educational issues are left to private action. Parents can decide whether or not to buy piano or dance lessons or to pay extra to send children to private schools. Parents willing to pay can choose religious education. Teachers can decide whether they want to work in one school district or another.

These limited deferments to the market have not generated significant competitive pressure on schools, in part because public school districts have written off the groups that traditionally attend private school. Private schools, moreover, are content to serve niche markets and have no incentive to grow. Moreover, families choosing private schools generally prefer traditional teaching methods and course materials, so private schools are seldom a source of innovative ideas.

How Can We Know More

If none of the mechanisms discussed above is producing evidence about what methods are most effective and how much must be spent on public education, how can Americans reduce their uncertainty? We suggest two approaches that involve profound changes in decision-making and use of resources. The first is rigorous research and development (R&D) and the second is more thoroughgoing use of market-like mechanisms like transparency, devolution of responsibility, performance incentives, and performance accountability.

Research and Development

The scientific way to reduce uncertainty is to study the process in question, toward identifying and testing promising new models. At least in theory, R&D can provide evidence about that is possible and thus support decisions on what to spend and how to spend it.

At present there is fragmentary evidence about the characteristics of schools and instructional programs associated with higher performance. Moreover, this evidence has limited applicability

to spending decisions for three reasons. First, it is based on variations in current practice rather than an effort to formulate and test a wider set of possibilities. Second, the research often identifies the attributes of effective programs without showing how these can be reproduced in situations where they do not now exist. Third, in consequence of the limited scope of programs studied, the effects now documented appear too weak to achieve the goal of bringing all children up to high standards of achievement.

It is possible to imagine an R&D strategy sufficiently rigorous to identify ideas outside the range of current practice and conduct rigorous testing of reproducible programs. But as the next section suggests, this strategy would need to be much more ambitious than any attempted to date.

If we are to know what it will cost to raise all students to high standards, we must at least have examples of schools and programs that attain these goals. In the absence of demonstrated exemplars, a serious R&D initiative is indispensable. The goal of such an initiative would be to create new methods for teaching and learning at the K-12 level that would dramatically accelerate learning, especially for low-income and minority students.

By "methods" we mean ways of presenting material and individualizing repetition and practice so that children do not develop large holes in their knowledge and skills. The methods sought would be much broader than a little module to teach one fact or concept: they would be whole systems for presenting a body of knowledge (e.g., what we could normally consider a one-year course like 3rd grade reading or 10th grade English) or even more broadly an approach to instruction that is consistent across a whole grade level or a whole school.[5]

"Methods" would be combinations of material and skills to be learned, technologies for presenting them, and teacher actions to explain materials and guide student work. Again, a specific programmed learning module, lesson plan, or student assignment would all be elements of a method; a method would essentially be an architecture that combines material, technology, and teacher instruction. It might also combine these instructional elements with efforts to create a specific motivational and supportive climate for students, with social and health services.

An R&D initiative would focus on creating, testing, and disseminating evidence about whole new methods. It would make three kinds of related investments in: (1) identifying component technologies, teaching techniques, and social interventions that might become integrated into broader systems; (2) assembling and testing combinations of such techniques into a broader method as defined above; and (3) demonstrating and disseminating evidence about promising methods so they can be adopted by schools and districts.

Such an initiative could be designed in imitation of DARPA, the Defense Advanced Research Projects Agency. DARPA's goal is to create new weapons, sensors, and information management systems that will make the armed forces more effective. It makes investments at three levels: in technologies that might someday contribute to broader systems, in systems

[5] Some readers will recognize the similarity between this and the original goal of the New American Schools Initiative. However, the selection processes for New American Schools design teams was dominated by conventional public educators who rejected ideas that would substitute technology for teacher labor saying (1) the unions would not stand for it and (2) we all know the mark of a good school is a spirit of collaboration of adults, not the methods used. Accordingly, New American Schools designs focused more on ways to foster good adult relationships than on new methods of instruction.

designs that are architectures that combine multiple technologies and affect human activities and performance; and in prototypes that the armed services can adopt with some confidence in their performance and cost.

DARPA invests in small technology innovations, but that's not all: it presses for use of new ideas together to create whole new capabilities. It does not simply assemble off-the-shelf technologies, but also identifies holes that must be filled and invests in efforts to fill them. And, it is not driven only by technology; it also responds to the Armed Services' views about capacities they will need in the future.

DARPA bridges very different worlds. At one end it operates on the frontiers between science and technology, and at the other end it bridges systems integration with operational use. It is neither a purely scientific enterprise, which would support scholars to work on anything their theories suggested was interesting, nor purely a marketing organization, which would focus on producing things customers would buy now. It is an innovation-creating organization whose core skill is recognizing the systems implications of potential technologies.

To produce dramatically more effective methods of teaching and learning, an education R&D initiative would have to imitate DARPA in several ways. At a minimum, it would need:

- Strong management that can understand the whole field from promising technologies through systems to school operations
- A substantial amount of money to invest at all levels (technologies, systems development, testing, dissemination)
- Freedom to try out ideas that cost more than is now normally spent on schools but might produce significantly better results and to try out less expensive methods, too
- Independence to allow risk-taking and pursuit of ideas that school administrators, teachers unions, and education schools might oppose because they trade technology for personnel
- A long time horizon to allow development of methods that incorporate entirely new technologies
- Accountability based only on the performance of methods developed

An education R&D initiative would face one big challenge that DARPA does not: unlike the armed services, that are committed to the use of technology, school districts and teachers unions seldom are. Most are wedded to the labor-intensive model of a teacher in a small classroom serving as the main medium of instruction. School districts and labor unions are well organized to control government and to claim that any change in method must come with new money; consequently an education R&D organization should not be part of government or subject to its control. Because charter, magnet, and independent schools might be the first users of its products, an education R&D initiative must not be constrained, as most federally funded labs and centers have been, to keep the public school establishment happy.

This means that the organization must be:

- Privately funded at least in part

- Managed by a new independent organization or housed in a university, think tank, or laboratory, not in a governmental or intergovernmental organization

Such an R&D initiative is certain to open up new possibilities and develop programs that can be tested and reproduced. One hopes it will also produce more productive systems designs that can make schools more productive, particularly for the low-income and minority students who are now farthest behind.

Will it identify instructional systems that fulfill all of society's aspirations for schools? In the short run, it may not. A serious R&D initiative might reveal that the best we can do, given our imagination about schooling and the intrinsic limitations of instructional processes, is still less than we need. It might lead us to experiment with much higher levels of spending and much greater integration of education with family services and antipoverty programs. These experiments themselves might or might not work, at least at first. But a rigorous R&D initiative will make it possible for decisions about spending and use of funds to be made on the basis of evidence, not ideologies or advocacy.

A Public Education System Optimized for Performance

No matter how rigorous it is, an R&D initiative can do only so much. New programs can make a difference only if they are used. This is impossible in a public education system where money is obligated in long-term commitments to people and buildings and where adults are insulated from performance pressure. A public education system that would be hungry for the results of R&D, and would put into practice any new program that promised higher performance, would be one that allowed money, adult human resources, and students to flow readily from lower- to higher-performing schools. It also would be one that disciplined spending so that there was just enough to provide the most effective known instructional program for a given set of students, and no more. Such a public education system would have the following five key attributes.

Public funding should be transparent. Without public funding, decent education would be beyond the reach of millions of families. The commitment to public funding is based on the realization that all Americans, even those who can afford to pay for education on their own, benefit from having a literate electorate and a competent, mobile work force.

Though nobody can say for sure how much money is required to provide every child an excellent education, it is obvious that very low or erratic funding levels can put the goal of general public education at risk. This is especially true when the least is spent on children who have the fewest family resources.

Unfortunately, disadvantaged children, and the neighborhoods in which they live, are usually the weakest competitors for centrally controlled resources. School districts, like other government agencies, allocate their funds and attention in response to political pressure. In school districts, this comes from articulate and engaged families seeking the best possible schooling for their children, and senior teachers who expect their loyalty to be rewarded with assignments to the most attractive schools. Because money and experienced teachers are always in short supply, the most influential families and neighborhoods win in this competition for resources, and others lose.

The most direct response to politically driven spending distortions is to attach funds to individual pupils so that all students will have the same baseline amounts spent on them. A situation where all students in a district benefit from the same level of spending would improve on the current arrangements. However, as subsequent sections will suggest, the struggle to find effective schools for disadvantaged children almost certainly requires weighted-student funding to ensure that the neediest students receive more resources.

The rationale for public funding implies more than using tax dollars to build buildings, pay salaries, or offer just one form of instruction even if it does not work for many students. It requires support for every child's education in a way that overcomes poor families' financial disadvantages. As the next section illustrates, current methods of supporting public education that attach money to buildings, teachers, transportation, and administrative functions are not traceable to students and hardly meet the lofty goal that initially justified public funding.

Resources should be concentrated near the student. If public education is to be adaptable—to the distinctive needs of particular children and to promising new models of instruction—it needs flexible resources. It must be possible to spend money differently on different children and to reallocate spending in ways required by promising new methods of instruction. This implies that decisions about spending should be standardized as little as possible and controlled by people who know children and are responsible for their learning. It also implies that as little money as possible should be obligated in long-term commitments and fixed expenditures.

Unfortunately, today's public education system is built on very different premises. Resources are anything but flexible due to long-term commitments to buildings, tenured employees, and programs established by national and state legislatures. Money is allocated to programs (e.g., vocational education, tutoring, transportation, and in-service teacher training) and to salaries. Spending decisions are made by the state or by a school district central office on behalf of all schools. Schools do not receive cash other than small amounts (normally less than $50,000 per year) for supplies, copying, small purchases, and fieldtrips. Schools often cannot choose their own teachers: the district central office assigns them.

Thus at the state and federal level the question is seldom "how much should we allocate for the education of a student," but rather "how big an appropriation can the supporters of teachers, or vocational education or computer literacy, swing for [name the interest group] this year?"

A public education system that continually sought to find and use the most effective method for every student would need a dramatically different approach to spending and decision-making. To be capable of reallocating funds from less to more productive uses, the system would need to avoid linking funding to specific employees, equipment, or programs. To support adaptation to students' needs, money would have to be controlled in close proximity to the student, by those directly responsible for providing instruction and attaining results.

These requirements differ sharply from current practice, and meeting them would require changes at every level. States would need either to consolidate all K-12 appropriations into one per-student allocation or allow districts to combine separate accounts. Districts would also need to consolidate many different accounts, some now mandated by the state and others created for

their own purposes,[6] and distribute finances directly to schools. In order to put as many consequential decisions as possible near the student, districts would also need to reduce automatic spending on their central offices to a modest amount, just enough to pay for financial administration, school performance assessment, and investment in new schools. Districts could also provide optional services and charge fees. The section below on a school-friendly environment will describe the functions of a central office in greater detail.

Community resources should be used strategically. People who have been involved intimately with schools serving the most disadvantaged youth know they require more time and money, and a more comprehensive commitment to youth development, than normally attaches to the concept of school. The division between education and social service institutions is yet another barrier that prevents communities from doing all they can to educate their children.

As discussed above, KIPP and similar schools might not be the final answer to improving student achievement in poverty neighborhoods. However, they make it clear that a public education system built to strive constantly for higher performance would not rule out expanding what schools do and how they structure a student's time. That, however, raises the question of money. It costs a great deal more money to operate a school 8-12 hours per day rather than six and to develop integrated learning-focused approaches to instruction, recreation, and family services.

As in the case of KIPP and its close relatives operated by churches, these schools require private investment in design, and most now derive some of their operating funds from philanthropy. However, there are only a few such schools, and philanthropy can stretch only so far. Communities that want to offer such schools to all the students that could benefit need to find ways of supporting them with public funds.

Student-based public funding, especially if weighted for student needs, can provide some of the needed extra operating support. If basic state and local support were allocated such that all funds followed children and every student brought exactly the same amount to the school he or she attended, then categorical program funds could provide extra amounts to support more intense education programs for disadvantaged students. The combination of federal Title I, state categorical programs, and funds for education of the handicapped could support a substantial amount of extra student weighting.

This situation exists in theory but not in practice. As Roza has shown, districts often under-fund schools serving disadvantaged children and then barely bring those schools up to spending equality by adding on state and federal categorical funds (Roza and Hill 2003). Within districts, the amounts spent on pupils who share a particular characteristic (e.g., low-income status, now vary tremendously depending on which school a child attends). Current practices, that seem to violate the intent of Title I comparability and non-supplanting requirements, are nonetheless legal due to a loophole that allows districts to ignore differences of higher average salaries paid to teachers serving advantaged pupils.

[6] One middle-sized urban district studied by the Center on Reinventing Public Education maintains 200,000 separate financial accounts.

Localities might find that the extra weighting possible with existing categorical programs is still insufficient in some cases. They will have to consider spending more, at least for the neediest pupils. In some circumstances, extra money could also come from funds normally used to support separate health and social service agencies, and from philanthropy.

Schools serving disadvantaged children might well be able to expand their hours and days of student contact if separate social service agencies' youth budgets were combined. This would require as wrenching a change in social services as in education, since it implies that agency funds would be used at the point of delivery by individuals responsible for children's overall development, rather than controlled centrally and used to pay salaries for a fixed set of providers. If this could be done, poverty area schools might evolve into charter youth service agencies whose core task is instruction, but which also have other flexible resources. Such schools would then be more like parishes than government agencies, able to draw from a wider array of expertise—and to spend more money—than is available to support their purely instructional roles.

In the future, public agencies responsible for education must overcome the tendency to make sharp distinctions between their own funds and those received from other agencies and from philanthropy. This would be a major leap for school boards and district central offices accustomed to drawing bright lines between "our" money and employees and "theirs" (Hill and Harvey 2004).

Despite the constant agitation about it, the question "How much spending on public education is enough?" is difficult to answer in the absence of a public education system in which funds from all sources can be used flexibly, ineffective activities must be abandoned, and resources can flow to more effective uses. It probably takes more to educate some children than others. However, it also takes less money to run a highly efficient system, where virtually all funds are applied directly to instruction and student services, than an inefficient one, where spending is driven by political and bureaucratic considerations.

Natural rewards and sanctions should be provided for performance. If public education is constantly to seek more effective methods of instruction and better matches between children and teaching methods, everyone in the system must face strong performance incentives. Though teachers and administrators all hope their work will benefit children, they have other concerns as well (e.g., complying with rules, avoiding conflict with co-workers and superiors, working in ways that satisfy themselves, and preserving time and energy for private pursuits). Strong performance incentives do not eliminate these other motives, but they can profoundly affect individuals' priorities.

Educators are neither more nor less dedicated to their work than other professionals—doctors, lawyers, engineers, and so on. In all those other professions, pay, job security, work satisfaction, and prestige are strongly linked to performance. The doctor who invents a successful new surgical procedure reaps huge rewards professionally and financially. Once a promising new method is developed, other doctors have strong incentives to learn and adopt it: early adopters can also reap financial rewards and those who use outmoded methods risk malpractice claims. Concepts of "best practice" have genuine operational meaning in medicine, law, and other professions. Other professionals face similar performance contingencies: a lot to gain from innovation and a lot to lose from failure to pursue the best.

In other professions, practitioners experience some stress and strain, and some competent people ultimately find they cannot "make it." These negative results are not good in themselves, but they are necessary means to intellectually aggressive practice and high overall performance.

Today in public education, professionals are insulated from strong performance contingencies. Teachers are tenured, often so early in their careers that their full performance potential had never really been developed or demonstrated. Pay is contingent on seniority and completion of coursework that might or might not enhance performance. Choice of workplaces and other privileges are also based on seniority, and tenured teachers regardless of their pay level can be terminated only for egregious performance or outrageous behavior. On the other hand, ambitious young people cannot advance ahead of the seniority scale no matter how hard or brilliantly they work or how scarce their skills. Consequently, concepts of "best practice" have no operational meaning in education, are hard to pin down, and, even when discussed, receive little more than lip service.

Above all, even the least productive public schools can count on student enrollment. Free movement of children in search of programs that work for them could create strong performance pressures for schools. Choice could also allow educators with strong ideas about how to meet the needs of a particular group of students—particularly at the secondary level where student motivations and needs become diverse—to compete for students and the dollars they bring.

School districts traditionally operate a fixed set of schools, a set that changes only when student populations grow or decline dramatically. Even in localities with extremely low-performing schools, districts invest new money and reshuffle staffs to strengthen existing schools rather than closing weak schools and starting new ones. The federal No Child Left Behind Act is pressing districts to think differently about the status of schools, making any school's existence and right to admit students contingent on performance. However, with few exceptions (e.g., Chicago), districts are more inclined to fight No Child Left Behind provisions than to change their relationships with schools. As U.C. Berkeley education professor Bruce Fuller has noted, opponents who want to reject No Child Left Behind out of hand can with some justification characterize it as a punitive policy based on exhaustive testing of students. However, leaders who want to use it as an asset for local school improvement can also characterize it as the first program that really requires the creation of new options for children in unproductive schools (Fuller 2004).

A public education system designed for constant improvement would make all commitments to individuals and organizations contingent on performance. At a minimum, it would leave room in employment relationships to reward spectacular performers and to develop alternatives to its lowest-performing schools. A school district bent on the highest possible performance would not guarantee anyone a permanent job or hold students in a bad school. It would terminate any arrangement for which there was a higher-performing option clearly available. On the other hand, it would be constantly open to new options, whether initiated by teachers, principals, or independent groups (Kolderie 2003).

These requirements differ sharply from current practice and would imply profound changes in school district missions and capacities. Instead of making permanent commitments to people and institutions, a district would make contingent commitments, limited in time and renewable only after review. Instead of limiting their own options, such districts would constantly expand

them, looking for a better instructional model for a given group of students, a better school leader or contract provider, and a better source of teachers.

As in other fields, this focus on performance would not all come at the expense of incumbent teachers and school leaders. Many would stand out and be able to claim better professional opportunities and more pay. Most could adapt to higher expectations, though, as in the case of physicians learning new procedures, it might require an investment of personal time and even money.

Without such an evidence-based orientation nobody in public education, from the school board member to the teachers in the classroom, can say with confidence that they have done the best possible for the children in their charge.

System should be openness to new ideas and people. If it were clear how to provide effective schools for all disadvantaged children, a public education system would have the simple challenge of administering proven models. However, in the face of profound uncertainty, public education needs to be open to many possibilities. Though the teachers and administrators employed by a big city public school represent a significant share of the community's relevant expertise, they do not have all of it. Private schools, museums, youth service centers, arts and music organizations, churches, colleges and universities, and companies that invest heavily in training all have significant expertise and ideas. Surely these will not all be different or better than those available within the traditional school system. But as public education strives to identify and implement new ideas for solving pressing problems, it cannot afford to ignore alternative sources of ideas.

The same is true for teachers and school leaders. In most big cities there are as many trained principals and teachers *not* working in the public school system as in it. There are, moreover, people with skills that are rare in the career teaching force (e.g., expertise in physics, laboratory science, higher mathematics, music, dance, and visual arts). Individuals experienced in managing day care centers, private schools, museum educational programs, and other training programs know a good deal about managing instruction and creating a positive environment for students. Professors and management consultants know things about turning around troubled organizations and surviving in a performance-pressured climate that public school employees have had little occasion to learn. A former head of Brooks Brothers, hired amidst budget chaos in St. Louis, Missouri, took just 18 months to reduce the overall workforce from 7,000 to 5,000 before leaving with the comment that schools are about students and learning, not adults and employment (Merrow 2004).

Any combination of these skills might produce a school that is excellent for one purpose or another or create capacities to provide great instruction in particular areas. Public education needs to be open to such people, organizations, and ideas. It can apply the same expectations about performance and respect for public values to such outsiders as to school district careerists, but it would be self-defeating to impose arbitrary limits on what they attempt.

Though it is true that not just anybody can teach or lead a school well, it is also true that current entry requirements for those positions are not guarantees of competence. While these requirements often develop capable people, they also certify people who cannot perform the job, while screening out many who could. Current state teacher and principal licensing requirements

protect incumbents and establish education schools as gatekeepers, but they do not contribute much to improve school performance (Portin et al. 2003; Decker, Mayer and Galzerman 2004).

A performance- driven public education system would need the freedom to provide schools by any means necessary, and to create circumstances conducive to all schools' success. Even the best charter school laws fall short of this requirement, partly because of caps and partly because charter schools usually receive considerably less money per pupil and fewer in-kind donations from government (e.g., free facilities, state-supported teacher pensions) than do traditional public schools. In effect, charter school operators are told to take it or leave it. A public education system cannot create good options if it is forced to deal only with providers who are compelled to accept a bad deal (National Working Commission on Choice in K-12 Education).

Some districts committed to aggressive experimentation and problem solving have found their state's charter school laws useful but not sufficient. They are supporting new start-ups via their inherent powers to contract out for instructional services (Cholo and Dell'Angela 2004). Though districts have limited their use of the contracting power in the past, buying a tutoring program here and an enrichment program there, the broader power to contract for whole schools is there for the using.

Conclusion

We Americans are now a very long way from being able to answer the questions policymakers repeatedly ask. We cannot say how much public education should cost because public school systems have been constructed to privilege certain methods and rule out other, possibly more effective ones. No amount of smart analysis of current data can overcome the narrowness of our experience with alternative instructional methods, and no amount of clever accounting can compensate for the fact that the real uses of funds and the costs of particular services have been carefully hidden.

Bad methods provide bad answers. Shortcuts to answers—studies that use rules of thumb to inflate current spending levels or that estimate spending needs by calculating the added cost of marginally more effective programs—can only mislead and disillusion policymakers and ultimately waste money.

Even with the best evidence, policymakers might get unwelcome answers. It might cost a lot more than policymakers are prepared to spend in order to bring all children's learning up to high standards. It might also require more dramatic changes in how money is used—and therefore who gets paid from public funds—than policymakers are politically free to make.

But education policy is about meeting the needs of the young, not comforting the old. Policymakers need valid answers, no matter how hard they are to get. Policymakers, and the public that pays taxes and ultimately decides how public funds are spent, need valid answers much more than they need quick or simple ones. Analysts who want to speak truth to power, and to their friends and neighbors, must be candid about what questions can't be answered now and about how we can know more tomorrow than today.

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