

Empiricism and the Knowledge Base of Educational Practice

Deborah Kerdeman
University of Washington
D.C. Phillips
Stanford University

Man who lives in a world of hazards is compelled to seek security.

—John Dewey, *The Quest for Certainty*

As John Dewey recognized, humans have always longed for security in an uncertain universe and have sought to achieve command over nature in order that they might better be insulated against disaster and, perhaps, also be able to improve their lot. Myths, legends, and superstitions often reflect these deep-seated human urges; so do fairy tales. Consider the wonderful story by the brothers Grimm of Rumpelstiltskin, the gnome who had gained enough control over nature to be able to spin straw into gold. The unfortunate young maiden to whom Rumpelstiltskin gave assistance had to pay a terrible price for his help. In the end, thankfully, the maiden learned Rumpelstiltskin's name. She thereby not only avoided Rumpelstiltskin's price but also ended up gaining control over him.

Today humanity is more advanced: Primitive faith in magic has been replaced, in many cases, by belief in the findings of empirical research. Indeed, we can go further: Some modern educational researchers seem to be intellectual descendants of Rumpelstiltskin, claiming to possess the capacity to spin the dross of hard data into educational gold using meta-analysis and other statistical techniques. But no less than the maiden in the fairy tale, one needs to stop and ask if the price they exact is too high. In the case of the lengthy and painstaking work of Wang, Haertel, and Walberg (WHW, 1993a), we shall argue that the answer is yes.

We shall pursue two different lines of thought; we are grateful to WHW for providing such a rich setting in which to cash out these important issues. First, although the issues are complex, in the final analysis the atomistic or reductionistic methodology used by WHW in their work (and which is so popular in many educational research circles) does not do justice to the educational phenomena that they wish to illuminate; while pursuing this general theme, we will make a number of points about the relation of theory and evidence in science, and we will touch on certain crucial assumptions that are made about educational research. Second, WHW have too simple a view of the relation between educational research and educational practice. But before turning to these, it may be worthwhile to summarize their general line of thought.

Summary: The Need for a Knowledge Base

During the 1980s, WHW report, "the mediocre performance of the nation's students and the increased number of at-risk children and families spurred government, business, educators, and the public to rethink many aspects of schooling" (Wang et al., 1993a). From restructuring efforts to performance assessments, "a variety of innovative programs" (Wang et al., 1993a) were developed. Amid the dizzying wave of reform, researchers began to study specific treatments and interventions. These assessments, however, were too sporadic and limited to permit robust generalizations about the "replicable long-term impact" (Wang et al., 1993a) of reform. Citing Mike Kirst, WHW conclude that, if programs and innovations were to be assessed with any degree of confidence, "snapshot studies" (Wang et al., 1993a) would have to be replaced by "a systematic knowledge base established over time and under varying circumstances" (Wang et al., 1993a).

Accordingly, WHW tell us, their article "is an attempt to begin to cull from theory, empirical results, and expert judgments a systematic knowledge base of school learning" (Wang et al., 1993a). Such a knowledge base, the authors assert, "should not represent a particular philosophy, such as behaviorism or pragmatism. Rather, it should include theories explaining the influences on school learning, empirical results distilled from research studies, and expert judgments about influences on school learning" (Wang et al., 1993a). In WHW's view, this body of foundational knowledge would hold direct implications for practice. Referring to it, teachers and other practitioners would know what to do in order to effect successful learning.

As a result of their inquiries, WHW reach the conclusion that distal variables—such as, demographic factors, and state or district or school-level policies—have less influence on learning than do proximal variables—such as, psychological and instructional practices and students' home environments; furthermore, WHW claim, the inference about the respective magnitudes of these effects can be made with great confidence, because the various methods used (content analysis, expert ratings, and meta-analysis) all lead to the same conclusion. They write:

The actions of students, teachers, and parents matter most to student learning; policies at the program, school, district, state, and federal levels have limited effect compared to the day-to-day efforts of the people who are most involved in students' lives. . . . Distal policies are likely to make a major difference in learning only when they affect proximal practices. (Wang et al., 1993a)

The purported magnitude of expert consensus leads WHW to proclaim that an emergent knowledge base, though "neither formalized nor explicit, [apparently] underlies learning" (Wang et al., 1993a). It is on this base, WHW conclude, that it is possible—and indeed prudent—to erect an edifice of school practice.

The First Line of Criticism: Abstracted Empiricism

The procedures used by WHW, in the main, smack of what C. Wright Mills elegantly termed *abstracted empiricism* (Mills, 1970). Despite their references to theory, WHW collected data and analyses of data in an atheoretical way; they were charitably inclusive, in the sense that, if they uncovered a researcher who

had measured certain variables, for whatever reason, that could possibly be related to the effects of schooling, then this material was likely to have been incorporated. (The technical problems associated with this way of doing business are not our concern here.) Theory—WHW's theory—about what factors shape the impact of schooling then emerged from their meta-analysis of all this data. Of course, they also cross-checked their findings by getting the opinions of experts; but as most of these probably used the same atheoretical procedure in their own work (they are largely, after all, experts in what variables impact school learning), it is not entirely clear that using them constituted a nonconfounded source of enlightenment! But what precisely are the difficulties related to this way of generating theory and/or a "theoretical framework" and "systematic knowledge base" (Wang et al., 1993a)? There are several points to be made here.

Data and Theory Generation

The first point concerns the impoverished sense of "theory." In the natural sciences—where the production of theories has rightly been regarded as a crowning achievement—it has long been realized that theory cannot be produced merely by processing or generalizing from the available data. Theory goes beyond the data and accounts for it, and theory therefore cannot be generated mechanically from data. (The philosopher Charles S. Peirce coined the term *abduction* to describe the process of theory invention; together with Dewey and Popper and others, he recognized that generating theory is a creative rather than an algorithmic process. See Phillips, 1987, Part 1.) The kinetic theory of gases, for example, cannot be produced by generalizing from data about the measured values of such variables as pressure, volume, temperature, and the mass of a gas; neither can quantum theory or evolutionary theory or the theory of relativity be produced by either a process of generalization or some sort of mathematical analysis of bodies of data (see, for further discussion, Phillips, 1992, chap. 9). After all, if theories were producible in this way, Darwin, Einstein, and the rest would not be recognized as scientists of genius. In the words of the philosopher of science, Carl Hempel,

Theories are usually introduced when previous study of a class of phenomena has revealed a system of uniformities that can be expressed in the form of empirical laws. Theories then seek to explain these regularities and, generally, to afford a deeper and more accurate understanding of the phenomena in question. To this end, a theory construes those phenomena as manifestations of entities and processes that lie beneath or behind them, as it were. (Hempel, 1966, p. 70)

Seen in this light, WHW's claim that proximal variables are more influential than distal variables is not an illuminating theory. To suggest, as WHW do, that this conclusion is equivalent to a theoretical framework (albeit an emerging one) is rather like saying that Boyle's law, Charles' law, and the kinetic theory of gases could profitably be replaced by a statement such as: Pressure, volume, and temperature have more influence on the behavior of a gas than other variables that could be measured. This undoubtedly is true, but it is hardly an advanced or informative theory. It is simply a generalized statement of the findings of empirical research, and a relatively atheoretical statement at that.

Measurement Without Hypotheses Is Blind

The second issue raised by WHW's methodology is that abstracted empiricism (measuring the maximum number of things that are measurable and then seeing what turns up in various analyses) often is unlikely to lead to relevant insight. For measurement that is not guided by deep reflection on the nature of the object or phenomenon being measured is likely to miss its core features. Science does not usually progress by measuring all that can be measured but rather by reflection and experimentation directed at determining what ought to be measured and then devising ways to deal with these things. The procedure followed by WHW is reminiscent of the one advocated by Francis Bacon (1561–1626): Exhaustive enumeration or collection of all possible facts takes place first and then is followed by a mechanical process of induction which will produce theories! This dream was eventually shattered by the realization that the facts researchers collect are largely determined by the things they look for, and what they look for is largely determined by the prior theories or models or hypotheses that they hold. (For a discussion and critique of Bacon's model of induction, see Phillips, 1987, Part 1.)

An Impoverished Model of Teaching and Learning

Teaching is a complex activity wherein a learner (hopefully) acquires physical and intellectual skills, information, theories, insight, a variety of levels of understanding, moral and ethical standards, and so forth. It is not clear that atheoretical measurement of variables can capture these things in a nontrivial way. Research on teaching, learning, and school success—like research on other complex matters—will be more to the point if it is undertaken on the basis of careful prior reflection, analysis, or theorizing about what ought to be studied.

The same point can be put another way: Jack Douglas, writing in a monograph on social research nearly two decades ago, stressed that it is a sound principle of research that the methods used in inquiry should be attuned to the (supposed) nature of the object of inquiry (Douglas, 1976). WHW make it clear that they are not willing to bite the bullet about using some conception or model of teaching/learning to guide their inquiries into the phenomenon they are researching. Indeed, they state explicitly that they were not guided by philosophies like behaviorism or pragmatism (Wang et al., 1993a). However, positions like behaviorism and pragmatism—especially the work of Dewey in the latter category (see *Democracy and Education*, chap. 25, 1916/1944)—do offer coherent views of the phenomena that are of interest to WHW. The point is that some conception of what it is they are studying is required to give direction and point to WHW's endeavors. And, of course, a skeptic might argue that WHW in fact do have such a guiding conception—an unduly mechanistic model of teaching and schooling that most readily lends itself to the kind of investigation they have carried out.

What or How?

There is a final point to be made in this discussion of abstracted empiricism. Arguably, the key issue in research aimed at producing a knowledge base for teaching and schooling is not which variables to maximize but rather how the relevant variables ought to be or can be maximized. Consider the following

example: It is intuitively obvious that, in general, a student who spends no time on task will learn very little. Thus the issue is not that teachers need meta-analysis to tell them that time on task has to be maximized. Rather, the issue is how to maximize time on task, given the conditions that teachers labor under! And in order to answer this question, some model or theory of the phenomenon needs to be used as a guide. Proxies, such as proximal variables are more closely related to effective schooling than distal ones, do not give help where help is needed. This point leads directly to our other major concern.

The Second Line of Criticism: The Oversimple Relation Between Theory and Practice/Policy

It is arguable, then, that WHW have not established a knowledge base of schooling but rather offer denatured generalized empirical findings. The atheoretical character of WHW's conclusions suggests that the authors have a mistaken view, not only of the relationship between theory and data but also about the role that hypotheses, reflection, and philosophical commitments play in the generation of theoretical knowledge.

But let us suppose for a moment that WHW in fact had produced a theory. Does this mean that, as the authors claim, researchers would be in a position to easily derive guidance for educational practice? On WHW's account, theory drives practice: Research on research on schooling bears directly on schooling itself. Armed with findings that they regard as broad, significant, and confirmed by experts, WHW harbor no reservations in proclaiming what teachers should do. Their view is: The more solid the base of knowledge, the more assured researchers can be that reform will proceed on course.

A peculiar kind of logic informs this way of thinking. From statistical correlations, practices are inferred; the stronger the correlation, the more obvious the practice seems. Gary Fenstermacher has discussed the error here; he calls this slide in logic a kind of "triple play" (Fenstermacher, 1978). As he puts it: "If the theorems are valid, then their conversion to rules and precepts is justified" (p. 166). Many a researcher has been seduced by the apparent security this move offers.

While it is tempting to infer practical imperatives from correlational descriptions, the simple fact is this: Conclusions about what ought to be done cannot be deduced from what is. No amount of expert consensus can alter this point of logic. Even if everyone could agree on the items in a knowledge base, how to put this knowledge to good use would remain an open matter. As William James (and Nathaniel Gage) put it, teaching is an art, not a science (Gage, 1978; James, 1958). Spanning the gap between what is and what ought to be is a host of linking premises that involve judgments of value. Value judgments are by nature varied and contentious. The move, therefore, from theory to practice always entails assumptions or suppressed linking premises that are open to debate. (See Phillips, 1980.)

The sociologist Max Weber put this point eloquently nearly 80 years ago. Writing about medicine, a "practical technology" (Weber, 1918/1946) which had become "highly developed scientifically," Weber observed:

The general "presupposition" of the medical enterprise is stated trivially in the assertion that medical science has the task of maintaining life as such

and of diminishing suffering as such to the greatest degree possible. Yet this is not problematical. . . . Whether life is worth living and when—the question is not asked by medicine. Natural science gives us an answer to this question of what we must do if we wish to master life technically. It leaves quite aside, or assumes for its purposes, whether we should and do wish to master life technically and whether it ultimately makes sense to do so. (p. 144)

Science, for Weber, indeed had produced technical advances, but towards what end these advances should be put, science cannot say. Statements about norms and ends are not proven scientifically. They rather are judgments and interpretations, forged through conversation and debate.

The most helpful science, we might conclude, confronts researchers with normative questions—questions that must be addressed if practice is to thrive. In this regard, WHW do a great service. The authors themselves do not recognize this important contribution; in their view, implications for practice are obvious imperatives emerging from their analyses of data. Yet the strength of WHW's study lies precisely where it leaves off: It initiates conversation about purposes and ends. The possibility, and even necessity, of normative conversation is most evident in the authors' remarks about proximal variables. Looking at each variable in turn will clarify assumptions about goals and goods that must be brought to light.

Psychological attitudes—particularly cognitive and metacognitive processes—comprise the authors' first "key types of proximal variables" (Wang et al., 1993a). According to the data, the effect of these processes on student learning proves to be especially strong. WHW therefore conclude:

All of these psychological attributes are essential to the development of independent, self-regulated learners. Currently, many educational and psychological theorists conceive of learners as architects building their own knowledge structures, a conception that reflects the cognitive paradigm of learning now prominent in the social sciences. (1993a)

As the authors themselves suggest, transforming findings about cognition into pedagogical practice entails far more than mastering specified techniques. A host of normative questions also must be negotiated. What is the meaning of *independent*? What does *self-regulated* mean? What assumptions about the role of tradition, authority, and community life do these constructs entail? Who, or what, guides or constrains the architects? Is it always desirable for learners to be independent? Might this value be counterproductive for certain kinds of students or in certain subject domains or social settings?

Variables concerning instruction pose similar questions. "When teachers engage students in social interactions," WHW (1993a) declare, "they can model appropriate behaviors, dissuade students from disruptive behavior, and establish a classroom atmosphere conducive to learning." But what exactly counts as "appropriate" or "disruptive" behavior, and under which conditions do these judgments hold? Who determines what is acceptable and what is deviant? Must students always conform to the teacher's model?

The final variable, home environment, is no less value laden. "In contrast to distal variables which are more removed from students' day-to-day lives, the home is central to students' daily experience." WHW (1993a) write. "Consequently, the home functions as the most salient out-of-school context for student

learning, amplifying or diminishing the school's effect on learning" (Wang et al., 1993a). On the basis of this finding, WHW conclude that "teachers must . . . develop strategies to increase parent involvement in their children's academic life" (WHW, 1993a, p. 25). Going beyond "traditional once-a-year parent/teacher conferences" (WHW, 1993a), "teachers should encourage parents to . . . [help] . . . with homework, [monitor] . . . television viewing, [read] . . . to their . . . children, and simply [express] . . . the expectation that their children will achieve academic success" (WHW, 1993a).

To value reading over TV seems like a worthy directive. Who can quarrel with encouraging parents to express high expectations? Yet even these seemingly innocent exhortations are saturated with normative assumptions. The implication is that parents won't, or can't, aid their children's learning; teachers, therefore, must enlighten parents about how to do their job better.

But as Marvin Lazerson and colleagues point out (Lazerson, McLaughlin, McPherson, & Bailey, 1985, chap. 1), the kinds of issues to which WHW point are extraordinarily complex. Schools alone can't rectify problems that are profoundly social. What value commitments must society make to ensure that every child has an opportunity to learn? What kinds of social trade-offs are involved in promoting home environments? Do teachers and parents in fact share a vision for how best to effect learning? What do parents in different situations need to promote their children's success?

Questions such as these cannot be answered "correctly." Neither rules nor algorithms can remove contingency and doubt. The way we choose to respond to these questions is always an act of judgment; practice cannot be deemed wrong or right independent of purpose and context.

This does not mean, however, that all choices are equally sound. Actions may be more or less appropriate, constructive, worthwhile. Opening up our decisions to critical scrutiny or challenge does not guarantee correctness, but it does increase the likelihood that assumptions will be acknowledged and that what Max Weber calls "inconvenient facts" (1918/1946, p. 147) will be exposed and confronted. Becoming conscious of deep assumptions, in turn, enhances the capacity for choice. And choice with respect to decision making carries with it increased responsibility.

The findings implicit in the present study thus do not—and logically cannot—dictate practice. Rather, they suggest normative questions that must be negotiated socially. From Dewey we learn that the quality of deliberation depends on the quality of association that a community enjoys. The richer the communal interaction—the more diverse the experiences, values, and beliefs of the participants—the more likely it is that otherwise unrecognized assumptions will be brought to light (see Bernstein, 1985; Dewey, 1916/1944, chap. 7; Fliess, 1950). On this account of decision making, not only research experts but all interested parties—teachers, parents, policymakers, and perhaps the learners themselves—are potential partners in the conversation about policies and practices.

On the kind of model sketched above, settling practical questions is neither clean nor simple. With diversity comes both richness and potential conflict. Not only practice but the nature of educational conversation itself is put into question. How, exactly, might each party contribute to the debate? What constitutes

authority and expertise in deliberations about aims, values, and practices in education? How can the insights of different groups be made available to others? How can access be assured? Who gains, and who loses?

This way of making decisions about educational practice challenges a network of assumptions held, not only by WHW but by many researchers, policymakers, and members of the public. Education, many of us want to believe, is apolitical. Something as precious as our children's future should not be sullied by partisan debate (Yack & Hansot, 1981). Conflict, moreover, is difficult to embrace. Lack of consensus seems to signal disarray; it suggests that progress is not being furthered but is rather being paralyzed (Kaestle, 1993).

Recognizing, however, that there is no one right way to promote successful practice, it becomes incumbent on us to reassess these assumptions. And clearly, as we discuss these matters and try to forge educational policies and educational practices, our findings—the findings of researchers—must be taken into account. But rather than constituting a knowledge base that contains directives for practice, research findings serve as a resource—one resource among, perhaps, many that can be put to diverse uses by the various participants in the conversation about education.

References

- Bernstein, R. (1985). Dewey, democracy: The task ahead of us. In J. Rajchman & C. West (Eds.), *Post-analytic philosophy* (pp. 48–59). New York: Columbia University Press.
- Dewey, J. (1944). Democracy and education. New York: The Free Press.
- Douglas, J. (1976). *Investigative social research*. Beverly Hills: Sage Library of Social Research.
- Fenstermacher, G. (1978). A philosophical consideration of recent research on teacher effectiveness. In L. Shulman (Ed.), *Review of research in education* (Vol. 6, pp. 157–185). Itasca, IL: American Educational Research Association.
- Fries, H. (1950). Social inquiry and social doctrine. In S. Hook (Ed.), *John Dewey: Philosopher of science and freedom* (pp. 106–117). New York: Dial.
- Gage, N. (1978). *The scientific basis of the art of teaching*. New York: Teachers College Press.
- Hempel, C. (1966). *Philosophy of natural science*. Englewood Cliffs, NJ: Prentice-Hall.
- James, W. (1958). *Talks to teachers on psychology*. New York: W. W. Norton.
- Kaestle, C. (1993). The awful reputation of education research. *Educational Researcher*, 22(1), 23–31.
- Lazerson, M., McLaughlin, J., McPherson, B., & Bailey, S. (1985). *An education of value: the purposes and practices of schools*. New York: Cambridge University Press.
- Mills, C. W. (1970). *The sociological imagination*. Harmondsworth, England: Penguin.
- Phillips, D. C. (1980). What do the researcher and practitioner have to offer each other? *Educational Researcher*, 9(11), 17–20, 24.
- Phillips, D. C. (1987). *Philosophy, science, and social inquiry*. Oxford, England: Pergamon.
- Phillips, D. C. (1992). *The social scientist's bestiary*. Oxford, England: Pergamon.
- Yack, D., & Hansot, E. (1981). Conflict and consensus in American public education. *Daedalus*, 110(3), 1–23.
- Wang, M. C., Haertel, G. D., & Walberg, H. J. (1993a). Toward a knowledge base for school learning. *Review of Educational Research*, 63, 249–294.

Weber, M. (1946). Science as a vocation. In H. H. Gerth & C. W. Mills (Eds.), *From Max Weber: Essays in sociology* (pp. 129–156). New York: Oxford University Press. (Original work published 1918)

Authors

DEBORAH KERDEMAN is Assistant Professor, College of Education, University of Washington, Seattle, WA 98195. She specializes in philosophy of education, philosophy of social science, and the implications of hermeneutics for educational inquiry and practice.

D. C. PHILLIPS is Professor, School of Education, Stanford University, Stanford, CA 94305. He specializes in philosophy of social science and educational research.

Received April 15, 1993

Accepted April 15, 1993