The Nature of Evidence in Design-based Implementation Research

Barbara Means and Christopher J. Harris, SRI International • *barbara.means@sri.com* • *christopher.harris@sri.com*

How can we make education research a tool for educational improvement?

Prevailing models of education research seek to support the first strategy option while DBIR supports the second.

Strategy #1 – Identify and disseminate interventions that "work"

Strategy #2 – Embed research into policymaking and practice

In this poster, we highlight the ways in which DBIR is a departure from much educational research in terms of both the conceptualization of what it means to conduct research that is useful and usable in education settings and the phasing of different kinds of research activities. An implication of our analysis is that a more flexible, less linear framework for education R & D is needed to make research usable by practitioners.

Prevailing Standards of Evidence

Before discussing the implications of design-based implementation research for structuring research and development, we consider the contrasting case of the prevailing evidence standards and associated sequencing of types of education research promoted by the Institute of Education Sciences (IES) of the U.S. Department of Education. The IES evidence standards are deeply engrained in federal policy for education research funding.

Building on the conception of "gold-standard" evidence of effectiveness as coming from randomized controlled trials (Baron, 2007), IES uses a "goal structure" that reflects a linear model of research and development:

- In the first stage, **Development and Innovation**, IES expects researchers to develop a new intervention and collect data on its feasibility and usability, as well as some pilot data on student outcomes.
- In the next stage, **Efficacy and Replication**, the assumption is that the intervention is "fully developed" and proposals seek funding for experimental tests of the intervention's impact in some limited range of contexts and often with considerable support from the research team (i.e., an efficacy study).
- The next stage in the sequence, **Scale-up Evaluation**, has the goal of taking an intervention that has already proven its efficacy in the prior research stage and testing whether it is effective under "typical conditions."

The IES evidence standards are deeply engrained in federal policy for education research funding. If we consider the logic behind the adoption of these standards, we find the basic assumption that there are clearly defined education programs or interventions that either "work" or "don't work" (see, for example, IES, 2011). Given this assumption, the researcher's goal is to collect evidence to place an intervention in one or the other category. In this view, the contribution that research makes to practice is through identifying "what works" and disseminating this information to practitioners.

DBIR R & D Model

In contrast to the Department of Education evidence stages and standards, *DBIR treats educational interventions not as fixed objects but as practices that will be adapted to local circumstances and can be expected to undergo modifications and improvements throughout their lifespan.* Moreover, in the DBIR model, the implementation of an intervention in particular settings is itself an object of research and a critical part of understanding how to scale an intervention without diluting its effectiveness.

DBIR is a departure from the standard Department of Education research framework in that:

- DBIR aims to generate research findings that are not just useful in principle but are actually used by those making decisions that affect education. Thus, DBIR tends to place more emphasis on understanding local actions and outcomes and to make fewer claims for generality than other research approaches.
- DBIR attends to implementation processes, not just "implementation fidelity." It looks for unanticipated or unintended consequences of introducing a new practice or new instructional material into an educational setting, not just whether an experimental protocol is being followed as stipulated. DBIR has a somewhat more flexible stance toward testing causal hypotheses than is embodied in IES standards, but does not eschew experimental design as an important research tool.
- DBIR follows a research trajectory that is more flexible and less linear than the prevailing education research and development cycle. DBIR expects variation in outcomes across different contexts and prioritizes the study of implementation in context as a strategy for refining the intervention as well as one for understanding implementation and context.

Evidence Implications of DBIR Principles

The four core DBIR principles (Penuel et. al., 2011) have important implications for how research evidence is defined and used:

Working with practitioners to jointly select the problem to address, the starting point for DBIR, is incompatible with large-scale RCTs.

A basic principle of DBIR is that the research agenda is jointly negotiated with the practitioners who are partnering with researchers. Rather than defining a research question about a particular intervention and then recruiting education entities willing to implement that intervention as defined, the researcher forms a partnership with practitioners and then negotiates the research questions with them. Such negotiation, essential to DBIR, is difficult to reconcile with the model of research adopted by IES because applicants for funding must focus on research designed to identify causal relationships between education interventions and student outcomes. The degree of intervention standardization required by traditional education research models necessarily puts the researcher in the role of defining the intervention a priori and then recruiting schools and districts willing to implement the intervention as defined in the experimental protocol with fidelity, a stance that is fundamentally incompatible with negotiating the intervention to be implemented with those who will implement it.

Iterative, collaborative design involves practitioners in making design decisions, and types of evidence other than randomized control trials often drive those decisions.

The collaborative nature of DBIR calls for research and practice partners to engage in multiple cycles of design, implementation, and refinement. Those who engage in these efforts find that designing and developing an educational intervention involves a huge number of decisions, not all of which could possibly be tested through experimental design. For early-stage innovations, there is typically a tradeoff between gathering stronger causal evidence of effectiveness and gathering more data on implementation in a range of contexts. Innovation developers are inclined to emphasize the latter kind of data collection because they expect their intervention to be undergoing rapid evolution (U.S. Department of Education, 2013). Implementation data are considered important for getting feedback on the appeal and usability of the intervention in practice and for establishing the range of desirable and acceptable variations in how the intervention is implemented.

DBIR anticipates inconsistent outcomes across different settings and is designed to support the development of implementation theory to explain these differences.

Ample research demonstrates that interventions that "work" in one setting and occasion do not necessarily work elsewhere or at another time (e.g., Cole, Kemple, & Segeritz, 2012; Means & Penuel, 2005). DBIR proponents do not assume that an intervention that achieves a positive effect size in a handful of experimental studies will necessarily have similar positive effects wherever it is implemented. Rather, they work with their practitioner partners to lay out a theory of the implementation process that is specific to the practitioners' context, and to study both implementation processes and outcomes simultaneously.

DBIR entails seeking greater commitment to the settings where research data are collected, to develope capacity for sustaining change in those educations systems.

The hope is that DBIR partnerships lead to increases in both researcher and practitioner capacity. Researchers are expected to become smarter about how to target issues that matter for education systems in their work and about how to conduct solid research within the constraints of practicing education systems. Collaborating districts are expected to become more interested in and adept at collecting data about both their implementation practices and the outcomes for their programs and interventions. There is not an expectation that classrooms, schools, and districts will launch a program of massive experimental research, but rather that they will carefully plan out implementation of major new initiatives and monitor both implementation processes and outcomes, seeking to gain insights from the variability of outcomes related to different implementation practices and settings that can be used to refine the implementation plan for the next iteration.

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