

Beyond the Laboratory and Lens: New Metaphors for Literacy Research

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PRELIMINARY REMARKS

As president of the Literacy Research Association, at least for the next two days, I want to personally welcome all of you to this year's conference and to thank you for your support of my presidency during the previous year. This year's conference marks our 60th anniversary as an organization and the first as the Literacy Research Association (LRA). These twin milestones provide an opportunity to celebrate our past as the National Reading Conference (NRC) while asserting that we are a dynamic organization open to adaptation and change.

Nonetheless, many traditions continue, including the annual presidential address. I am sure that many of the former presidents in the audience today have felt the same as I do now. It is a privilege and an honor to address so many of my colleagues, and it is a humbling and intimidating opportunity to join my distinguished predecessors.

To mark our 60th anniversary and to promote our new name, as you leave this session, each of you will be given a flash drive inscribed with our new logo. I want to thank the field council, particularly Heidi Mesmer, its chair, for joining me in sponsoring this gift and memento. On the flash drive, you will find an earlier version of my talk and the accompanying slides, and several key articles that I will cite. However, to express my appreciation for this opportunity, and to honor former presidents of NRC, it also includes all of the previous presidential addresses published in the *NRC Yearbook*, thanks to the help of Jamie Colwell, my doctoral student.

INTRODUCTION

One privilege of the presidential address is having free rein to choose a topic. Former addresses fall roughly into two categories: talks that highlight some aspect of a president's research and talks that challenge the thinking or direction of the field. I have chosen the latter, perhaps riskier, approach. I was nudged in that direction for two reasons. First, our anniversary and name change inspires reflection about the past and thoughts about the future. Second, in 2005 my friend and colleague Don Leu (2006) gave a presidential talk devoted to our shared interest in how digital technologies affect literacy. He would be a hard act to follow. I urge those who remain unconvinced that we live in a revolutionary new world of literacy, as Don argued, to again read his presidential address.

Another presidential privilege is to choose, as President-Elect, the conference theme. My talk today extends the theme I chose for last year's conference entitled "Literacy Research Past, Present, and Future: Multiple Paths to a Better World." Consistent with my theme today, that title introduces a metaphor: our research as a path to a better world. As that metaphor implies, we do not engage in research for its own sake or simply to satisfy our intellectual curiosity. If you doubt

that bettering the world is the central imperative of our work, I recommend reading an article in *Educational Researcher* by Karl Hostetler (2005) entitled "What is Good Education Research?"

His answer to his own question is that good research is not just theoretically and methodologically sound; it contributes to enhancing people's wellbeing. My former colleague Tom Reeves at the University of Georgia goes further (Reeves, 2006, Reeves & Harrington, 2005). According to Tom, education research not aimed directly at bettering the world is socially irresponsible, and perhaps should not be categorized as education research at all. Both articles are on the flash drive.

My talk today argues that the dominant metaphors for our research, past and present, have helped enlighten paths to a better world, but they have not been particularly well suited to building them. Specifically, the laboratory and lens metaphors suggest that our primary responsibility as researchers is to generate understanding that subsequently may be useful to others who actually build the paths to a better world. Today I propose several alternative metaphors, and an overarching one to reverse that stance. These metaphors suggest that understanding is not the precursor of actionable improvement, but a consequence of seeking it, thus making our work more useful, beneficial, and socially responsible.

Two of the plenary sessions last year highlighted the need for such a shift as well as the formidable challenges we would face operating in that frame, especially in contexts where enhancing wellbeing through literacy is desperately needed. For example, Charles Payne informed us about the complex, systemic factors that undermine reform in urban schools. He urged us to address alterable variables that could make a difference rather than finding causal ones that are only explanatory. In her Oscar Causey address, Taffy Raphael shared her and her colleagues' often unsuccessful struggles to conduct research aimed at constructive change in urban schools. As these talks illustrated, research aimed at making the world a better place is not for the faint hearted. Nor is it for those who are looking for magic bullets, prescriptions for success, or who ignore or gloss over the messiness of a complicated world. But neither is it for those satisfied to simply identify that complexity and revel in it without investing in constructive action.

THE LIMITED INFLUENCE AND EFFICIENCY OF OUR WORK

Finally, the Saturday plenary was a lively and engaging debate between two teams of leading researchers who argued opposing views on the following proposition: "Literacy researchers have not produced a base of knowledge that provides practitioners and policy makers with explicit guidance for improving literacy and literacy instruction." The decidedly mixed votes across several rounds of the debate suggested considerable ambivalence about the influence and usefulness of our work.

One somewhat depressing explanation is Labaree's (1998) argument that education research is inherently a lesser form of knowledge. Consistent with the theme of my talk today, he used two metaphors to make that distinction. Education research, he said, is a broad-ranging rural landscape, whereas research in the hard sciences is an urban landscape with skyscrapers of knowledge. I believe Labaree's point might be supported by examining almost any issue of AERA's (American Educational Research Association) journal *Review of Educational Research*. It is unlikely that you would find an article synthesizing a clear consensus from research about the ingredients of effective

action aimed at improving people's wellbeing. More likely you will find a review of opposing theories and incompatible findings, an overview of disputed conclusions and interpretations, a caveat about the complexity of the issues, and a never-ending call for more research.

A new book by John Hattie (2009) supports Labaree's point, at least on the quantitative side. He analyzed 800 meta-analyses that included more than 50,000 experimental studies and 2 million students. The effect size across all of these studies was .4, not a particularly impressive figure, especially when one considers the bias toward publishing statistically significant findings and that many of the studies investigated obviously useful pedagogical practices such as providing feedback and increasing time on task. On the other hand, we might discount meta-analyses entirely, given that Gene Glass (2008), the originator of that approach, recently renounced it as a means to inform policy or practice, as noted in the following quote from his recent book: "I do not believe that [research studies aimed at shaping policy], mired as they are in debates between research methods experts, have any determinative value in shaping the current nature of public education or its future" (p. 285). The recent debate in a themed issue of *Educational Researcher* (Volume 39, Number 4) about the purpose, validity, meaning, and conclusions of the National Early Literacy Panel is a prime example of Glass' point.

My editorships of *Journal of Literacy Research* and *Reading Research Quarterly* for a total of 12 years provided a uniquely personal perspective about the limited influence and efficiency of our work. The investment of time, energy, and resources behind the 1500 manuscripts with which I had editorial contact is staggering, especially considering that overall only about one in ten were deemed worthy of publication. My years as an editor left me in awe of the productivity and the scholarly and methodological rigor of my colleagues' work. But I would be hard pressed to identify a set of studies, let alone a body of work, that has had any tangible influence on bettering the world.

I am certainly not the first to raise these issues. For example, the central theme of an article by Deborah Dillon, David O'Brien, and Elizabeth Heilman (2000) in the millennial issue of *Reading Research Quarterly (RRQ)* was that our work should be more pragmatic. That article, I believe, should be required reading for all literacy researchers and those who wish to become one. It is included on the flash drive that you will receive after this session.

I believe we all know in our hearts that knowledge pursued is no substitute for knowledge applied, and most of us feel at least uneasy about the longstanding gap between research and practice. However, today I am asking whether our metaphors for research may be partly responsible, and whether new metaphors might help us increase the relevance, practicality, and humanitarian influence of our work.

METAPHORS WE LIVE BY

I can trace my thinking about the limitations of our metaphors to a personal experience etched in my memory. In the early 1990s I received an Elva Knight grant from the International Reading Association to conduct a conventional experiment comparing the effects of engaging students in creating what we called multi-media book reviews on a computer instead of writing traditional book reports. From the outset, this project was a disaster, at least from the standpoint of the experimental methods in which I had been trained. For example, the school principal, at the last minute, decided

to assign most of the struggling readers to an effective teacher in one of our experimental classes, which left us scrambling for statistical ways to address the inevitable imbalance. Later, a teacher in one of the control classrooms liked the online book reviews so much that she started doing them in her classroom. Both of these developments were sensible and in the best interest of students, but undermined our experiment.

However, the event I remember most was a post-project, actually a post-mortem, meeting with two of the doctoral students who had worked with me on the project. As we tried to console ourselves with an experiment gone bad and maybe salvage some supportable findings, one of the students said something that I will never forget. He commented that one reason for our failed project was that the teachers represented a nuisance variable. That observation was correct from the standpoint of experimental design, but to express that fact with such an impersonal, detached, almost disrespectful term, gave pause to all of us in the room. As our discussion proceeded, we discovered that our abject failure to conduct a valid experiment had actually revealed some useful insights about our intervention and how we might implement it better in the future.

That experience revealed the extent and power of the laboratory metaphor that put our work at odds not only with the reality of classrooms and schools, but, more importantly also with pedagogical decisions that served students. It disconnected us from the contexts in which we conducted our research and from the lives of those who we intended our work to inform.

Some of you may be thinking that naturalistic approaches guided by a lens metaphor would negate the limitations of the laboratory metaphor we were using. However, as I will point out in a few minutes, it has its own problematic entailments. You may also be thinking: Do metaphors really matter that much? Could replacing one metaphor with another really make that much difference? Actually, there is a literature suggesting that metaphors really do matter and they have subtle, but profound influence, on how we view the world.

For example, George Lakoff and Mark Johnson (1980), in their seminal book entitled *Metaphors We Live By*, pointed out that metaphors are much more than linguistic tools for explanatory or aesthetic purposes. In fact, many metaphors become unconsciously embedded in everyday language and their entailments create and sustain cultural coherency. For example, many cultures use war metaphors for argument. The entailments of the war metaphor include *attacking a position, indefensible points, a new line of attack, winning or losing, gaining ground, demolishing arguments*, and so forth. Another everyday example is time as commodity. *We spend time, share it, save it, waste it, borrow it, budget it, use it profitably* or not, and hope that some tasks don't *cost us* too much of it.

According to Lakoff and Johnson (1980), metaphors unconsciously promote one view and suppress others. For example, considering labor as a resource (e.g., as in human resources) is really a metaphor, one that promotes economic and political interests, but suppresses the distinction between meaningful and dehumanizing work. Likewise, new metaphors have the potential to redirect our conceptions and actions. For example, Lakoff and Johnson explain how a loving relationship between two partners might be conceptualized metaphorically as creating a collaborative piece of art, thus undoing ideal and unrealistic views of unending romantic love that requires no effort.

New metaphors can also be agents of power used to set agendas, to shape perceptions, and to inspire action. No Child Left Behind, and its more recent cousin, Race to the Top, are examples of such metaphors. Or, consider the Tea Party Movement. Thus, we need to consider our metaphors carefully and choose those that will most help get us where we want to go.

METAPHORS LITERACY RESEARCHERS LIVE BY

Metaphors are rife in the discourse of our field. For example, consider how we talk about reading and texts. Reading is often described metaphorically as immersion, absorption, nourishment, transportation, movement, liberation, transaction, and so forth. Texts are digested, followed, constructed or deconstructed, seminal and disseminated, wrestled with, and those who have difficulty with them struggle. Could we even talk and think about reading and texts without such metaphors? Or, how might we think differently about them if we adopted new metaphors for reading such as mirrors, music, harvesting a crop, or gifts.

In the realm of instruction, the medical metaphor continues to dominate in some quarters for conceptualizing how we view and treat (in all senses of that word) students having difficulty reading. For example, we may send them to a reading clinic for a diagnosis and a prescribed treatment. Response to Intervention (RTI) alludes to a medical metaphor, as does Reading Recovery. But, for literacy researchers the laboratory and the lens are the predominant metaphors, to which I now turn.

The Laboratory Metaphor

The laboratory embodies the highly controlled conditions and quantitative measurements that define the scientific method. Literacy researchers who invest heavily in that metaphor when they work in dynamic, real-world contexts sometimes go too far and sometimes not far enough. On the not-far-enough side, they often conveniently omit many of the laboratory metaphor's entailments. For example, scientists who actually do highly controlled laboratory experiments know that their research is often messy, riddled with unforeseen and troublesome errors, leading to erroneous findings. They know that many scientific advances are often spurious or serendipitous effects (e.g., penicillin, X-rays, and even Viagra). Some major discoveries first appeared to be measurement error (e.g., for years astronomers thought pulsars were nothing more than flaws in their observational equipment).

Real scientists are also circumspect about moving laboratory research into the real world. For example, Steven Cole, a UCLA medical researcher studying biological links between stress and physical illness, stated:

I have to say, anytime things work out in the real world, frankly, it should be a surprise to those of us that do laboratory science. I assure you that there are many, many things that we discover that work fine in the test tube that don't work out in the real world. (see: http://chronicle.com/article/Misery-in-the-Genes-How-DNA/65335/?sid=at&utm_source=at&utm_medium=en)

Or, consider the conclusions of a scientific panel investigating the possible harmful effects of plastic containers for food and drinks:

Given so many variables, it is difficult, if not impossible, to determine

how harmful these chemicals might be, or if they are harmful at all, or what anyone can do to avoid their effects. (see: http://www.newyorker.com/reporting/2010/05/31/100531fa_fact_groopman)

I know that many of you agree with me that the laboratory metaphor has marginal validity as a metaphor for classroom research, and perhaps a few others who may be considering leaving the room now. But, let me speak for a moment to those who largely agree. I believe that the laboratory metaphor has left some residue in our thinking, even if we have consciously rejected it. Let me give a few examples.

The fallacy of fidelity. In valid scientific experiments a treatment must be carried out with fidelity, which means, in an instructional study, that instruction must not vary. Even if that were possible, it should be contrary to every bone in an educator's body. I suppose, then, we might logically call good teaching infidelity, because it varies to accommodate students' diverse backgrounds and needs, changing circumstances, the availability of materials, and so forth. So, any inclinations any of us may have to prescribe classroom practices or even to suggest that such prescriptions are possible can, I think, be traced to the laboratory metaphor, which leads to the next example that is a close cousin.

The fallacy of "best practice." The fallacy can be revealed by trying to insert words into the blanks of the statement:

Considering all the possible instructional practices for teaching/developing/installing [insert your favorite aspect of literacy here], [insert a practice here] is the best practice of all.

As I have argued in published work (Reinking, 2007), if we can define best practice, it should not be any more difficult to identify worst practice, which seems nonsensical. What would the worst possible practice be? Whenever we use the term *best practice*, we implicitly further the laboratory metaphor and its limited attention to conditional factors.

The dominance of effectiveness. Another residual effect of the laboratory metaphor is the dominance of effectiveness in our research. No one would argue against striving for effectiveness in promoting literacy and seeking an understanding of how to achieve it through our research. However, the laboratory metaphor promotes disproportionate attention to measurable achievement at the expense of contextual factors, not to mention its neglect of valued outcomes that are difficult to measure. Two other practical aspects get little attention: efficiency and appeal. What good is an instructional program that is clearly effective on average if it is a logistical nightmare, a financial black hole, anathema to teachers and students, or if it produces unacceptable collateral outcomes? To the extent that we ignore or play down such factors, the laboratory metaphor is holding sway.

Playing the research card. If you have ever used research to advance or settle an argument about what should or should not be done in classrooms, or perhaps even if you remain silent while others attempt to do so, you are endorsing the laboratory metaphor. Taking that stance might be called *playing the research card*. As Bill Ayers (2006) has suggested, "In education a sentence that begins 'The research says . . . ' is too often meant to silence debate. It evokes Science, which is assumed to be larger than life: The expected response is awe and genuflection. It functions as a kind of bludgeon" (p.90). As this quote suggests, laboratory science invites a posture where research is

the final arbiter for making educational decisions. The periodic requests on the LRA listserv for research that counters some ill-advised instructional program in a local school district is an example of looking for research trump cards. If we choose to participate in that game, we are endorsing the laboratory metaphor. Can we imagine a world in which research is not used to win arguments? Are there metaphors that might create research that disengages us from arguing what the research does or doesn't say?

Devaluing professional wisdom. The laboratory metaphor also tacitly devalues professional wisdom. It implies a clear demarcation between researchers and practitioners, a separation that unfortunately is deeply embedded, I believe, in our self-concept. We see the task of researchers as producing the raw findings that practitioners and policy makers are expected to put into practice. For example, Labaree (2003) argued that teachers must be reprogrammed to adopt a different worldview if they are to become researchers:

. . . students and professors in researcher training programs often encounter a cultural clash between the world-views of the teacher and researcher. . . Differences in worldview between teachers and researchers cannot be eliminated easily because they arise from irreducible differences in the nature of the work that teachers and researchers do (p. 14).

Certainly new skills and broader perspectives are necessary to become a researcher, but what does it say about our metaphors if they require would-be researchers to purge or suppress the instincts they acquired as teachers? Gerald Duffy (1994) offered a different perspective, made more poignant because it needs to be stated at all:

Viewing research findings as something to be handed down as technical information ignores the reality that teachers must make strategic decisions about when to apply findings, how to adapt them to certain situations and even when it might be appropriate to ignore the findings altogether (p. 19).

Are there metaphors that would put effective, efficient, and appealing practice, not research, at the center of what we do, as suggested by the caption of a cartoon showing two researchers in a discussion with one saying to the other, "We know it works in practice, but will it in an experimental setting?"

Before going on, I can't resist a few challenges to those who may still cling to the laboratory as the most valid metaphor for education research. These challenges might also be useful to those who wish to confront that unenlightened view when it surfaces.

Challenge 1: What experimental research negates the findings of the nationwide first-grade studies conducted in the 1960s? Has there been research or is there something different about classrooms and instructional interventions today that call into question Bond and Dykstra's (1967) conclusions that contextual factors are more important than method or approach? As they stated, "Reading programs are not equally effective in all situations . . . factors other than method . . . influence pupil success in reading . . ." (p. 415). That interpretation actually holds as recently as the disappointing results of the equally massive data collection reported in the Reading First impact studies (Gamse, Jacob, Horst, Boulay, & Unlu, 2009).

Challenge 2: The second challenge relates to what might be referred to as *the tyranny of statistical averages*. I will give two examples. First, David Pearson (2007) has pointed out that

the study of an experimental researcher's dreams is when everyone in the experimental group outperforms everyone in the control group (i.e., disjoint, non-overlapping distributions). However, in reality the distributions of treatment and control groups always overlap even when means are statistically different. In that typical case, many students do equally well in the treatment and control conditions and both may represent reasonable choices depending on the situation. Taking Pearson's point one step further: Not only do distributions typically overlap, but it is common for some students to do better in the control condition and some to do worse in the treatment condition when the distributions are skewed, as they often are. What are teachers supposed to do with those students? Or, how does knowing what works well on average inform teachers who have a whole class of students on the fringes of some statistical distribution?

A second example of the tyranny of statistics is *Simpson's Paradox*. This paradox is a little known, but not uncommon, statistical phenomenon that calls into question almost any conclusions based on statistical averages, especially when multiple variables are likely to affect outcomes. It is illustrated in Table 1, which shows the breakdown of imaginary, but not far-fetched, results from a medical experiment reporting the effects of an experimental drug on a group of patients. The box showing combined results for males and female patients ($n = 80$) suggests that the experimental drug was more effective than no treatment. However, when the same data for the same patients are broken down by gender, as shown in the second and third boxes, the no-treatment condition produced higher recovery rates for both males ($n = 40$) and for females ($n = 40$).

The results have been interpreted facetiously to suggest that a doctor who does not know the gender of a patient should expect better results than if gender is known. Simpson's paradox has reversed conclusions in how to treat kidney stones when the data are broken down by small or large stones, in sex discrimination cases at a major university that showed overall bias favoring males but none by any individual department, and in rating two baseball players, one of whom had a higher batting average than another player for two consecutive seasons but a lower average across both seasons. Experimental studies not only have confounding or nuisance variables, they have what

have been called lurking variables that can reverse conclusions entirely depending on how aggregate data are parsed (for a portal to understanding Simpson's paradox and these findings see: http://en.wikipedia.org/wiki/Simpsons_paradox).

The third challenge is to follow in the footsteps of your elders. Several highly respected researchers in our field with impeccable credentials as experimentalists have come to the enlightened conclusion that a laboratory approach is ill suited to working in classrooms. For example, the late Ann Brown (1992; Brown

Table 1. Imaginary Results from an Experiment Testing the Effectiveness of an Experimental Drug on Recovery Rates

| | Recovery | No Recovery | N | Recovery Rate |
|---|----------|-------------|----|---------------|
| Combined Group (male and female) | | | | |
| Drug | 20 | 20 | 40 | 50% |
| No Drug | 16 | 24 | 40 | 40% |
| Total | 36 | 44 | 80 | |
| Males Only | | | | |
| Drug | 18 | 12 | 30 | 60% |
| No Drug | 7 | 3 | 10 | 70% |
| Total | 25 | 15 | 40 | |
| Females Only | | | | |
| Drug | 2 | 8 | 10 | 20% |
| No Drug | 9 | 21 | 30 | 30% |
| Total | 11 | 29 | 40 | |

& Campione, 1996) conducted laboratory-inspired research to explore the role of meta-cognition during reading comprehension. But, she abandoned those methods when she attempted to translate her laboratory findings into workable instruction in classrooms. Likewise, Michael Pressley in his final publication before his untimely passing (Pressley, Graham, & Harris, 2006) argued that we need classroom intervention research that attends to multiple theoretical perspectives, variables, and outcomes; that investigates processes across years; that uses methods that accommodate interacting variables and cross-case qualitative data; and that communicate results in a way that is useful to practitioners. At best, the laboratory metaphor works against these characteristics.

The Lens Metaphor

The lens emerged as an alternative metaphor in the early 1990s amidst tumultuous debate about whether naturalistic methods were a valid way to conduct literacy research. Some NRC members resolved that issue by voting with their feet when they formed the Society for the Scientific Study of Reading. Their allegiance to the laboratory metaphor could not be compromised. The primary entailment of the lens metaphor is that what we research, what observations we attend to, and ultimately what conclusions we draw are subjective and ideologically driven and filtered through whatever lens we use to interpret the world.

The lens metaphor offsets many of the limitations of the laboratory metaphor. Specifically, it emphasizes the inherent complexity of contexts for teaching and learning and moves us beyond perseverating on measurable achievement. Thus, inherently it offers more potential to inform practitioners and to close the gap between research and practice.

But, the lens metaphor has a fundamental limitation. Behind a lens is essentially a passive, if not ideologically neutral, observer and analyzer. The lens metaphor suggests looking studiously at interesting and complex phenomena without any specific imperative to transform what is being observed and analyzed. Research using the lens metaphor can sensitize practitioners to sometimes hidden issues and to deeper understandings affecting their practice. But it does not inherently inspire research that provides explicit guidance for day-to-day practice.

In short, the lens metaphor has no imperative for engaging in constructive action. In fact, discursive analyses and mountains of intriguing data may create what the famous sociologist Paul Lazarsfeld (1948) called a *narcotizing dysfunction* where deep and pervasive knowledge of social problems vicariously substitutes for doing something about them. Further, the theoretical underpinnings of the lens metaphor invite philosophizing and social analysis rather than action. In that regard, I believe we need a lot less Jacques Derrida and much more of pragmatic post-modernism such as that expressed by the Richard Rorty stance (as cited in Linn, 1996):

[According to Rorty] what is needed isn't . . . reformers who pride themselves in being a proper post-modern . . . what is needed are reformers who can create a job program for kids growing up in the ghetto (p. 42).

If the curse of the laboratory metaphor is a failure to recognize and contend with the complex interacting factors operating in real classrooms, the curse of the lens metaphor is that it passively allows us to wallow in them. The result, more precisely the lack of results, is the same.

Some New Metaphors

Are there other metaphors that move us beyond the limitations of the laboratory and lens? I think so. I offer three ancillary metaphors and then an overarching one that I believe should equal the laboratory and lens in importance. None of these metaphors require new methods of data collection and analysis, only a repurposing of those methods within new metaphorical frames.

Chefs, not cooks. First, if our work is to influence practice, it may be important to have appropriate metaphors for our audience. A metaphorical distinction that I find useful is between teachers as cooks or chefs. That metaphor was inspired by a common complaint that pre-service teachers often want recipes for success. I try to convince them that their goal should not be to become a cook following recipes, but eventually a master chef who combines good ingredients into innovative and pleasing gourmet dishes often made from local ingredients. In fact, our colleagues in science education actually have a competition that uses that metaphor modeled after the televised iron chef competitions, where top chefs are challenged to create a gourmet meal built around a key ingredient. In the science education version, small teams of teachers compete to create the most interesting and effective lessons on a topic given a few objects. What if we framed our research as informing creative chefs rather than cooks who follow recipes? It might negate, for example, playing the research card and overselling the results of our research as prescriptions.

Ecology. Another supportive metaphor is ecology. It is not entirely new. Ecological validity has always been part of our research lexicon, but typically as only a potential foil to experimental validity. However, what if we framed our forays into classrooms as ecological expeditions and the introduction of new perspectives and activities as having ecological repercussions? An ecological metaphor would constantly remind us of the many complex interacting variables in classrooms.

Evolution. Evolution is a complementary, and offsetting, metaphor to ecology. Although ecosystems are complex and sometimes fragile, evolution reminds us that life forms have developed mechanisms to ensure they can adapt and survive. Thus, initiating new perspectives and activities into classrooms may be met with resistance to preserve the existing order. Educational practices and policies at all levels are the product of unique and powerful evolutionary forces designed to sustain their survival in the face of changing conditions.

For example, Chip Bruce and Andee Rubin (1993) experienced that reality in their long-term efforts to integrate a computer application they called QUILL into classrooms. QUILL was designed to engage students in more authentic purposes for reading and writing. To their dismay, teachers benignly subverted that intent by employing QUILL to address more conventional academic goals such as improving grammar and punctuation. The status quo resists change and evolution is slow and incremental. There really are no quick fixes. Authentic change typically occurs only after extended periods of trial and error.

Engineering. Finally, I propose engineering as a dominant, overarching new metaphor that I believe should stand shoulder-to-shoulder with the laboratory and lens, perhaps even subsuming them. Engineering, too, is not an entirely new metaphor as illustrated by the following quotes:

The study of how educational interventions work can never be far removed from the task of engineering them to work better (Newman, Griffin, & Cole, 1989, p. 147).

Educational research often sits in the uneasy intersection between science and engineering (Feurer, Towne, & Shavelson, 2002, p. 28).

Some have even proposed that education research, more literally, should be considered an engineering science instead of a social science. As Figure 1 shows, Stokes (1997) framed the issue a bit differently. He created four quadrants based on whether the emphasis of research was on fundamental understanding or a consideration of use. He argued that the quadrant most often advancing scientific understanding was the one that focused simultaneously on both. He named that quadrant after Louis Pasteur, whose efforts to preserve food, led him to deep understandings of microorganisms and thus to found the field of microbiology.

Figure 1. Quadrant Model of Scientific Research

| | | No | Yes |
|--------------------------------------|-----|--|---|
| Quest for fundamental understanding? | Yes | <p>Pure basic research (e.g., Niels Bohr)</p> | <p>Use-inspired basic research (e.g., Louis Pasteur)</p> |
| | No | | <p>Pure applied research (e.g., Thomas Edison)</p> |

Adapted from: Stokes, D. E. (1997). *Pasteur's quadrant: Basic science and technological innovation*. Washington, DC: Brookings Institution.

Other examples illustrate that the engineering metaphor means more than simply solving problems or building things that work. For example, theoretical understanding of flight was known since Bernoulli almost 175 years before the Wright brothers. But, their genius was creating a workable flying machine with three-axis control, eventually creating the new field of aerodynamics. As Schoenfeld (2006) points out, there is a reciprocal relation between trying to build or improve something and to understanding it.

The following highlight some of the entailments of the engineering metaphor that might bring new purpose to our work and increase its influence:

- *Action* (engineering is a verb)
- *Explicit goals/ends* (presumably that better the world)
- Attention to *interacting variables in multiple contexts*
- Use of *whatever data are useful* (begs methodological debates)
- *Pragmatic stance* (begs epistemological debates)

- *Multiple solutions to the same problem* (negates the fallacy of best practice)
- *Tests and develops theory in practice*
- *Employs multidisciplinary expertise and collaboration*

Taken together, these entailments would have several other benefits. Here are a few examples:

- *Opens up new perspectives and issues for research.* For example, engineers must identify thresholds of failure. In designing a bridge an engineer must ensure that there are no conceivable conditions that would exceed its threshold of failure. Perhaps our research should specify thresholds of failure, or to use a medical metaphor, dangerous dosages and interactions?
- *Narrows the gap between research and practice.* Conducting research as engineering reasonable solutions to problems in authentic contexts is exactly what practitioners do, albeit less systematically than researchers.
- *Addresses simultaneously all major areas of education research.* According to Lagemann (2008) there are three major areas of education research: problem finding, problem solving, and translational research, but especially the latter, which she argued has been virtually absent from our research and which explains, in part, the gap between research and practice.

AN APPROACH CONSISTENT WITH NEW METAPHORS

There is a relatively new approach to research that draws on these new metaphors, particularly the engineering metaphor. It goes by many names such as *design experiments*, *design studies*, *teaching experiments*, *lesson studies*, or *formative experiments*. These specific variations are often subsumed by several umbrella terms such as *design-based research*, *design research*, *developmental research*, and *educational design research*, all of which clearly connect with the engineering metaphor. Some LRA members whose work is influenced by this approach include my frequent collaborator Barbara Bradley, Jim Baumann, Erica Boling, Karen Broadus, Susan Neuman, Doug Fisher, Nancy Frey, Robert Jiménez, Gay Ivey, Susan Lenski, Vickie Purcell-Gates, and Anna Taboada.

That approach can be understood by comparing it to experimental and naturalistic approaches. For example, experimental research uses quantitative methods and typically asks which among several competing practices *What intervention is best, on average?* Naturalistic studies use qualitative methods and ask what happens when a practice occurs, or, more simply, *What is?* Design-based research asks a different question using qualitative or mixed methods: *What is necessary to allow a practice to achieve a valued goal or simply What could be, and how do we get there?*

Put another way, imagine responses from three doctoral students who are asked what methodology they will use in their dissertation research. One traditional response is "Quantitative (or qualitative) methods because it is consistent with my world view." A second response is "Qualitative or quantitative methods depending on my question." A third, and new, response would be "Design-based research because I want to implement and understand (theoretically) an intervention that has potential to help educators achieve a valued pedagogical goal."

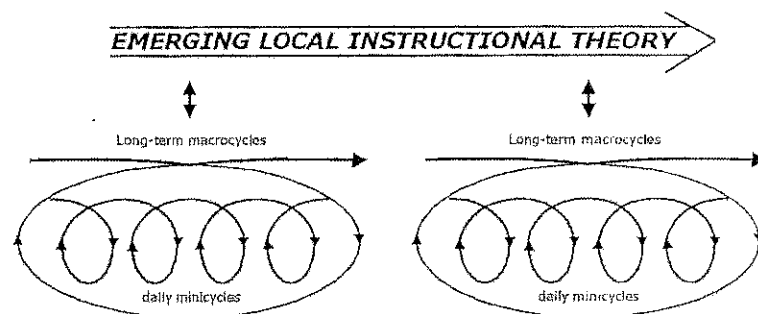
A defining difference, then, is that this approach, like an engineering project, originates with an explicitly stated goal—one that is valued and useful, and justifiably has potential to directly

enhance wellbeing. Among several models available for conducting design research is the one I have used in my own research. It goes essentially something like this: Identify a valued pedagogical goal, justify its value, identify an intervention that has potential to accomplish the goal, implement it, modify it while gathering and analyzing data to address the following generic questions:

- What factors enhance or inhibit achievement of goal?
- In light of those factors, what modifications are useful or necessary?
- Is the environment transformed in any way?
- What are the unanticipated collateral effects (positive or negative)?
- What are the key ingredients of success or failure?
- What pedagogical theories are supported or negated?

As shown in Figure 2, data are collected and analyzed to inform cyclical modifications of the intervention. Mini-cycles occur almost daily, whereas macro-cycles occur over longer periods,

Figure 2. Data Collection, Modification, and Theory Development in Design-Based Research



From Gravemeijer, K., & Cobb, P. (2006). Design research from a learning design perspective. In J. Van den Akker, K. Gravemeijer, S. McKenney, & N. Nieveen (Eds.), *Educational design research* (pp. 17-51). New York, NY: Routledge.

perhaps across investigations.

The product developed is an intervention with general design specifications suggesting the key ingredients for success or failure in achieving a valued goal in specific contexts as well as across contexts. However, another product is a deep theoretical understanding of the processes and outcomes in terms of ecology and evolution. All forms of data collection and analysis that inform that process are considered and used.

In summary, design research is an approach that aims to:

- *achieve valued goals* by . . .
- *flexibly designing workable interventions* guided by . . .
- *systematic data collection* that enables . . .
- *resting, refining, and developing pedagogical theory*
- *in the crucible of authentic practice.*

I believe it is worth noting that it is the only approach to education research that originated within the field of education. All of our other approaches to research and the metaphors that sustain them are borrowed from other fields or disciplines.

MOVING FURTHER BEYOND THE LABORATORY AND THE LENS

However, new metaphors can move us beyond simply considering new approaches to research. Here are a few examples of how they might more generally influence our work:

- We could adopt what Messick (1992) referred to as consequential validity. Again, borrowing from my colleague Tom Reeves, we might replace or supplement Institutional Review Board (IRB) approvals for our research projects with an HBRB: Human Benefits Review Board. To pass the HBRB review, projects would have to explicitly specify how the proposed work would benefit people's wellbeing.
- Similarly, we might expect every published account of our research to begin with an explicit justification of its contribution to creating a better world.
- We might insist that at least one reviewer of our manuscripts be a practitioner and charge that reviewer with evaluating consequential validity. Might we invite practitioners to comment on our published work, as is becoming more common in digital publications? Such moves, which are relatively easy to implement, would, I believe, move us quickly in the direction of new metaphors and greater resolve to make a difference.
- What if LRA took a stance rejecting the premises of the "What Works Clearinghouse" advocating instead for a "What it Takes to Work Clearinghouse"? In fact, that is the recommendation of a recent working paper from the Harvard Kennedy School of Government (Smyth & Schorr, 2009). It argues that financial cutbacks have promoted more calls for accountability in social programs where only those programs showing statistical superiority on average are funded. The outcome is the cancellation of many programs that are highly effective in specific contexts even though they are below the overall mean.
- If we are going to continue to use medical metaphors, why not include Bulterman-Bos' (2008) suggestion that we follow the lead of medical researchers at research hospitals. They see patients, which keeps their research grounded in the reality of practice and people's lives. My hero in that regard is Jim Baumann; I was his department head many years ago. I recall the day he walked into my office asking me to support his decision to exchange places for one year with a second-grade teacher in a local school.

SUMMARY AND CONCLUDING REMARKS

Finally, to summarize my main points:

- Improving human wellbeing is the central imperative of education research. The deep humanitarian commitment to bettering the world that is so evident in LRA should be the reservoir from which all of our efforts emanate.

- But, our work has been marginally effective and inefficient in meeting that imperative, as evidenced by the perennial divide between research and practice and our ambivalence about the extent to which our work provides a useful base for bettering the world.
- Drawing on Lakoff and Johnson's (1980) work, I have pointed out that metaphors are pervasive elements of language and thought that influence our views, perceptions, interpretations, and actions, and that shape our identities as researchers.
- For literacy researchers the prominent metaphors are the laboratory and lens. These metaphors are not particularly well suited to furthering the central imperative of our work. The laboratory metaphor insulates us from the messiness of the real world and from the complex interacting variables that influence success or failure. The lens metaphor invites a passive observational stance that has no imperative for constructive change and that promotes abstract understanding and conclusions over concrete improvements.
- I proposed several alternate metaphors that promote instead the pursuit of valued goals in authentic contexts to gain useful understanding. Seeing the beneficiaries of our research as chefs, not cooks, helps put our research into proper perspective. Ecology and evolution remind us of the complex challenges we face, keep us humble about our work, and inspire more reasonable expectations and time frames for making a difference. Engineering opens up new ways to approach our work based on the idea that deeper understanding is developed through constructive action to achieve valued goals.
- My central argument is that our established metaphors too easily dismiss us from accountability to make a difference and do little to inspire a fervent resolve to do so. Instead, they invite a shallower focus on our next publication, our next conference presentation, or our next grant proposal. Adopting new metaphors may help us break free from a cycle of inconsequentiality and to reframe and repurpose our work without necessarily giving up our research interests, our methodologies, theoretical perspectives, and all the research activities to which we are accustomed.

So, I come to the end of my brief moment in a long history of presidential addresses. I sincerely hope that I have not unnecessarily offended any sensitivities or unintentionally denigrated anyone's research, let alone tarnished NRC/LRA's illustrious history about which there is much to be proud in this year of our 60th anniversary. At the same time, I hope I have convinced you that it behooves all of us at this historic juncture to take stock honestly of what we have and what we have not accomplished in making the world a better place, and what we want to accomplish in the next decade and beyond.

If my perspectives are wrong, misguided, off base, overstated, or all of the above, I take comfort in the advice I give to my doctoral students. I tell them that their obligation as scholars is not to always be right. On the contrary, they should expect that they will occasionally, if not often, be dead wrong, and if they never experience that sensation, they are not paying attention, not reflecting, not listening to their colleagues, or worse, engaging in demagoguery. Their only obligation, if they are wrong, is to be wrong in informed and interesting ways. The spirit of NRC in the past and I hope of LRA in the future has been an open forum for new ideas and perspectives, collegial dialogue and, when necessary, collegial correction. I hope my talk today has reflected that spirit and that it

will generate responses from you, my colleagues, in the same spirit. I look forward to having the opportunity to engage in that dialog during our next few days together and beyond.

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