A DIAGNOSTIC READING OF SCIENTIFICALLY BASED RESEARCH FOR EDUCATION

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A complete science of psychology would tell us every fact about everyone's intellect and character and behavior, would tell us the cause of every change in human nature, would tell us the result which every educational force — every act of every person that changed any other or the agent himself — would have. It would aid us to use human beings for the world's welfare with the same surety of the result that we now have when we use falling bodies or chemical elements. In proportion as we get such a science we shall become masters of our own souls, as we are now masters of heat and light. Progress toward such a science is now being made.[1]

Most every day when I drive to my office I pass one of the experimental farms on campus where I see a lone llama standing tall amid a flock of grazing sheep. And every day I wonder if that llama asks itself the same question that I do: What am I doing with *these* guys? Despite being a methodologist and proletarian philosopher of social science with specific interests in interpretive research methodologies and hermeneutics, over the course of my career in higher education I have found myself located primarily in faculties of educational psychology where the "real" methodologists are housed. These faculties have long held that their experimental methodologies and statistical tools are the only genuinely legitimate scientific apparatus for conducting empirical inquiries in education (why they have admitted a philistine such as me is another matter), and the idea of scientific psychological research as the foundation of education is quite simply their raison d'être. Hence, the notion of scientifically based education is familiar territory to me. Of course, that has not meant that in these settings I have witnessed consistent agreement over the years on just what constitutes scientific research. Seemingly never resolvable, internecine quarrels routinely unfold over the merits of different theoretical perspectives and methodological approaches (single-subject designs, experiments versus quasi-experiments, null hypothesis testing, the merits and uses of qualitative data, and so on). Yet I recognize these as family squabbles posing very little threat to the integrity of the family and its sense that what is most important is a science of learning. Although Edward Thorndike's enthusiasm for the promise of scientific psychology now seems but a Laplacean dream, it still serves to unite the brotherhood and sisterhood of educational psychologists.

The latest incarnation of that vision is the widespread enthusiasm for science-based educational research, and its close cousin, evidence-based practice.

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1. Edward L. Thorndike, "The Contribution of Psychology to Education," *Journal of Educational Psychology* 1, no. 1 (1910): 8.

Psychologists, along with allies in the disciplines of sociology and economics and the fields of measurement and quantitative methods, are leading the way in this movement.[2] The American Psychological Association (APA) is practically ecstatic at the prospect of an increased role for psychology in establishing the scientific basis for educational interventions in testing, motivation, classroom management, reading instruction, math instruction, preschool curriculum, and character development and socialization of school children. Director of the U.S. Department of Education's Institute of Education Sciences (IES), Russ Whitehurst, a psychologist himself, has made it clear to his colleagues that

> because psychologists are more likely than any other professional group working in the schools to have scientific training — and respect and understanding of the role of research and evidence in practice — they should be prepared to play an important role in moving the culture of education toward reliance on evidence.[3]

At the ready, the director of APA's Center for Psychology in Schools remarked, "teachers don't want fluff educational theory and ideology. They want to know what works."[4] In response, the APA has established several initiatives to address this issue. Its Presidential Task Force on Psychology and Education is intended to "pinpoint skill areas that schools tend to underemphasize in instruction and assessment, focusing on cognitive and socioemotional skills that could be better taught and evaluated." Another task force is designed to help ensure that preservice teachers learn how to translate evidence-based psychological principles into practice. In addition, the Task Force on Evidence-Based Interventions in School Psychology has the goal of helping school psychologists "craft quality academic and behavioral improvement programs" based on "rigorous prevention and intervention research."[5]

The APA's enthusiasm is matched only by that of experimentalists involved in the creation of the What Works Clearinghouse (WWC) standards for evaluating the

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2. Of the twenty-nine people comprising the combined membership of the technical advisory group for the What Works Clearinghouse (see http://w-w-c.org/whoweare/memberlist.html) and the board of advisors of the Council for Excellence in Government's Coalition for Evidence-Based Policy (see http://www.excelgov.org/displayContent.asp?Keyword = prppcAdvisory), sixteen are from the disciplines of psychology and economics, or the fields of measurement and quantitative methods; one is from medicine; one is from criminology; four are senior fellows at Mathematica, the Brookings Institution, the Hoover Institute, and the Progressive Policy Institute; and two are from Manpower Research Demonstration Corporation and Westat, Inc.

3. Jamie Chamberlin, "Federal Institute Will Emphasize Science in Education," *APA Monitor on Psychology* 34, no. 2 (2003): 20, http://www.apa.org/monitor/feb03/federal.html.

4. Bridget Murray, "Wanted: Politics-Free, Science-Based Education," *APA Monitor on Psychology* 33, no. 8 (2002): 52–53, http://www.apa.org/monitor/sep02/wanted.html.

5. Ibid.

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scientific basis of claims that an intervention "works."[6] The Study Design and Implementation Assessment Device (the Study DIAD) sets out standards to assess the degree to which the design and implementation of individual evaluations of educational interventions permit warranted conclusions about the causal effects of those interventions. Perhaps in response to criticisms from some scholars in the educational research community that its view of legitimate scientific methods of inquiry was initially too restrictive, the WWC formally tenders a modest methodological ecumenism, acknowledging, "many forms of research are relevant to education, and different forms of research serve different functions." However, in assembling what it promises to be "accessible, high-quality information about evidence of effects," the WWC strictly limits its interest to a single methodology for evaluating the interventions to be vetted for inclusion in the clearinghouse's database:

> The fact that the Study DIAD focuses on research pertaining to the causal effects of educational interventions does not mean we believe that research designs meant to uncover causal relationships are the *only* tools that should be used by social scientists. Nor does it mean we believe that to be truly "scientific," social science must be limited to randomized trials. To the contrary, we believe that (a) no single method can be used to address all interesting and important questions about educational interventions and (b) even when causal relationships are of primary interest qualitative studies and quantitative surveys, among other types of research, yield important information about when, why, and how interventions work, and for whom. However, because of our mission, our central focus and the focus of the Study DIAD are on research designs — such as randomized trials, certain quasi-experiments, regression discontinuity designs — that have as their primary purpose uncovering causal relationships.[7]

A second set of WWC standards, the Cumulative Research Evidence Assessment Device (CREAD), is used to make judgments with respect to causal effects found across an entire body of accumulated evidence.

Lest teachers and administrators be mystified by the technical jargon of treatment homogeneity, causal molar validity, effect sizes, and the like as they struggle to choose and implement science-based interventions in classrooms, the IES and the Coalition for Evidence-Based Policy have engaged in a publicity campaign to explain what science-based research is, why it is important, and how to make use of it. The IES "user-friendly guide" to "Identifying and Implementing Educational Practices Supported by Rigorous Evidence" (prepared by the Coalition) is one of the

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6. See, for example, Thomas D. Cook, "Randomized Experiments in Educational Policy Research: A Critical Examination of the Reasons the Educational Evaluation Community Has Offered for Not Doing Them," *Educational Evaluation and Policy Analysis* 24, no. 3 (2002), 175–199; Thomas D. Cook, "Why Have Educational Evaluators Chosen Not to Do Randomized Experiments?" *Annals of the American Academy of Political and Social Science* 589 (September 2003): 114–149; Frederick Mosteller and Robert Boruch, eds., *Evidence Matters: Randomized Trials in Education Research* (Washington, D.C.: Brookings Institution Press, 2002); and the exchange on the nature and merits of meta-analysis between Mark Lipsey and Thomas Schwandt in the *American Journal of Evaluation* 21, no. 2 (2000): 207–229.

7. William R. Shadish, Thomas D. Cook, and Donald T. Campbell, *Experimental and Quasi-Experimental Designs for Generalized Causal Inference* (Boston: Houghton Mifflin, 2002), quoted in Jeffrey C. Valentine and Harris Cooper, *What Works Clearinghouse Study Design and Implementation Assessment Device*, version 1.1 (Washington, D.C.: U.S. Department of Education, 2004), 1. Some of the criticisms of the WWC's restrictive view of legitimate science-based methods are summarized in Margaret Eisenhart and Lisa Towne, "Contestation and Change in National Policy on 'Scientifically Based' Educational Research," *Educational Researcher* 32, no. 7 (2003): 31–38.

most recent examples of this effort.[8] Here readers are advised that randomized, controlled trials are the gold standard for evaluating an intervention's effectiveness, and they can see at a glance the process that IES recommends for determining whether an intervention is backed by rigorous evidence.

Taken collectively, these recent developments promoting the use of the psychologist's conceptual and methodological armamentaria as central to sound educational research should put to rest any lingering doubts about Thorndike's triumph in the battle over the conception of what counts as educational science.[9] Despite proclamations that the interpretive turn in the social sciences is complete, and the claims to victory in the "paradigm wars" in education proffered by a diverse range of "qualitative" inquirers, that news does not seem to have reached those folks who have the ear of the IES.

There can be no doubt that federal agencies are legislating methods of evaluation research, not simply in education but throughout the government. Requiring that researchers use experimental studies in order to obtain IES funding is part of the current administration's much more pervasive management agenda that strongly emphasizes results- or performance-oriented government. The Office of Management and the Budget has developed a methodology for determining program effectiveness, The Program Assessment Rating Tool (PART), to be used by managers in all federal agencies. Central to this methodology is the use of experimental and quasi-experimental studies to determine program impact.[10]

In the current climate where science-based research and evidence-based practices occupy center stage in thinking about social and educational programs, a multilevel quarrel is unfolding. On the one hand, there are social scientists, educational researchers, and evaluators who agree that judgments about program impact or effectiveness should be made primarily (if not exclusively) on the basis of the causal efficacy of a social or educational intervention. Yet within this group there is disagreement over which methods best support the making of such a judgment. Some argue that a causal inference can be legitimately warranted only by means of a randomized experiment, while others argue that causality can be reasonably

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8. Coalition for Evidence-Based Policy, "Identifying and Implementing Educational Practices Supported by Rigorous Evidence: A User-Friendly Guide" (Washington, D.C.: U.S. Department of Education, 2003), http://www.ed.gov/rschstat/research/pubs/rigorousevid/guide.html. For other examples of this publicity effort, see Ron Beghetto, "Scientifically Based Research," *ERIC Digest 167* (April 2003), http://eric.uoregon.edu/publications/digests/digest167.html; Thomas D. Cook, "Sciencephobia," *Education Next* 1, no. 3 (2001), http://educationnext.org/20013/62.html; Therese Mageau, "Determining 'What Works' — An Interview with Dr. Grover 'Russ' Whitehurst," *T.H.E. Journal Online* 31, no. 6 (2004); and Robert E. Slavin, "A Reader's Guide to Scientifically Based Research," *Educational Leadership* 60, no. 5 (2003): 12–16.

9. Of course, this issue is not confined to the U.S. context. The resurgence of interest in science-based or evidence-based educational policies is manifest throughout the Anglophone world, wherever policy-making has taken up the ideologies and practices of the new managerialism, neoliberalism, and market globalization. See, for example, Stephen J. Ball, "Labour, Learning and the Economy: A 'Policy Sociology' Perspective," *Cambridge Journal of Education* 29, no. 2 (1999): 195–206.

10. For information about the purpose and methodology of the OMB's Program Assessment Rating Tool, see http://www.whitehouse.gov/omb/part/.

established using methods such as pattern matching, case study, quasi-experimentation, and the modus operandi method. Much of this argument hangs on apologies for and criticisms of various theories of causality.

Another quarrel simultaneously unfolds because there are other researchers who, for a variety of reasons (not all of which are shared by the different members of this group), hold that the method of experimentation has little or no legitimate place in the evaluation of social and educational programs and policies. Some of these scholars claim that experimentation is inherently militaristic and oppressive; others equate the turn to experimentation with a resurgence of scientism; and still others hold that genuine experiments are impractical or virtually impossible to conduct effectively in the study of human affairs.

Finally, still another loosely coupled group of evaluators and researchers argue that experimentation and the associated search for causal efficacy in social interventions is not by definition some kind of Darth Vader–like undertaking. In fact, many within this group look in on the first quarrel over the best methods to establish causal judgments and find it informative. However, this group is relatively united in the belief that to frame the debate as principally an argument about science or scientific method is naïve. They hold that the more fundamental issue is a political one, namely, the federal government's forceful insinuation of itself into deciding what constitutes legitimate research methodology. Some see this intrusion as merely the latest manifestation of the ideology of neoliberal governmentality that aims to redefine social and educational programs as primarily mechanisms that deliver services to customers in a cost-effective and efficient way. Others add that judgments of program effects are not always and only about establishing causality; they further maintain that to narrow scientific judgments in this way is to ignore a host of useful studies that are descriptive, illuminating, supportive of organizational development, contributory to practitioners' critical self-understanding, and so on.

This may not be Babel but it surely is a diverse mix of views. Having coexisted for so long with my educational psychologist colleagues, I have learned that attempting a dialogue across differences is often a more productive strategy than outright confrontation. Such a dialogue must take seriously the pluralism — the genuine difference and not merely diversity — of philosophic orientations, methodologies, political perspectives, cultural views, values, and so on.[11] Interpreting and confronting this pluralism entails taking an ethical stance toward the difference of the other view, and not all such stances are equally morally defensible. One can, for example, view pluralism in a fragmenting way and thus respond by communicating only with one's own group, feeling no need to engage with others outside this small circle. Alternatively, one can be polemical, acting simply to advance one's own view and exhibiting no genuine willingness to listen and learn from others. One might also be defensive, adopting a form of tokenism expressed by paying lip service to the idea that others should do their own thing while remaining steadfastly

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11. Gert J.J. Biesta, "Bildung and Modernity: The Future of Bildung in a World of Difference," *Studies in Philosophy and Education* 21, no. 4–5 (2002): 346.

convinced that there is nothing to be learned from others. Finally, one can take up an engaged fallibilist pluralism, which entails

> taking our own fallibility seriously — resolving that however much we are committed to our own styles of thinking, we are willing to listen to others without denying or suppressing the otherness of the other. It means being vigilant against the dual temptations of simply dismissing what others are saying by falling back on one of those standard defensive ploys where we condemn it as obscure, wooly, or trivial, or thinking we can always easily translate what is alien into our own entrenched vocabularies.[12]

It is in the spirit of engaged fallibilistic pluralism that I, at least on my better days, endeavor to understand the current interest in science-based educational research. What follows is my diagnosis of this development presented through several readings that emphasize different potential effects. The first is a charitable and considerate appraisal that draws attention to the fact that advocating experimental methods in a science of educational research is not an inherently evil thing to do. The subsequent readings are grimmer, suggesting more deleterious consequences of the science-based movement for the entire enterprise of educational research and educational practice.

FAREWELL TO EXPERIMENTPHOBIA

To a large extent, whether one sees any potential for good news in the renewed interest in scientific research in education is a function of how one stands on the issue of the "paradigm wars." The general tenor of things these days in social and educational research is that only the most naïve researcher seriously doubts that experimental as well as fieldwork methods, qualitative as well as quantitative data, and narrative as well as statistical forms of analysis and reporting are important in understanding social reality. To put the point more in terms of the enduring philosophical argument about whether the social sciences are (or should be) explanatory or hermeneutic undertakings, it would be hard to find many who would disagree with the proposition that an adequate social science should seek both to understand the meaning of human action and to grasp the causes, connections, and consequences that lie beyond the horizon of meaning of everyday practice.[13] Yet dichotomous thinking has not disappeared, and one can still find persistent efforts to identify inquiry employing experimental methods as the worst kind of so-called quantitative research and, among other things, inherently "militantly empiricist" — "claiming to produce findings that are verifiable, definitive, and cumulative [and] set against a softness where interpretation is central and findings are always subject to debate and reinterpretation."[14]

As Ann Oakley has recently noted, this dichotomous thinking has as its main referent ideological differences, marking out contrasting values and political and philosophical positions, and is distinctly unhelpful as a practical guide to research

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12. Richard J. Bernstein, *The New Constellation: The Ethical-Political Horizons of Modernity/Postmodernity* (Cambridge: MIT Press, 1991), 335–336.

13. See, for example, Brian Fay, *Contemporary Philosophy of Social Science* (Oxford: Blackwell, 1996).

14. Patti Lather, "This *IS* Your Father's Paradigm: Government Intrusion and the Case of Qualitative Research in Education," *Qualitative Inquiry* 10, no. 1 (2004): 25.

methods. Focusing specifically on the ways in which we study social phenomena, she argues that the best outcome of such warfare has been the realization that *all* methodological approaches to social-behavioral inquiry need to be far more self-critical and self-reflexive:

> "Quantitative" methods need to enshrine a greater respect for the perspectives of the people who contribute data. One of the things this may mean is less use of prepared measuring and assessment scales, which often force people's experiences and views into places they do not want to go...."Qualitative" methods could do with more self-criticism about the mediation of their research findings by partial, researcher-driven perspectives by more caution, openness and accountability in relation to the findings claimed. It is time to stop boasting that "triangulation" and computer-based analysis are all that are required to establish the trustworthiness of "qualitative' findings — just as it is time to give up the pretence that all that matters in experimental research are large sample sizes, adequately concealed allocation [to treatment conditions] and competently executed statistical tests.[15]

Oakley promotes a distinctly pragmatic view of experimental knowing and doing in everyday experience and questions why it is necessary for us to "go on about 'quantitative' and 'experimental' and 'qualitative' methods as though these were inherently opposed, rather than simply being aspects of the way we all live in and make sense of this world."[16] Thomas Cook, a strong advocate for experimental studies in evaluating educational programs, argues in a similar way that experimentation is not inherently hostile to qualitative knowing. He claims that for experimentation to be effective, it is necessary for its advocates

> to be explicit about the real limits of their preferred technique, to engage their critics in open dialogue about the critics' objections to randomization, and to assert that experiments will be improved by paying greater attention to program theory, implementation specifics, quantitative and qualitative data collection, causal contingency, and the management needs of school personnel as well as of central decision makers.[17]

In this light, the interest in a science of educational research that revitalizes experimental ways of knowing can be read as another salutary effort to put the "methods wars" to rest. This rehabilitation need not necessarily entail a debate on the nature of science. Whether, to use Clifford Geertz's distinction, the science at issue is a natural science in search of laws or an interpretive science in search of meanings, to be scientific is to be committed to systematic reasoning that draws inferences based on evidence. It is characteristic of this reasoning process — whether it unfolds in experimentation, ethnography, or ethnomethodology — that it demonstrates explicit argumentation about concepts, ideas, frameworks, and theories; identifies and explains patterns, variations, and rival understandings (hypotheses); and does so in a way that leaves it open to scrutiny by others.[18] Despite the fact that methodological frameworks, inquiry objectives (for example, determining what comprises "theory," or setting priorities of theory-testing versus

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15. Ann Oakley, *Experiments in Knowing* (New York: The New Press, 2000), 303.

16. Ibid., 293.

17. Cook, "Sciencephobia," 9–10.

18. The central point here is that scientific research is an argument linking empirical content and conceptual work. For more on this, see Lisa Towne, Richard J. Shavelson, and Michael J. Feuer, eds., *Science, Evidence, and Inference in Education: Report of a Workshop* (Washington, D.C.: National Academies Press, 2001); and Robert R. Alford, *The Craft of Inquiry* (Oxford: Oxford University Press, 1998).

theory-building), procedures, and the nature of evidence all vary, this overall character of scientific thinking remains steady.[19]

However, lest we become too sanguine and comfortable about all this, two important caveats bear noting. First, in the spirit of John Dewey, we ought to regard the very idea of carrying out a strategy of "what works" that is based on the primacy of social experimentation as itself an experiment that requires reflection and evaluation. However, there appears to be little interest among advocates of a "what works" strategy to engage in this kind of examination. Second, a defining characteristic of scientific thinking is acceptance of a fallibilist epistemology and of the corrigibility of knowledge claims. Thus, the IES is a bit overzealous in its rhetoric promoting the WWC as a "trusted source of scientific evidence of what works in education." It might more accurately claim that what it has established is the "What We Currently Think Works Clearinghouse" that provides the evidence to date that we believe we can trust.[20]

THE PRACTITIONER AS TECHNICIAN

According to IES director Whitehurst, science- or evidence-based educational practice rests on integrating professional wisdom with the best available empirical evidence in making decisions about how to deliver instruction. Professional judgment, in turn, is the wisdom that individuals acquire through experience and is reflected in numerous ways, including through the effective identification and incorporation of local circumstances into instruction. Empirical evidence is defined as scientifically based research from fields such as psychology, sociology, economics, and neuroscience, especially when this research is conducted in educational settings wherein objective measures of performance are used to compare, evaluate, and monitor progress. Both professional wisdom and empirical evidence are required because without the former, education cannot adapt to local circumstances and operate intelligently in the many areas in which research evidence is absent or incomplete. By the same token, without empirical evidence, education cannot resolve competing approaches, generate cumulative knowledge, and avoid fad, fancy, and personal bias.[21] Despite this seemingly sensible approach, the potentially grim development afoot in this picture of the relation between educational research and educational practice is that educational practice will become little more than managing the challenges of implementing proven practices.

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19. Efforts to delineate the general character of a scientific investigation of educational matters need not *necessarily* entail devaluing other forms of inquiry. The National Research Council committee charged with preparing *Scientific Research in Education* did *not* claim that other kinds of studies failed to qualify as important scholarship in education, nor did they argue that these other kinds of inquiries were meaningless. See National Research Council, *Scientific Research in Education*, eds. Richard J. Shavelson and Lisa Towne (Washington, D.C.: National Academies Press, 2002).

20. I am indebted to my colleague Bill Trochim for suggesting this idea.

21. This characterization comes directly from Russ Whitehurst, "Evidence-Based Education (EBE)" (presentation delivered at the Student Achievement and School Accountability Conference, October 2002), http://www.ed.gov/nclb/methods/whatworks/eb/edlite-slide007.html.

Although the IES and WWC appear to assume that teachers are smart enough to choose proven educational programs and practices (that is, those that "work"), they seem to view teachers' everyday understandings of how to effectively educate the full range of their students — including Mary, who simply resists sounding out her letters; Ramon, a bilingual Latino who genuinely despises being in school because he is shunned by classmates; John, who requires after-school help to deal with division problems in math; and Peter who is so troubled by domestic violence at home that he is simply in a foul mood most every morning he arrives at school — as nothing more than folk wisdom that must sooner or later be remedied by scientific evidence regarding what works in each of these situations. Given the broader context in which the discussion of teacher qualifications (or the lack thereof) is framed, especially in the wake of the No Child Left Behind Act (NCLB), I find it hard to accept that the IES and WWC genuinely believe in the validity and centrality of practitioner knowledge. Nowhere in the NCLB legislation, the Education Secretary's annual report on teacher quality, or the Teaching Commission's report, "Teaching at Risk: A Call to Action," can one find any evidence for the belief that it is necessary to cultivate practical judgment as a critical aspect of teacher expertise.[22] As characterized in these documents, highly qualified teachers are those who possess bachelor's degrees, are fully licensed, and have demonstrated competence in their subject matter.

The overwhelming message is that practice is in need of redemption by science. "Science" in this circumstance does not simply refer to research on "proven" educational practices, but to a broader notion of a science capable of engineering teacher effectiveness. In an article that examines issues related to improving teacher quality, Whitehurst argues that value-added methods are perhaps the most powerful tool for addressing the question of whether teachers matter in education. Value-added methods are based on examining student gains in achievement from year to year. Teachers who "add value" are those whose students show the most improvement in measures of achievement over the school year. Moreover, he points out that the likelihood of adding value in this way is increased when teachers operate in a system that links and aligns professional development, student academic achievement standards, state assessments, and state and local curricula: "Individual difference in teachers will never go away," Whitehurst writes, "but powerful institutional systems and new, effective forms of professional development should reduce those differences."[23]

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22. See *No Child Left Behind Act of 2001*, Public Law 107-110 (HRl), http://www.ed.gov/nclb/landing.jhtml?src=pb; U.S. Department of Education, "New No Child Left Behind Flexibility: Highly Qualified Teachers," fact sheet, http://www.ed.gov/nclb/methods/teachers/hqtflexibility.html; U.S. Department of Education Office of Postsecondary Education, *Meeting the Highly Qualified Teachers Challenge: The Secretary's Third Annual Report on Teacher Quality* (Washington, D.C.: U.S. Department of Education, 2004); and The Teaching Commission, "Teaching at Risk: A Call to Action" (New York: The Teaching Commission, 2004), http://www.theteachingcommission.org. The Teaching Commission's report holds that teacher quality can be improved by linking teacher compensation to student performance, raising standards for entry into preservice teacher education programs, strengthening state licensing and certification requirements, and empowering school administrators to act as CEOs.

23. Russ Whitehurst, "Improving Teacher Quality," *Spectrum: The Journal of State Government* 75, no. 3 (2002): 15.

What we are witnessing here is the absorption of the practical by the technical, a familiar enough story, perhaps, but it bears repeating.[24] IES is promoting education as a science-based practice — an undertaking governed by norms of scientific rationality (objectivity, generalizability, replicability, clear-cut criteria for success, public accountability, and so on). To make things easier, let's calls this notion of "scientific practice" SP. SP is almost exclusively concerned with determining which means are most effective and efficient in achieving predetermined ends, such as minimizing the high school drop-out rate; reducing delinquent, disorderly, and violent behavior in middle school; increasing English-language acquisition among elementary school students; and increasing adult literacy.[25] SP aims to put all aspects of education — from teacher qualification and subsequent professional development, to teaching method, to curriculum choices, to outcome measurement — on a scientific basis. Alongside SP is the current "practice" of teachers and administrators; let's call this sort of "everyday practice" EP. EP is concerned with simultaneous deliberation about means and ends — deciding what will count as a satisfactory, or at least not an entirely unacceptable, educational outcome in the case at hand.[26] In other words, EP is an undertaking governed not solely by scientific norms but by practical desirability; it is a deliberation about what is the right course of action to take that is not directly answerable through the use of scientific knowledge.

When advocates of SP look in on the doings of EP, they are dismayed to find that deliberation about how to use SP's painstakingly undertaken calculations of what works is a pretty messy affair involving all kinds of untidy things like personal preferences, values, beliefs, prior experience, situational responsiveness, and so on. Advocates of SP conclude that, by *their* standards, there seems to be a complete absence of reason among those using EP to determine the right ends to pursue and means to employ. There does not seem to be anything even remotely resembling scientific rationality; instead, reasoning within EP appears to be makeshift, intuitive, unreliable, and unaccountable. So, SP advocates say, "Look, the way *we* reason in making decisions about valid and reliable interventions that are effective and efficient in achieving different ends must become the norm for what reason means."

In this scenario, technical, scientific reason becomes the *only* way to think about what reasoned practice is — and, hence, the messy give-and-take of deliberating ends and means (including asking such questions as what is required to be a good teacher on this occasion, or what is an appropriate and effective way to educate this child in this circumstance) is made to seem deplorable and embarrassing. In the end the essentially normative context of teaching (and administrative) practice, with its understandings of obligations and necessities, is displaced by the

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24. The following analysis draws on Joseph Dunne and Shirley Pendlebury, "Practical Reason," in *The Blackwell Guide to Philosophy of Education*, eds. Nigel Blake, Paul Smeyers, Richard Smith, and Paul Standish (Oxford: Blackwell, 2003), 197–198.

25. These are but four of the educational aims (what the WWC calls topic areas) that the WWC has chosen to emphasize in its systematic review of evidence to determine what works. See http://www.w-w-c.org/topics/current_topics.html.

26. Dunne and Pendlebury, "Practical Reason," 199.

scientifically rational order, with its emphasis on calculation and consequence.[27] Moreover, we often associate the idea of being reasonable with those qualities and traits that characterize being human. Thus, if what it means to be reasonable is to admire and employ scientific, technical reason, then the person who is not reasonable in this sense is not simply mistaken but is perhaps also less human in some way — less deserving of respect, more ignorant, and so on.[28] Through touting scientific reason as the natural order of things, the community of SP thus stakes out a position of authority over EP. In other words, expert scientists look upon everyday practice as being in need of salvation. Teachers and other school personnel are cast as incapable of determining the most effective and efficient ways of teaching reading, mathematics, and so forth, a conclusion confirmed by the fact that teachers are not adding value to student achievement. Therefore, EP must be fixed (or made "practitioner-proof") — that is, teachers must be transformed into technicians, thereby obliterating the practical texture of their engagements with students and denying the authority of their experience. At best, practitioners can use their local knowledge to determine how to retrofit "what works" remedies to local circumstances.

Efforts to hold out for the kind of practical rationality that governs EP against establishing the technical rationality of SP as *the* standard for behavior are often misunderstood by defenders of science-based research. The latter often adopt an all-or-nothing view: *either* our actions are guided by reliable, general scientific knowledge of what works *or* they are idiosyncratic and driven by intuition, habit, and so on. It is important to watch out for two dodgy ways of thinking here. The first has to do with a potentially pernicious contrast between leading an examined versus an unexamined life. In this case, the examined life — the one "really" worth living — is equated with a sense of life governed almost exclusively by technical and scientific rationality. The unexamined life — the one not worth living — is one that apparently eschews argument and evidence in favor of making decisions on some other basis. But, as Gert Biesta has argued, "while the unexamined life may not be worth living, the unlived life is definitely not worth examining."[29] His point is that we should situate the examined life — that is, find out where and when it makes sense to appeal to reason and evidence, and where it does not. After all, he observes, the examined life is only one way to lead a meaningful life, and it is not necessarily always the best way. I worry that in the press for science- and evidence-based everything, we are making the "examined" life — that is, the life governed by scientific and technical rationality — synonymous with what it means to lead a good life.

The second kind of questionable thinking at work here is also familiar: it is the failure to recognize that science- and evidence-based approaches to educational

27. Ian Sanderson, "Getting Evidence into Practice: Perspectives on Rationality," *Evaluation* 10, no. 3 (2004): 371.

28. Sarah McGough pointed out this possibility (personal communication with author, January 29, 2004).

29. Biesta, "Bildung and Modernity," 348.

practice are part of the ethos of rote learning and memorization measurable on standardized tests. Undeniably, such learning is useful, but educational practice is not simply a matter of a teacher imparting, and a student acquiring, facts and information. To educate is to draw out thought — to develop students who are intellectually liberated, so to speak, and thus capable of acting in intelligent, critical, and healthy ways.[30] Deciding whether one is doing the right thing and doing it well in educating a student requires more than an ability to implement evidence-based curricula for teaching knowledge and skills in math, science, and reading. It requires decision-making methods that are inescapably characterized by simultaneous attention to the particulars of the situation (that is, the particular student one is facing at this time and in these circumstances) and to a host of considerations having to do with values, interests, habits, beliefs, traditions, and so forth that make decisions about how best to educate (at least in a democracy) inveterately untidy, contested, corrigible, and case specific. This practical character of deliberating educational means and ends cannot be made to go away by increasing the rigor, pace, or reach of science-based thinking. Thus, I share with David Wiggins the "unfriendly suspicion" that those seeking to overcome the rough texture of educational practice and its demand for practical wisdom

> want a scientific theory of rationality not so much from a passion for science, even when there can be no science, but because they hope and desire, by some conceptual alchemy, to turn such a theory into a regulative or normative discipline, or into a system of rules by which to spare themselves some agony of thinking and all the torment of feeling and understanding that is actually involved in reasoned deliberation.[31]

If my hypothesis — that a science-based approach to educational practice leads to the devaluing of practical knowledge — is warranted by more than the anecdotal evidence I have from talking with teachers, then there is considerable irony in the appeals by science-based education advocates to evidence-based medicine as the standard for practice. Although the merits of evidence-based medicine are debated, there is general agreement that it is not a replacement for clinical judgment but a means of enhancing it. Moreover, clinical judgment is clearly regarded as an interpretive act that draws upon narrative skills to integrate the case-specific features of the patient's individual story with test results, evidence from medical trials, and the accumulated professional expertise of the clinician to decide upon an appropriate course of action: "Clinical medicine is more art than science because it lacks rules that can be generally and unconditionally applied to every case, even every case of a single disease."[32]

Without denying the relevance of evidence regarding effective educational interventions, we ought to rethink our priorities in assessing the relation between educational science and educational practice. Perhaps we should be less concerned

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30. See John Kaufman, "Education as Creative Conversation," *Education Week*, March 24, 2004; and Robert J. Sternberg, "Good Intentions, Bad Results," *Education Week*, October 27, 2004.

31. David Wiggins, "Deliberation and Practical Reason," in *Practical Reasoning*, ed. Joseph Raz (Oxford: Oxford University Press, 1978), 150.

32. See, for example, Trisha Greenhalgh, "Narrative Based Medicine in an Evidence Based World," *British Medical Journal* 318 (January 1999): 324.

with efforts to define scientific research as a basis for educational practice and more concerned with defining educational practices as the bases for scientific research. This is hardly a new idea, for it bears the imprint of both Dewey and Lawrence Stenhouse. Neither of these educational theorists and researchers found experimentation and measurement unmitigated evils, yet both regarded the real classroom as a crucially important testing laboratory. For Stenhouse, this meant that "The research act must conform to the obligations of the professional context," and thus "experimental or research acts [and here we might include evidence-based practice as itself one of those experimental acts] cannot be exempted from the demand for justification by professional as well as by research criteria."[33] I am not suggesting that the remedy here is some wholesale turn toward the teacher-as-researcher movement but, rather, that there is a need to pay more careful attention to the traditions of practical knowledge and to the kinds of empirical inquiries that produce actionable evidence, as Stenhouse called it, relevant to professional practice. We might even mount studies focused on evaluating how this disagreement plays out for different teachers in different circumstances in an effort to better understand the potential ramifications of this disagreement, rather than assuming that such differences should not exist or dismissing differences as an outgrowth of inexperience or incompetence.

Thinking differently about the study of educational practice implicates matters of educational researcher training but not necessarily in the direction of improving the experimental design skills of researchers. What it suggests, as David Berliner recently argued in the specific case of educational psychology, is that educational researchers must begin to think of themselves not simply as scholars within a discipline but as professionals who engage in practical action and bring their knowledge to bear on the complex, at times ambiguous, and often contested issues of practice.[34] In part, this means that educational researchers, as Berliner argues, have to understand that the resolution to predicaments and dilemmas of practice is rarely simply a matter of assembling and assessing competing data but instead derives from competing values and conceptions of right answers to value-rational questions. This need not betray in any way the empirical project of generating evidence, but it clearly resituates that task in terms of the public, practical responsibilities of the educational researcher.[35]

33. Stenhouse, quoted in John Elliott, "Making Evidence-Based Practice Educational," *British Educational Research Journal* 27, no. 5 (2001): 555–574.

34. David C. Berliner, "Toward a Future as Rich as Our Past" (Stanford, California: Carnegie Foundation for the Advancement of Teaching, 2003), http://www.carnegiefoundation.org/CID/essays/CID_Edu_Berliner.pdf.

35. This is a topic for another essay; however, it should be noted that there are several ways of modeling this kind of public science of educational research. See, for example, Ben Agger, *Public Sociology* (Lanham, Maryland: Rowman and Littlefield, 2000); William M. Sullivan, *Reconstructing Public Philosophy* (Berkeley: University of California Press, 1986); and Bent Flyvbjerg, *Making Social Science Matter* (Cambridge, England: Cambridge University Press, 2001).

SCIENCE — AS YOU LIKE IT

Countless pages of academic journals and public presentations have been devoted to arguing that the problem with science-based reforms in education is the definition of science endorsed by the Education Science Reform Act, the IES, and the WWC; to pointing out that this way of thinking is based on an outdated philosophy of social science; to criticizing the treatment of randomized, controlled trials as the gold standard of methodology; to lamenting the reemergence of scientism; to reinstating the significance of qualitative knowing; and to defending the relevance of postmodern analyses.[36] All valid and compelling concerns to be sure, but, at the risk of sounding anti-intellectual, perhaps emphasizing these issues is a bit like fiddling while Rome burns. In fact, a central problem is the very fact that we have focused our core argument on the conceptual matter of defining what constitutes "good" educational research, while sociologists, economists, political scientists, historians, and others are busy with the practical task of shaping educational policy and practice.

In responding to criticisms of *Scientific Research in Education* (*SRE*), the National Research Council (NRC) report they edited, Lisa Towne and Richard Shavelson (along with Michael Feuer, executive director of the Division of Behavioral and Social Sciences and Education at the NRC) have maintained that the NRC's concern with defining the characteristics of high-quality scientific research in education and promoting a scientific culture of educational research that is publicly accountable can be (and should be) kept separate from the federal government's efforts to legislate acceptable educational research practice (evident in the NCLB legislation, the IES, and the WWC, for example).[37] They claim that if the NRC's findings "happen to coincide with the viewpoints of federal officials, so be it."[38] Perhaps because the National Academies are a quasi-governmental agency obligated to provide independent scientific advice and evaluation to any government agency that requests it, and, thus, they seek to maintain independence while not foreclosing options for productive interaction with federal officials, this public stance on the part of the authors and director is to be expected. Yet, surely they must recognize on some level that "coincidence" is hardly a valid (scientific!) explanation for the confluence of (1) renewed interest in experimental methods, (2) cultivating a scientific culture of educational research, (3) criticism of ineffective educational practices, (4) arguments about the inadequacy of preservice teacher education, (5) commitment to demonstrating the effectiveness of federal programs through performance and results measurement, and (6) the broad embrace of neoliberal theories of government accountability.

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36. See the *Education Science Reform Act of 2002*, HR 3801, Public Law 107-279, http://www.ed.gov/about/offices/list/ies/index.html, 126.

37. Michael J. Feuer, Lisa Towne, and Richard J. Shavelson, "Scientific Culture and Educational Research," *Educational Researcher* 31, no. 8 (2002): 4–14.

38. Michael J. Feuer, Lisa Towne, and Richard J. Shavelson, "Reply to Commentators on *Scientific Culture and Educational Research*," *Educational Researcher* 31, no. 8 (2002): 28.

An opposing view is offered by Frederick Erickson and Kris Gutierrez, who argue that "the prescription of a 'scientific culture' as an effective remedy for the ills of educational research and of 'hard science' causal studies of program effects as a remedy for defects in educational practice must be treated very skeptically." On their view, the well-warranted concern for improving the rigor of educational research cannot be read independently of the broader federal discourse concerning education. To support this argument, they point specifically to claims made in the Department of Education's "Strategic Plan for 2002–2007" that the "field of education operates largely on the basis of ideology and professional consensus…[and] is subject to fads and is incapable of the cumulative progress that follows from the application of the scientific method and from the systematic collection and use of objective information in policy making."[39]

Erickson and Gutierrez worry that because *SRE* does not challenge "the reigning optimism about hard science as a royal road to improvement," it, by default, supports the discourse of scientism.[40] Yet there is more at stake here than glorification of scientific reasoning. The discourse of scientism at the present time is inseparable from the discourses of performance management, effectiveness and accountability, marketization and vocationalization of education, and the Popperian idea of the rule of institutions controlled by reason alone, all of which are constructing our sense of sociality as consumers.

HOW THE MARKET MATTERS

In his observation that research in psychology, economics, cognitive science, and sociology is the place to look for sound scientific investigations, Whitehurst echoes the point I made earlier about his expectation that the discipline of psychology will play a prominent role in science-based research. The case for the "sorry state" of educational research is being prosecuted most strongly by Thomas Cook, a professor of sociology at Northwestern University whose views on the importance of conducting randomized experiments to test educational interventions have been highly influential in shaping the philosophy and practice of the WWC. Cook has expressed the opinion that "nearly all educational evaluators believe that experiments are of little value." He further holds that these researchers may not be needed for the task of conducting studies to evaluate the evidence base of educational interventions, because it may well be possible to meet the demand for this kind of scientific research with staff from research firms and university faculty in the policy sciences.[41] In all fairness, Cook suggests that such end runs around the educational research community are regrettable: "It would be a shame if this occurred and restricted our [experimentalists'] access to those researchers who

39. Frederick Erickson and Kris Gutierrez, "Culture, Rigor, and Science in Educational Research," *Educational Researcher* 31, no. 8 (2002): 22. See also Department of Education, "Strategic Plan, 2002–2007" (Washington, D.C.: U.S. Department of Education, 2002), http://www.ed.gov/about/reports/strat/plan2002-07/index.html; see esp. the section titled "Goal Four: Transform Education into an Evidence-Based Field."

40. Erickson and Gutierrez, "Culture, Rigor, and Science in Educational Research," 22.

41. Cook, "Randomized Experiments in Educational Policy Research," 195–196.

know best about micro-level school processes, about school management, about how school reforms are actually implemented, and about how school, state, and federal officials tend to use education research....Such knowledge genuinely complements controlled experiments."[42]

The issue that typically comes to the fore here is the adequacy of research findings coming out of colleges and schools of education. The common complaint heard both inside and outside of the educational community is that educational research is too ideological and must become more empirically rigorous if it is to be taken seriously in policy and practice.[43] The community of educational researchers is held to have, at best, an underdeveloped scientific culture, as reflected in the lack of a common understanding of how knowledge claims are warranted, little consensus on what constitutes research quality, and weak coordination of different perspectives on educational problems and questions.[44] This is not a trivial matter for those of us who are troubled by deficiencies in the scope and rigor of research methodology curricula in colleges and schools of education, a fairly longstanding concern that predates *SRE*. But when recommendations for better training in science-based methods of educational research are read within the context of the larger set of discourses, it becomes clear that more is at stake here than the preparation of educational researchers.

A market model of the utility of educational research is assumed in efforts to transform educational research and practice into science-based or evidence-based undertakings. One can readily acknowledge that empirical educational inquiry could become more rigorous — dustbowl empiricism of any kind, whether a few statistics and a cloud of dust or a few interviews and cloud of dust, is inexcusable — by, for example, taking seriously the principles articulated in *SRE*, but that is not the issue at stake in the potential dismissal of the relevance of much educational research. The problem pertains to a political strategy that aligns educational research with a market model of providing consumers with "tested" educational products and that sets aside as unessential those kinds of studies that do not serve this aim. Much like *Consumer Reports*, WWC will warrant these products by ensuring that they are based on evidence of what works. This approach conceives the federal government's primary responsibility as providing (through WWC) quality control — its sets the standards and holds providers accountable to these standards. It establishes criteria for "what works" in educational programs and products (and "what works" more generally in terms of overall school performance), and thereby indirectly but powerfully influences and shapes the products provided to consumers such as teachers and parents.[45] Educational research that does not address itself to the task

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42. Cook, "Sciencephobia," 10.

43. See, for example, Ellen Lagemann and Lee Shulman, eds., *Issues in Educational Research* (San Francisco: Jossey-Bass, 1999).

44. This is the view promoted by the authors of the NRC report *Scientific Research in Education*. See also Evelyn Jacob and C. Stephen White, eds., special issue on "Scientific Culture and Educational Research," *Educational Researcher* 31, no. 8 (2002), http://www.aera.net/publications/?id = 438.

45. See John Elliot, "The Paradox of Educational Reform in the Evaluatory State: Implications for Teacher Education," *Prospects* 32, no. 3 (2002): 273–287.

of warranting the efficacy of educational "products" may be interesting in some way, but it is largely superfluous to this central task of determining what works. The attitude toward these other forms of educational inquiry appears to be something like "Well, that's nice dear, but I have some real work to do."

Both the IES and the WWC are promoting a definition of educational research as serving primarily to establish and evaluate the efficacy or impact of educational programs and practices. Key to implementing this model of research is building the capacity, willingness, and intellectual disposition among educational researchers to conduct the kind of scientific research necessary to determine whether an educational practice (intervention) is backed by evidence — in short, whether "it works." This capacity, in turn, is defined as the ability to conduct and evaluate experimental and quasi-experimental studies. Not much else genuinely counts as useful educational research, unless, of course, it is studies focused on the conditions necessary for implementation that help us get inside the black box of intervention effect. (Hence, Cook's concern about losing the source of this kind of knowledge that is an important complement to experiments.) In a science-based culture of educational research and practice, only these kinds of studies (or, more accurately, the evidence of effectiveness that these studies aim to provide) genuinely matter for teachers, administrators, and policymakers, who are now regarded principally as consumers of educational programs and products facing the grave danger of being misled by dubious claims of effectiveness.[46] Given this market strategy, certain kinds of educational studies that, over time, come to be regarded as having little or no utility (market value) will eventually be viewed by consumers as unessential and, therefore, will no longer be produced.

The market model of educational research has another obvious consequence for educational practice, namely, it divorces knowledge from action. By promoting experimental design as the gold standard of educational research, we further ensure that the production of knowledge about educational means is confined to knowledge elites; teachers and administrators are but consumers of the knowledge produced by those elites. Teachers and administrators are accountable for outcomes, but they are not actors accountable for constructing those ends, or for determining the means to achieve them. Of course, this is made all the more possible because of the low cultural status and limited authority accorded to the teaching profession. The market model of research that provides evidence of what works in teaching mathematics, science, and reading is fully articulated within the view of schooling as a system that produces competent players for roles in business, industry, and the like. It is not likely that those who regard education as, at least potentially, an endeavor that engenders social progress and transformation

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46. Just who are the consumers here is a question worthy of further exploration. There are both proximate and distant consumers, so to speak. The "nearby" consumers are the teachers and school administrators who will "buy" the educational interventions that work. However, they are making those decisions (at least ideally) on behalf of parents (acting on behalf of their children) who, desiring the best "outcomes" of education for their children, run the risk of being duped or defrauded by educational interventions that do not "work."

through developing our capacities for self-examination, reflection, and social critique, as Jean-François Lyotard might have it, would have much if any influence.

SCIENCE AND POLITICS

"Science is political," argues Robert Proctor, "whenever the objects under investigation are of vital human interest."[47] Certainly, this characterization applies to the problems of education, health, security, and various forms of privilege and exclusion that different segments of society enjoy or from which they suffer. Concerns about the intrusion of politics into science are quite apparent in the 2004 report of the Union of Concerned Scientists (UCS), *Scientific Integrity in Policymaking*.[48] UCS accuses the Bush administration of suppressing findings that contradict its own ideological and political goals and of packing scientific advisory panels with members who can be counted on to favor measures that bolster industrial profits or conservative ideologies over those meant to secure public health and safety.[49] Although largely refraining from criticism of the Bush administration's current practices and instead accentuating a list of best practices, both the General Accounting Office's 2004 report, "Additional Guidance Could Help Agencies Better Insure Independence and Balance," and the National Academy of Science's report, "Science and Technology in the Public Interest: Ensuring the Best Presidential and Advisory Committee Appointments," directly address the latter concern of the UCS.[50]

There is no evidence of this kind of naked intrusion of politics into the broad concern over science-based educational research and practice. However, there have been disagreements on matters where science and politics meet in education. For example, in 2003 President Bush's assistant secretary of education responsible for elementary and secondary school policy resigned and subsequently denounced the administration's insistence that low expectations for black students (among public school administrators and teachers) was the cause of their poor academic performance. She was highly critical of the NCLB assumption that there is a level playing field for all children entering school and argued that high-quality early childhood programs are absolutely necessary to systematically address the enormous differences in school readiness evident among white and minority children.[51] This incident should at least raise the question, How could it possibly be the case that

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47. Robert Proctor, *Value-Free Science?* (Cambridge: Harvard University Press, 1991), 267.

48. Union of Concerned Scientists, *Scientific Integrity in Policymaking: An Investigation into the Bush Administration's Misuse of Science* (Cambridge, Massachusetts: Union of Concerned Scientists, 2004), http://www.ucsusa.org/global_environment/rsi/page.cfm?pagEID=1642.

49. Richard Lewontin, "Dishonesty in Science," *New York Review of Books* 51, no. 18 (November 18, 2004): 38.

50. General Accounting Office, "Additional Guidance Could Help Agencies Better Insure Independence and Balance" (Washington, D.C.: Government Printing Office, 2004), http://www.gao.gov/new.items/d04328.pdf; and National Academy of Science, "Science and Technology in the Public Interest: Ensuring the Best Presidential and Advisory Committee Appointments" (Washington, D.C.: National Academies Press, 2005).

51. Susan B. Neuman, "From Rhetoric to Reality: The Case for High-Quality Compensatory Prekindergarten Programs," *Phi Delta Kappan* 85, no. 4 (2003): 286–291.

the push for science-based research in education is decoupled from a broader gov-
ernment agenda that promotes a particular view of education in society? It is well
established that there are very large out-of-school differences in social class, closely
related to race, that contribute to lower achievement among black students.[52]
Rather than directly address the racial discrimination that these differences reflect,
the central premise of the current administration is that racial discrimination has
been erased and that the reason for the substantial difference in achievement be-
tween black and white students is a difference in skills. Thus, inadequate public
schools become the target and the remedy is a mixture of charter schools, vouchers
to attend private schools, increased emphasis on basic academic skills, testing for
accountability, and weakening the power of teachers unions so that administrators
have greater discretion in hiring and firing decisions.[53]

It seems unlikely that calls for a science of education and science-based educa-
tional research are tangential to these policy concerns. A conservative educational
agenda regards public schooling as the enemy — economically disadvantaged chil-
dren, ethnic and minority children, children with limited proficiency in English,
and children with special needs simply are not achieving at the same level as their
white middle-class counterparts. Conservatives argue that, for many years, the fed-
eral government has poured money into public schools (that, coincidentally, serve
the majority of these children) without appreciable effects. It is obvious, so the ar-
gument goes, that public schools are incompetent. More money will not eliminate
incompetence, but a rigorous regime of accountability will. The regime rests on
three central actions: (1) testing *all* children repeatedly in the basic skills of reading
and math; (2) ensuring that schools failing to meet absolute targets for improving
test scores will be sanctioned by allowing students to transfer out of them (and, of
course, failing public schools ultimately will be closed)[54]; and (3) aligning teacher
qualifications (that is, subject-matter competence) with curriculum standards, stu-
dent achievement standards, and performance-based pay. Sooner or later, this
approach will eliminate all failing public schools; only the fittest will survive.

For this conservative agenda to work, attention to the output side of things
(through accountability testing, for example) is not sufficient; inputs must be engi-
neered as well. Studies show teachers are incompetent (obviously, if they were
competent, we would see student scores on achievement tests rise from year to
year). One of the reasons they are incompetent (in addition to the inadequate pre-
service training they receive in colleges and schools of education) is that they lack
an arsenal of remedies proven to work in improving test scores in reading, math,
and so on. Conservatives note that most researchers in education schools and col-
leges are not producing this kind of research — in fact, as noted previously, they
maintain that what many educational researchers think is good education is largely

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52. See a summary and review of some of these studies in Richard Rothstein, "Must Schools Fail?" *New York Review of Books* 51, no. 19 (December 2, 2004): 29–32, 37.

53. Ibid.

54. At present, it is likely that more than 20,000 public schools will fail to meet the targets set for read-ing and math achievement by 2006. Neuman, "From Rhetoric to Reality," 287.

a matter of ideological preference and professional consensus. Consistent with the conservative agenda is a thoroughgoing skepticism that the community of educational researchers will ever get its house in order and recognize that the purpose of schooling is to produce the skills needed to support the global economy. Yet, conservatives do not wish to write off that community once and for all, so they instead provide a significant incentive to change educational research practice by restricting federal funds primarily to those studies meant to produce evidence of what works in inculcating basic academic skills in reading and mathematics, as well as in English-language learning, character education, adult literacy, and preventing delinquent and disorderly behavior (WCC topic areas).

Now, of course, it may be that many researchers arguing for a science of educational research, one that prominently features the use of experiments, do not subscribe to this conservative agenda. Nonetheless, their advocacy for such a view neatly aligns with that agenda, and it provides conservatives with some cover in promoting their view of schooling as a systematic, science-based reform uncluttered by ideology.

FINAL THOUGHTS

Clearly, many researchers committed to the idea of science-based research in education have mastered the art of being heard outside their own proximal zone of concern. Just who are the rest of us talking to and just what are we trying to convince them of? I cannot help but feel considerable chagrin when I recognize the irony of my own efforts on this occasion. In the process of preparing this essay, I examined many papers and speeches prepared by the folks who advocate a science-based education ideology. These works have appeared in the popular press and other nonacademic outlets addressed to policymakers, superintendents, and teachers. Whatever criticisms I may mount of their views in this academic journal, directed toward a rather specialized audience, have far less impact on wider public opinion than their proselytizing does. The juggernaut rolls on, and I worry about a dangerous cocktail of cynicism, preaching to the choir, and fairly unproductive arguments about defining method and science that linger as a vestige of the paradigm wars. We ought to be engaging the matter of science-based educational research differently. Educational researchers should join the political and public (not just the academic) conversation about the place of educational science in society and about how science is both implicated in and confronts the politics of what counts as knowledge: Who does an educational science serve and how? Who stands to gain and who to lose from the appeal to or disregard of scientific findings? How is a science of education implicated in a political agenda? Under what circumstances is an endorsement of educational science a simultaneous expression of disrespect for difference and diversity in perspective and understanding? If we want to inaugurate a dialogue that might matter, perhaps it should be around these questions.

In his book about reviving a kind of social criticism that neither compromises intellectual seriousness nor surrenders to widespread cynicism, Jeffrey Goldfarb

observes, "An important part of politics is politics as experienced. Democracy as an ideal is experienced as alive when opposition is articulated in thought and action. Success of the opposition is not required. Its persistent appearance is."[55] Those of us deeply worried about science-based and evidence-based approaches to research and practice need to make new kinds of appearances. In those appearances we would be wise to avoid the ingenuous claim that concerns for building a scientific culture of educational research simply coincide with federal initiatives and the naïveté of saying that what is primarily at stake here is a definition of science.

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55. Jeffrey C. Goldfarb, *The Cynical Society* (Chicago: University of Chicago Press, 1991), 177.