RESEARCH ESSENTIALS

AN INTRODUCTION TO DESIGNS AND PRACTICES

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CHAPTER

16

RESEARCH, POLICY, AND PRACTICE: THE GREAT DISCONNECT

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KEY IDEAS

- Simple models of how research affects practice are inadequate.
- Basic research rarely informs a practitioner about what to do in concrete situations.
- Teachers' professionalism can be undermined when research is used to prescribe what teachers should do in their classrooms.
- Conceptions about what constitutes the act of teaching are relatively fixed, making it difficult to change teaching behavior.
- Changing teachers' roles often makes classroom management more difficult.
- Teachers' need for order may outweigh their need to be innovative.
- Classroom contexts are remarkably varied and complex, thus limiting generalizations from research about appropriate teacher behavior.
- Decentralized educational systems, such as in the United States, make it easier for teaching fads to take hold.
- Treating educational research as a design science or field of engineering may be more fruitful than regarding it as basic social science research.

ONCE UPON a time, early in my career, when the world seemed quite a bit simpler than it really is, I believed that my research, and that done by my fellow educational psychologists, would influence what happens in America's classrooms and in teacher education. I believed in the model of research that famous researchers often espoused. They discussed a linear process linking **basic** (theoretical) **research** to **applied** (practical) **research**, that connected research to the improvement of practice. The model espoused made it seem that if we researchers generated the data, then the application of scientific findings to the solution of problems in the real world was inevitable.

ORIGINS OF FAITH AND APOSTASY IN RESEARCH AS A GUIDE TO PRACTICE

Many educational researchers inherited their faith in easily affecting practice from the "father" of educational psychology, Edward L. Thorndike. Upon the founding of the *Journal of Educational Psychology*, in 1910, Thorndike penned an opening essay, saying,

> *A complete science of psychology would tell every fact about everyone's intellect and character and behavior, would tell the cause of every change in human nature, would tell the result which every educational force . . . 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 now are masters of heat and light. Progress toward such a science is being made. (Thorndike, 1910, p. 6)*

Thorndike and most scientists of his day thought that the world would be made better year after year, as scientific research replaced fad, fashion, and hunch, as evidence drove out ignorance, much as Jesus drove out the moneychangers from the temple. A complete science, Thorndike thought, would dictate the nature of appropriate practice. With great assurance he predicted that in only a few short decades *all* of educations' problems would be solved through research. But Thorndike eschewed going to schools and watching how instruction actually takes place (Berliner, 2006a), thus it is no wonder that Thorndike was so very wrong.

However, Thorndike's views met with opposition, even back then, when it seemed that science would cure all of mankind's ills. There were always those who believed that a science of education or instruction could be achieved, and that it was desirable to do so, but they were less sure that such a science would strongly influence classroom instruction. For example, William James, another founder of educational psychology, in one of his most quoted yet least influential statements, said, "[Y]ou make a great, a very great mistake, if you think that psychology, being the science of the mind's laws, is something from which you can deduce definite programmes and schemes and methods of instruction for immediate school-room use. Psychology is a science, and teaching is an art;

and sciences never generate arts directly out of themselves. An intermediate inventive mind must make that application, by using its originality" (James, 1899/1983, p. 15).

James recognized that psychologists and other social scientists could not tell educators precisely what to do amid the complexity of the world that they face:

> *A science only lays down lines within which the rules of the art must fall, laws which the follower of the art must not transgress; but what particular thing he shall positively do within those lines is left exclusively to his own genius. . . . To know psychology, therefore, is absolutely no guarantee that we shall be good teachers. To advance that result we must have an additional endowment altogether, a happy tact and ingenuity to tell us what definite things to say and do when that pupil is before us. That ingenuity in meeting . . . the pupil, that tact for the concrete situation, . . . are things to which psychology cannot help us in the least. (James 1899/1983, pp. 15–16)*

Yet another of the early founders of the scientific tradition in education, John Dewey, noted in a major speech that those promoting a scientific approach to education needed to recognize that the teacher

> *lives in a social sphere—he is a member and an organ of a social life. His aims are social aims. . . . Whatever he as a teacher effectively does, he does as a person; and he does with and towards persons. His methods, like his aims, . . . are practical, are social, are ethical, are anything you please—save merely psychical. In comparison with this, the material and the data, the standpoint and the methods of psychology, are abstract. . . . I do not think there is danger of going too far in asserting the social and the teleological nature of the work of the teacher; or in asserting the abstract and partial character of the mechanism into which the psychologist . . . transmutes the play of vital values. (Dewey, 1900, p. 117)*

Dewey saw that the abstract world of the researcher, and the partial characterization or simplification of the classroom that researchers necessarily create to study phenomena, along with the intensely social world that teachers inhabit, made it difficult for scientific knowledge to influence teachers' classroom practices. In that same speech, Dewey's apostasy to the simple faith about how things happen ("basic research → applied research → changed practice") was seen to be something even more profound than mere skepticism. He wondered, as well, whether it was ethical to have the educational psychologist on the one side, acting as a legislator of behavior, and the classroom teacher on the other side, following the orders from the scientist as an obedient child might. He wondered about the influential role most people wanted teachers to play in our society, and whether that could ever happen if the scientist were to dictate the behavior of teachers. "Can the teacher ever receive 'obligatory prescriptions'? Can he receive from another a statement of the means by which he is to reach his ends, and not become hopelessly servile in his attitude?" (Dewey, 1900, p. 110).

Dewey's caution of a century ago has not been heeded in the current educational climate in which our federal and state governments force certain kinds of "evidence-based" teaching practices upon teachers and demand that they comply, regardless of their professional opinions and experience. For example, in the last

few years we have seen various government agencies require teachers to use the controversial program known as Reading First. Government agencies have demanded that English language learners be educated through Structured English Immersion. And governments have required high-stakes testing to improve learning. Thorndike would not have minded such authoritarian policies for teachers were the science behind these initiatives solid, which it is not. But James and Dewey would have seen problems in dictating to teachers even if the science were more solid than it is. They simply did not believe that it was possible to succeed with a system of instruction-through-fiat. Even with strong data to back up the demands for certain kinds of classroom behavior, they would have been suspicious. They saw a much greater disconnect between research and practice than did Thorndike and those who followed his simple line of reasoning. James and Dewey understood that the world of research and the world of practice were only loosely coupled, like the educational system itself.

REFLECTION QUESTIONS

1. How do you think research influences practice?
2. Who makes the best case above for the effects of science?

I was once a simple thinker about these issues, firmly in Thorndike's camp. But I eventually learned that research data does not provide the surety that I believed such data possessed. I learned that practice is amazingly more complex than I first understood it to be, filled with variables not easily captured in one's research, all of which are interacting with each other simultaneously (Berliner, 2002). I learned that practitioners are, by and large, doing remarkably well in the complex world they inhabit and that the student achievement for which they are held responsible is determined by many forces that operate outside of the school (Berliner, 2006b; Berliner & Biddle, 1995). And I learned that policy and politics have more power than research to change practice—even, sometimes, for the worse (Edelman, 1988; Smith, 2004). This chapter explores my changing opinions and the reasons for them. To foreshadow the conclusion of this chapter, the "Great Disconnect" between research, policy, and practice may be inevitable.

EXAMPLES OF THE PROBLEM

Consider the following examples of the relationship between research, policy, and practice.

Case 1

The capacity of a teaching method known as **reciprocal teaching** to improve reading comprehension is not in doubt. But there is also a twenty-five-year history of this well-documented method finding little or no foothold in the world of practice. Reciprocal teaching refers to an instructional activity that takes place in the form of a dialogue between teachers and students regarding segments of text. The dialogue is structured by the use of four cognitive strategies: summarizing, question generating, clarifying, and predicting. The teacher and students take turns assuming the role of teacher in

leading this dialogue. The goal is to teach students how to make meaning from text. This research was first described by Palincsar (1982), elaborated on by her a few years later (1986), and also described in an influential journal article by Palincsar and Brown (1984). The work was stunning in claiming that through a relatively simple-to-learn set of procedures, over a relatively short period of time, and for not much cost, teachers and other adults could dramatically influence the comprehension of children in the middle school age range. By the mid-1990s the research community had looked closely at this remarkable work and done what scientific communities always should do: they replicated and extended the original work.

Rosenshine and Meister (1994) performed a **meta-analysis** (see Chapter Seven) of sixteen studies of reciprocal teaching that followed the original work. A meta-analysis allows the different studies to be combined so that a set of similar studies can be evaluated as a whole. When standardized tests were used to see if reciprocal teaching "works" as claimed, the meta-analysts found an effect size of .32. That is, the students who had the reciprocal teaching, compared to students that did not, were scoring about a third of a standard deviation higher, roughly 13 percentile ranks higher. On the tests that were made by the various researchers to assess learning, tests that were tied more to the curriculum that students had been practicing with, the effect size was .88, almost a full standard deviation higher. This translates into an advantage for the students who received training in reciprocal teaching of about 31 percentile ranks over those who did not receive such training.

In a wide variety of settings, reciprocal teaching has been found to work similarly to how it was described in the original studies. Clearly, for classroom teachers, this is a research finding with power; this technique can dramatically increase student comprehension of text among students with reading comprehension problems. But here is the conundrum: Reciprocal teaching is not used by the vast majority of teachers and, worse, has not even been heard about by the vast majority of teachers. Powerful, practical, and replicated research too often seems not to reach the classroom teacher. There is some kind of disconnect.

Case 2

I doubt if there is any better-established finding in the science of education than that which demonstrates the folly of retaining students in grade. Reading the literature in this area over many years provides strong and verifiable warrants for action by practitioners. The data reveal that if you had two similar children who were behind the same amount in what they had learned, the child who goes ahead with his or her age mates profits more than the one who stays back (Holmes & Matthews, 1984). These positive effects show up in measures of their academic achievement and their attitude toward school. The research suggests that there is a much more successful policy than retaining the child in grade, but unfortunately it often goes by the name of "social promotion." This policy has many negative connotations associated with it, making it sound as if low-achieving students were being promoted for just showing up in school.

Nevertheless, negative connotations or not, the data strongly suggest that for a child not keeping up with his or her classmates the proper course of action in almost

every case is that the child should be promoted to the next grade along with his age mates, *and* extra resources should be allocated to help the struggling child (that is, tutoring, after-school programs, counseling, and so on). The data set supporting this recommendation to practitioners, administrators, school boards and teachers is large, and highly (though not perfectly) consistent (Brophy, 2002; Shepard & Smith, 1989; Smith & Shepard, 1988). Furthermore, it is now well established that the odds of dropping out of school go up considerably if a child is retained in grade once, and they rise much higher if retained in grade more than once (Brophy, 2002). But to the scientific community's complete dismay, two recent presidents, Congress, and state legislatures across the country have endorsed polices that will result in about 10 percent of public school students age 16–19 being left back at least once in their K–12 years (National Center for Educational Statistics, 2006). Research informs us that this was the wrong decision for almost all of the five million American students retained in grade, over one-third of whom have already dropped out of school! Even more ironic, George W. Bush, with the bipartisan support of most members of Congress, signed in 2002 an educational bill that mentions scientific educational research and evidence-based decisions in education at least a hundred times. And with no hint of hypocrisy, that same bill has been used to advocate against promotion for students who are behind in their work, with the legislation used to point out the preferability of retention in grade. Because of this bill we can expect that the *wrong* decisions about retention will be made hundreds of thousands of times per year. So we have policy and practice ignoring research, harming most of the children who are retained and their families, increasing the American dropout rate, and affecting the poor, minorities, and males at many times the rate of white or female students. There is obviously a disconnect between research, policy, and practice here as well.

Case 3

Homework debates rage regularly in the United States and Canada. Is homework, in general, good for students? If you give homework, how much might be recommended at particular ages? Should homework require parental support? Although the debates occur at school board meetings and among parents and teachers, these debates are not usually informed by a remarkable set of studies that help us to reach some very reasonable conclusions. Harris Cooper (2007) has studied research on homework for a number of years. His advice is authoritative and often unheeded. Literally, he has reviewed hundreds of studies, and with these he conducted a meta-analysis on those that met minimum standards of quality. Cooper's recommendations have been adopted by the National Parent Teacher Association and the National Education Association and resulted in similar research and policy guidance in Canada (Rushowy, 2008). Cooper found that homework seems to have little positive effects on achievement much before junior high and only seems genuinely beneficial at the high school level. The recommendation is that homework for children in grades K–2, *were it wanted*, should not exceed 10–20 minutes each day. Older children, in grades 3–6, seem able to handle up to 30–60 minutes a day total, *were that wanted.* Although there are reasons to assign homework, such as developing habits of home study and responsibility for ones' own work, the effects of those homework assignments on achievement for students in the

K–6 grades are likely to be undetectable! Cooper has noted often that if politicians, educators, and parents expect homework for young children to result in big gains in test scores, they will be disappointed. In fact, Cooper notes that too much time spent in homework can lead to boredom with schoolwork, as most activities remain interesting to most people only for so long. And homework can prevent access by our youth to leisure activities or community service that also teach important life skills. Furthermore, parents can find themselves getting too involved in homework, and while doing so they can confuse children by using different instructional techniques from the teacher.

Such writers as Alfie Kohn (2006) would go further than Cooper, persuasively arguing for a ban on most homework. But neither Cooper nor Kohn is listened to by politicians and administrators, particularly those fighting to have test scores rise in schools that are failing under the **No Child Left Behind Act**, a United States law requiring all children to pass standardized exams. Research does not matter. Opinion is much more powerful. I once gave some "facts" about a particular educational issue to a politician, demonstrating, quite convincingly I thought, that he had the wrong approach to the issue. He responded to me by saying "David, don't you know that facts are negotiable, but perceptions are rock solid!" So in the case of homework, when unwarranted and unjustified perceptions, opinions, or beliefs are combined with a mild kind of sadistic, punishment mentality that is held by many older citizens toward our youth, inappropriate policies are the predictable result.

Case 4

The eminent researcher David Cohen (1990) studied a mathematics teacher who said with excitement that research changed her ways of thinking about mathematics and her classroom practice. Mrs. Oublier noted how innovative her class was compared to when she began her teaching—her kids were more comfortable, her teaching was more flexible, group work was exciting, and she now taught for understanding—all the result of professional development associated with California's "new mathematics" curriculum. Here, at last, was success of the simple research-to-practice model described by so many. But on deeper analysis all was not so simple.

When Cohen observed her class, there certainly was evidence that children were working in groups. There were mathematics materials in use, as suggested by research, and these concrete manifestations of mathematical ideas and principles were incorporated into the lessons. But when he observed Mrs. O's class over a lengthy period of time, Cohen found something quite different from what Mrs. Oublier thought was happening. He says,

> *[S]he filled the new social reorganization of discourse with old discourse processes. The new organization opened up lots of new opportunities for small group work, but she organized the discourse in ways that effectively blocked realization of those opportunities. (Cohen, 1990, p. 321)*
>
> *[Although her] class was spatially and socially organized for . . . cooperative learning, [the] class was conducted in a highly structured and classically teacher-centered fashion. The chief instructional group was the whole class. The discourse . . . consisted either of dyadic exchanges between the teacher and one student or of whole-group activities,*

> *many of which involved choral responses to teacher questions. No student ever spoke to another about mathematical ideas as a part of the public discourse. Nor were conversations between students ever encouraged by the teacher. Indeed, Mrs. O specifically discouraged students from speaking with each other, in her efforts to keep the class orderly and quiet. (Cohen, 1990, p. 320)*
>
> *[D]iscourse in Mrs. O's class tended to discourage students from reflecting on mathematical ideas, or from sharing puzzles with the class. There are few opportunities for students to initiate discussion, explore ideas or even ask questions. Their attention was focused instead on successfully managing a prescribed, highly structured set of activities. . . . Even if the students' minds were . . . privately full of bright ideas and puzzling mathematical problems, the discourse organization effectively barred them from the public arena of the class. (Cohen, 1990, p. 322)*

Cohen noted that we should not be too harsh on Mrs. O. She and others who try to adopt research to their classrooms, to change how they think and act, are really special beings, but they "cannot simply shed their old ideas and practices, like a shabby coat, and slip on something new. Their inherited ideas and practices are what teachers and students know, even as they begin to know something else. . . . [A]s they reach out to embrace or invent a new instruction, they reach with their old professional selves, including all the ideas and practices comprised therein. The past is their path to the future. Some sort of mixed practice, and many confusions, therefore seem inevitable" (p. 323).

The findings of the historian Larry Cuban (1993, 2007) make this same point: *Plus ça change, plus c'est la même chose* (The more things change, the more they stay the same). Cuban noted that constancy, not change, has been the discernable pattern when studying teachers over a hundred years. He likens classrooms to x the bottom of the sea during a storm. The surface of the sea may be all roiled up with foam and froth in the midst of storm after storm, but just a few feet down, the bottom of the sea is calm, rarely changing very much, however long the storm blows. Teachers seem much the same, as research and policy roil the surface. Life in classrooms appears to be remarkably stable, as illustrated by the four cases described above.

REFLECTION QUESTIONS

1. Which of the research findings above do you find the hardest to believe and why?"
2. Are any of the findings a good match with your own beliefs?

WHY THE DISCONNECT?

There appear to be many reasons for the disconnect between research and practice. A brief look at some of these follows.

The Privacy Problem

Cohen and Spillane (1992) wondered why U.S. teachers are not as easily guided to new forms of practice as in some other countries. They note that, "The classroom

doors behind which teachers labor are no thicker here than elsewhere, but teachers in the United States receive fewer strong and consistent messages about content and pedagogy. Hence, they and their students have found it relatively easy to pursue their own preferences once the doors have closed behind them" (p. 23).

Thus, the privacy of American teaching, once described as the second most private act adults engage in with another, affords teachers the luxury of doing what they do in the ways they always have. It is always difficult to get people to change, as any psychotherapist will attest. And when left alone, as teachers often are, their need to change is not particularly urgent if they think they are doing pretty well, doing things the way they always have done with their students.

The Changed Roles Problem

Cohen and Spillane (1992) also note that most of the current reform efforts, with origins in modern **constructivist theories** of learning, ask teachers and their students to make dramatic, not small, changes in the roles that they play. This too could explain why such reforms leave classroom life relatively unchanged. Cohen and Spillane, citing numerous examples, say,

> *Even if teachers knew all that they needed, the reforms propose that students become active, engaged, and collaborative. If so, classroom roles would have to change radically. Teachers would have to rely on students to produce much more instruction, and students would have to think and act in ways they rarely do. Teachers would have to become coaches or conductors and abandon more familiar and didactic roles in which they ''tell knowledge'' to students. Researchers have studied only a few efforts at such change, but they report unusual difficulty, for teachers must manage very complex interactions about very complex ideas in rapid-fire fashion. The uncertainties of teaching multiply phenomenally, as does teachers' vulnerability. (Cohen & Spillane, 1992, pp. 30–31)*

REFLECTION QUESTION

1. How would you argue that "privacy" and "changed roles" explain the disconnect between research and practice?

The Problem of Complexity in Classrooms and Other Social Settings

Lee J. Cronbach, with whom I was lucky enough to work, eventually decided that social science research (and the educational and psychological research that was a part of social science research) was extremely hard to do well. He realized that in doing such research many variables, some knowable and controllable, many neither knowable nor controllable, simultaneously interact. The complexity of these interactions makes solid scientific generalizations from the social sciences, across time and across settings, hard to come by. This suggests, as well, that research guides for practice must be very tentative. Science simply cannot deal with all the complexities of practice occurring in different locales and across different decades. Cronbach says,

> *Our troubles do not arise because human events are in principle unlawful; man and his creations are part of the natural world. The trouble, as I see it, is that we cannot store up generalizations and constructs for ultimate assembly into a network. (Cronbach, 1975, p. 123, italics in original)*
>
> *Instead of making generalization the ruling consideration of our research, I suggest that we reverse our priorities. An observer collecting data in one particular situation is in a position to appraise a practice or proposition in that setting, observing effects in context. In trying to describe and account for what happened, he will give attention to whatever variables were controlled, but he will give equally careful attention to uncontrolled conditions, to personal characteristics, and to events that occurred during treatment and measurement. As he goes from situation to situation, his first task is to describe and interpret the effect anew in each locale, perhaps taking into account factors unique to that locale or series of events. (Cronbach, 1975, pp. 124–125)*
>
> *Intensive local observation goes beyond discipline to an open-eyed, open-minded appreciation of the surprises nature deposits in the investigative net. This kind of interpretation is historical more than scientific. (Cronbach, 1975, p. 125)*
>
> *The special task of the social scientist in each generation is to pin down the contemporary facts. Beyond that he shares with the humanistic scholar and the artist in the effort to gain insight into contemporary relationships, and to align the cultures view of man with present realities. To know man as he is is no mean aspiration. (Cronbach, 1975, p. 126)*

This extensive quotation from a measurement specialist, often thought of as one of the most hard-nosed scientists of the twentieth century, argues a number of points. First, that education is complex, and therefore variables are interacting in ways we cannot really understand. Second, that observation and making sense of local conditions by sympathetic observers is probably better feedback for practitioners than is reference to a traditional research finding in an educational research journal. Finally, that it is no small achievement to understand practitioners in the contexts in which they work, be they teachers or air traffic controllers.

It was the complexity of educational settings that made Cronbach a nonbeliever in the simple research-to-practice model that existed in the early and middle of the twentieth century. And by the end of that century it was understood that the complexity of the tasks teachers faced produced severe limits on what researchers might ever say to practitioners that would improve their instruction.

REFLECTION QUESTION

1. What makes teaching and classrooms so complex?

The Problem of Science When It Delves into the Arts

As Cronbach noted, the social scientist has much in common with the artist and humanistic scholar. Perhaps, Cronbach might opine, even more than they do with the physical scientist. Elliot Eisner always took this view as well. Like Dewey, Eisner worried about

the democratic element: Can teachers ever act like origins if they are treated like pawns? But he also thought of teaching as much more of an art than a science. Using the arts to think about the jobs that teachers do, Eisner said (1983): "Teachers are more like orchestra conductors than technicians. They need rules of thumb and educational imagination, not scientific prescriptions" (p. 5). Perhaps this misunderstanding about art and science as articulated by Cronbach and Eisner provides another reason that prescriptions about instruction derived from educational research are so often ignored by practitioners.

Eisner, with his colleague, Tom Barone, helped to develop and promote arts-based education (Barone & Eisner, 2006). They try through the arts to capture more of the aesthetic qualities that characterize classrooms and to tell the stories of their research through media other than the traditional journal article, using theater, story, dance, and drawing instead. Arts-based research in classrooms and other educational settings has, like qualitative research in general, a kind of authenticity about it. Similar to qualitative research, arts-based research focuses on the particular, rather than the general; thus, arts-based research sometimes appears to the practitioner to have more legitimacy than they are willing to credit to traditional quantitative social science research. Although not as widely used as other qualitative forms of inquiry, practitioners often perceive this kind of research as having fidelity, and so arts-based research may have a slightly better chance to influence classroom life than traditional quantitative research.

REFLECTION QUESTION

1. When you think of teachers, can you think of other metaphors in addition to the "conductor"?

The Problem of Quality in Research

Mary Kennedy (1997) has been one of the most thoughtful writers about the great disconnect. She gives many reasons for that state of affairs, one of which is the problem of quality in research. She notes that researchers have a habit of criticizing each other's work, arguing in particular over the proper or the improper design of studies and methods of statistical analysis. The famous Campbell and Stanley chapter on research design in 1963 argued that there were "true" experiments, and thus for the practice community, everything else, which were the majority of the inquiries in education, must be interpreted as less than "true" experiments: untrustworthy either as research or as guides to practice. Campbell and Stanley (1963) said the experiment is "the only means for settling disputes regarding educational practice, as the only way of verifying educational improvements, and as the only way of establishing a cumulative tradition in which improvements can be introduced without the danger of a faddish discard of old wisdom in favor of inferior novelties" (p. 2).

Campbell and Stanley elaborated on the many threats to the validity of studies, and the problems with the generalizability of studies across ecological settings, making it appear to those outside the research field that the quality of most educational research is poor. The internal arguments by statisticians and other scholars over methodology then become an excuse for ignoring educational research—or perhaps because of the

squabbling, ignoring research appears to be a reasonable response to such ambiguity about quality. The internal squabbles in the field seem to make the research insufficiently persuasive or authoritative to the practitioner, despite the fact that arguing over methodology is precisely what one would expect of an active scientific community. I know of no scientific field of inquiry that is complacent about its methods of inquiry and satisfied with the quality of its research. To argue about such things is to do science. Such arguments should never be an excuse to ignore the current research that a science has to offer.

The Problem of Relevance

Mary Kennedy (1997) points out that it really was not until Philip Jackson's important book *Life in Classrooms* (1968) that the focus of educational psychologists began to switch to studying real teachers in their real world. Learning researchers understood that instructional psychology, which was booming by the mid-1980s, was about human learning in educational contexts, and that was a far cry from the earlier laboratory studies of learning with animal subjects. Instructional psychology not only held more promise to influence practice, but the applied research was influencing basic understandings about learning (Resnick, 1981). The simple model of basic research leading to applied research that might affect practice switched direction, with applied research in school contexts beginning to influence basic ideas about human learning.

Toward the end of the twentieth century, learning in real-world contexts began to be studied more earnestly (Greeno, Collins, & Resnick, 1996), but sadly, such research still appears not to be affecting practice very much. The relevance of the insights by psychologists or other researchers still seems to miss the mark. Changes in practice attributable to research are hard to document, even though educational researchers are now more than ever wedded to conducting their studies in real-world contexts, and using more qualitative than quantitative methods. Because of changes in where and how research is done, perhaps, over time, the problem of relevance will be overcome. But I doubt it.

As Kennedy notes, in many classes the need for order is highest on the list of teacher needs, as teachers usually face twenty-five or more students at a time. Furthermore, in many of those same classes the students would prefer to be elsewhere, doing little of the teacher's assigned work, which many students see as dreary and unconnected to their lives. Thus classroom life is about managing a good deal of uncertainty, and that is not fertile ground for implementing research-based practices. Some of the research produced by scholars in education can adequately, if not poignantly, describe the complexity and uncertainty that characterize classroom life (for example, Doyle, 1986; Jackson, 1968), but describing classrooms better, as the researchers have learned to do, is far different from actually influencing practice in those classrooms.

REFLECTION QUESTION

1. Why might you trust or mistrust research describing classrooms?

The Problem of Accessibility to Ideas by Practitioners

Kennedy (1997) notes that accessibility has been the most common belief about why research does not influence practice. But there is now a long history of trying to ensure that research be accessible to practitioners, and it still seems not to affect classroom life very much. For example, in the 1960s the United States (U.S.) federal government created research and development (R&D) laboratories and charged them with disseminating research, a model like that used to improve agriculture. Many of these R&D centers have been working on school improvement for forty years by publishing pamphlets and policy briefs, providing professional development, and holding conferences about educational research that could make a difference in classrooms. These regional centers for dissemination of research have been augmented by the federal government's promotion and funding of technical assistant centers (TACs), so that even more personnel can provide the expertise needed to change practice in desired ways. The R&D laboratories and TACs, as well as a huge (multimillion-dollar) professional development industry, are designed to play the role that William James thought was necessary, namely, the development of intermediate inventive minds to stand between the basic researchers and those in practice. But the R&D laboratories and TACs still do not have great effects on practice. The complexity of life in classrooms pushes back against the ideas and technologies put forward by researchers and their spokespersons about what might improve practice.

It appears not to be true that a lack of accessibility to research is a major reason given when explaining the big disconnect between research and practice. All the work done by R&D laboratories, TACs, and through university courses and the providers of professional development, has apparently increased *knowledge* about research more than it has changed practice. Recent research revealed, surprisingly, that educational research is better known by school principals in both Australia and the United States than was heretofore appreciated (Biddle & Saha, 2002). But "knowing about" and "implementing" research are quite different processes. Although many school leaders knew about cooperative learning and a dozen other innovative teaching practices, such knowledge seems not to lead to implementation of those findings systematically in classrooms.

The Problems of Stability and Instability in the Education System

Kennedy (1997) also notes that the problem of research failing to influence practice much may not be the fault of the research community but the fault of the practice community. The remarkable stability of classroom life has been documented by Cuban (1993, 2007). Part of this is attributable to the long apprenticeship of observation (Lortie, 1975) that teachers undergo. Unlike other professions, teachers spend at least twelve years observing how teaching takes place, and so it should not be surprising that their norms for teacher behavior are rather entrenched, and thus hard to change.

It is also true that teachers depend on students for their jobs as well as for their emotional fulfillment. By changing their teaching behavior, by adding uncertainty into classroom life, teachers endanger the relationship with students that is based on order

and certainty. Ramping up the requirements for performance, for example, something urged by politicians and parents all the time, means that some students may become management problems, and classroom control will be lost. Spending more time in test preparation means that students become bored more quickly in school and thus become behavior problems. Teachers need to negotiate these tensions. Some comfortable balance is needed between teacher behavior and student acquiescence to teacher authority, and that kind of need may produce remarkable stability in classroom life: a desire for stability that is almost impermeable to change.

Kennedy notes, however, that from another viewpoint, it is the excessive instability of classrooms that works against changes of the type we are interested in affecting. The lack of centralization of the U.S. educational enterprise, with fifty different states and about fifteen thousand local educational systems, makes political influence at the local level nearly impossible. This can be seen in the relatively wide variety of textbooks in use, all with different philosophies behind them. Math can be taught in some places using a variety of everyday problems, taught in other places with strong reliance on materials, and in still other places as memory and drill oriented.

The decentralization of the American educational system, and the constant yearning for magic bullets that will fix what is perceived to ail schools in different locales, also result in excessive fads in schools, adding to the instability of the system. Thus educational systems see Madeline Hunter's techniques for conducting lessons come and go; or they see discovery learning come and go; or they try cooperative learning one year but abandon it the next; or homework is increased under one superintendent and cut by another; and so forth. As Kennedy notes,

> *So we have a system that can be characterized by a lack of agreed-on goals, a lack of shared guiding principles, no central authority to settle disputes, decentralized decision-making, a continual stream of new fads and fancies, limited evidence to support or refute any particular idea, textbooks that manage conflicts by including all possible ideas and giving no serious attention to any of them, and reforms that are running at cross-purposes to each other. (Kennedy, 1997, p. 8)*
>
> *These two views of the education system as large, cumbersome, and unchanging on the one hand, and as disorganized and driven by fads on the other, are not incompatible. Most [educational] fads and fancies are more observable in rhetoric than in practice . . . and those that do influence practice tend to alter its more superficial features rather than altering the fundamental character of teaching and learning. (Kennedy, 1997, p. 8) (Also see the case of Ms. Oublier, above.)*

REFLECTION QUESTION

1. What would be the effects of making all schools uniform and centralized?

The difficulty of getting research to affect practice, the great disconnect that is the subject of this chapter, is related to a host of problems that contribute to the bad reputation of educational research (Kaestle, 1993; Lagemann, 2000). The difficulties inherent in the educational system include the privacy of teaching, so that changes in practice need not be attempted, if the changes are not of sufficient interest to the

teachers. Change also appears to be hard when there is the need, as there sometimes is, for dramatic alterations in role enactment for teachers and students. The problem of the complexity of classroom life also becomes a barrier for the researcher whose relatively simple social science methods may not be able to capture the complexity of school life. These problems are compounded by the fact that some of teaching is surely much more of an art than a science, and the ways of perceiving and knowing in these two traditions are quite different.

Complexity of classroom life and the methodological debates of researchers as they try to deal with such complexity often result in practitioners' negative perceptions of the quality of the research that is being produced. The perceived relevance of the research to practitioners, along with its presumed inaccessibility, adds to the list of problems that work against research influencing practice often, or to a significant degree. And finally, the twin factors of excessive stability and excessive instability in parts of the educational system, work against research having much effect on practice. There is, however, evidence that research has an effect on practitioner discussions of practice (for example, Biddle & Saha, 2002), but stability rather than change continues to characterize life in classrooms.

It is important to note that the United States is not alone in its problems regarding research's influence on practitioner life. Pessimistic views about the influence of research on practice are echoed across the Atlantic by two of Europe's leading educational scholars (Weinert & De Corte, 1996). They say, "After 100 years of systematic research in the fields of education and educational psychology, there is, in the early 1990s, still no agreement about whether, how, and under what conditions research can improve educational practice. Although research and educational practice have changed substantially since the beginning of the twentieth century, the question of how science can actually contribute to the solution of real educational problems continues to be controversial" (p. 249).

In part, I think the entrenched stability of teaching is due to the nature of teacher reasoning in classrooms. It is becoming apparent that practitioners do not often use the formal methods of scientific reasoning and proof to make sense of their world. It is, instead, the method of practical argument that is used, a much more contextualized and pragmatic form of reasoning that may not be "scientific" but is highly functional for survival and success amid the complexity that was noted above. This is the case argued by Fenstermacher and Richardson (1993, 1994), and it is worth considering this as a major reason for the practice community's imperviousness to what is offered by the research community.

HOW MIGHT THINGS CHANGE?

Although there are many reasons for pessimism, there are still ways to think about research and practice that might change these disconnected worlds. First to be recommended is the research method called "design experiment" (Schoenfeld, 2006). **Design experiments** are more like the kind of tinkering an inventor does than they are like either applied or basic research. It is an inquiry into how things can be manipulated or how they get done in live classrooms, within their real-world complexity. Edison and

Ford are more the models for the design experiment than are Einstein or Pasteur. The goal is to make ideas that *might* be good, that *might* work, actually work in the midst of the booming, buzzing world that characterizes life in schools. Design experiments require extensive time in classrooms observing and tinkering to find the solutions, say, to getting reciprocal teaching into classroom life.

One other form of research that might change practice is what is called teacher research or **action research** (Cochran-Smith & Donnell, 2006; see Chapter Fifteen). This is where teachers engage in inquiry at a local level to change existing practices that are problematic, or to start a program they think might work and monitor its effects at the local level. The design experiment and teacher research are research methods that hold promise for thinking that, one day, research and practice can be better connected. But I am not sure that is likely!

Research may be classified along two dimensions (Stokes, 1997): Whether it is primarily a quest for new, basic knowledge, or whether it is primarily a quest for knowledge that is useful. Although it is not always easy to categorize the intentions of the research or the researcher, this simple analysis can provide a two-by-two matrix for analyzing research goals (see Table 16.1).

Three cells are of interest. The **pure research** cell, where there is only the quest for knowledge and no concern for usefulness, is where theoretical physics or astronomy would be located. This is where almost all the animal studies of learning would be classified as well as the thousands of studies published in educational research journals that examine basic processes of learning and instruction in classrooms, laboratories, and child-care centers, and on computers. These studies are typically not intended to be immediately useful to classroom teachers.

Pasteur's quadrant is different. In this quadrant the goal of the researcher is both a conscious attempt to be useful while also developing scientific knowledge of the kind that is generalizable, contributing to the discipline in which the work is done. Named after the great scientist Louis Pasteur, whose work on the development of vaccinations and the germ theory (usefulness) also revolutionized basic research in microbiology (creation of generalizations in the field of biology). The now common process of pasteurization is the outcome of some of this scientist's work. Educational research, such as that surrounding reciprocal teaching, is often of this same type. Reciprocal teaching was a search for a useful technique to help students in the middle grades who had comprehension difficulties, *and* the research contributed to an understanding of text

TABLE 16.1. Types of Research Goals

		Is This an Inquiry Primarily About Usefulness?	
		NO	YES
Is This a Quest Primarily to Generate New Knowledge?	YES	*Pure research*. Albert Einstein, Nils Bohr, for example.	*Pasteur's quadrant*. Use inspired basic research.
	NO	*Empty cell*	*Edison's quadrant.* Invention more than science.

comprehension processes through scaffolding, a contribution to basic scientific knowledge, as well. The work on homework and retention in grade, described above, can also be classified most easily in Pasteur's quadrant. This is because it is policy research, designed certainly to be useful, but designed as well to illuminate public policies. Policies are created out of the values and beliefs about how people and governments ought to act, and those beliefs are often widely held or they could not be easily enacted. Thus policies function for individuals or nations in a way similar to the function of scientific theories in the physical and behavioral sciences. Policy research, therefore, is intended to be useful *and* often to be **generalizable**, to affect the ways people frame certain issues that are of wide public interest.

The cell that is called **Edison's quadrant** describes research that is not intended to be generalizable at all. It is about the invention or tryout of ways to do things that seem desirable. Thomas Edison, Henry Ford, the Wright brothers, Steve Jobs, and the founders of Google made few contributions to science, but they took scientific ideas and from them they made things that work. They tinkered and they carefully studied the effects of that tinkering. They made knowledge that already existed into something useful. This is where I would classify much of the research called design experiments, and where I would classify much of the research called teacher research. Design research and teacher research are often attempts to engage in useful forms of scholarship, often of the particular, rarely with a concern for the generalizable, though that need not be excluded. But this is an engineering style of research and development. It is certainly not anti-science, but it is much more about using the principles of science to make things work. Bridges and churches were built long before engineers understood the properties of building materials and the geologic formations in which those structures were built. Masons, architects, and engineers tinkered and modeled, and they did trial runs until they could build the structures they wanted, long before the researchers could explain why some structures were better than others.

It is the tinkering by teachers and researchers, and the study of their craft by the teachers themselves, that seems to me the most likely to pay off in improved education. If those in the research community can learn to do more design experiments in real-world settings, and join teacher-researchers to produce knowledge about how things work in real-world classrooms, the great disconnect might become a much smaller disconnect. Educational research would end up being less a field of traditional scientific research, and much more a field of engineering, invention, and design. It might be that concentrating on working in Edison's quadrant instead of Pasteur's can provide education with bigger payoffs. The teachers of Alberta, Canada, for example, engaged in a massive province-wide effort to conduct their own research and they have done so with amazingly positive results (Alberta Initiative for School Improvement, no date). They picked their problems based on local needs. They learned to think a bit more systematically about those problems than they might ordinarily have done in order to write proposals to obtain funding by the province. They conducted their own research and evaluations of the programs they designed. Their engineering and tinkering were remarkably successful (Alberta Initiative for School Improvement, n.d.).

I think educational research might gain a better reputation if it could help those working in Pasteur's quadrant, and in the more basic areas of research, to apply their

scientific findings to classroom life through a corps of engineers and inventors. These individuals would act as the intermediate inventive minds that William James predicted over a hundred years ago that we would need to bridge the gap between research and practice. But note what is important in this view of the great or little disconnect between research and practice: it still champions more and better research of the kind that is both basic and use oriented.

My views of what might be needed to better connect research and practice is not a plea to stop funding other forms of research, as tinkering, innovation, design, and the profession of engineering require well-warranted scientific knowledge as an underpinning. Design experiments and teacher research need to be supported for their ecological fit as much as we need to support research of a more traditional kind for its generative power. In the end, we want knowledge of three kinds—knowledge for its own sake, knowledge for its usefulness, and knowledge about how to make things work well in the settings we want to improve.

REFLECTION QUESTIONS

1. How do design experiments work?
2. What examples can you think of using this approach?
3. How would you explain action research in your own words?

SUMMARY

Educational science began just over a hundred years ago with great hopes that basic research on learning and instruction would improve teaching and student achievement. For some individual teachers and schools, educational research has made a difference in what has been accomplished. But for most of these years there has been a disconnect between the research and practice communities. A number of case studies demonstrate that the abstract and simplified research from educational scientists does not easily cross over to the concrete and complex world of practice. Thus, constancy in education is the norm.

Among the reasons that educational practitioners do not use educational research is the fact that teaching is often a private activity. With few observers of teachers actually in the act of teaching, there is little pressure for teachers to engage in the changes recommended by research. In addition, changing teacher behavior based on research findings may add uncertainty to classroom life, and that is uncomfortable for both teachers and students, particularly as teachers have a strong need to keep order. And the complexity of life in classrooms means that educational research may only be able to provide practitioners rules of thumb—not rules of practice. The assumption that classrooms might run better if we had a prescriptive science may simply be wrong. Other talents for successful management of classrooms may be needed. This suggests that qualitative and arts-based research, rather than quantitative basic research, may be more compatible with the realities of life in classrooms than the majority of the research community now believes to be true.

Educational research also suffers from a public relations problem. Its quality is not perceived to be high, and it seems to be inaccessible to practitioners. But closer examination suggests that neither of these beliefs is true. It is true, however, that there is a tendency for excessive stability in some parts of the educational system and excessive instability in other parts of the educational system. These two characteristics make it difficult to move research into practice. It may be possible for the current unhappy situation to change only if educational research becomes more like the fields of design or engineering, that is, solving local problems by engaging in action research or design experiments to make educational environments function the best they can. Ultimately three kinds of research are needed to improve practice. Research that is basic, unrelated to need; research that is applied, oriented toward usefulness; and research about how to make things actually work in the settings we want to improve. The latter form of research requires engineering of the first order. Were more of such research to be done, the great disconnect between research and practice might be substantially reduced.

KEY TERMS

action research
applied research
basic research
constructivist theories
design experiments
Edison's quadrant
generalizable
meta-analysis
No Child Left Behind Act
Pasteur's quadrant
policy research
pure research
reciprocal teaching

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