



Advice for Developing a Research Design that Employs Design-Based Implementation Research (DBIR)

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Purpose

This brief provides guidance for how to design a research plan using DBIR. It can also serve as a resource for preparing a research proposal to a federal agency or foundation that employs a DBIR approach. This guidance is informed by the development of the approach in a range of settings, including projects of the [Research+Practice Collaboratory](#).¹

Background

There is increasing interest in developing more collaborative approaches to research and development. DBIR is one of those approaches, and several agencies and foundations today are encouraging proposals that could employ a DBIR approach. Researchers developing proposals or serving as peer reviewers may benefit from guidance about how to build or evaluate a research plan. At present, there is no shared agreement as to what constitutes a strong DBIR plan, but this document is intended to provide some guidance from people familiar with the model to the field that can help build a common understanding of DBIR as an approach.

When To Use a DBIR Approach

DBIR is a potentially suitable approach for both “early-“ and “late”-stage research and development projects, that is, within exploratory, design and development, efficacy, and effectiveness or scale-up studies. DBIR is not just an approach for testing existing interventions, nor is it wedded to any particular type of method. Any time a team is developing resources, materials, and tools across two levels of a system (e.g., for students and for teachers, or teachers and instructional coaches), DBIR may be an appropriate approach. What matters most is to align the research questions, theoretical frameworks, and research methods to the stage of research (Pages 4-6 Guidance).

What Makes a Project a Good Example of DBIR

DBIR includes many elements of more established research and development approaches, including iterative design and gathering of evidence related to the efficacy of resources, materials, or tools. What distinguishes DBIR Projects from others is that all four features of DBIR are present (see the guidance on page 3).

There are two good questions to ask in order to check whether your proposed project fits the definition:

Question 1: Could practitioners and researchers come to agree on the description of the problem of practice you are addressing?

DBIR projects all involve the collaborative negotiation of the goals for the work, and as part of that negotiation, projects organize around a shared problem of practice. This is a key

¹ The ideas expressed in this guidance document are those of the Research and Practice Collaboratory project and are not necessarily those of any agency that funds research.



characteristic of any research-practice partnership, whether or not the partnership has adopted a DBIR approach.

A proposed DBIR project should take as a goal identifying a problem of practice that can be recognized by all stakeholders as the most important problem to be addressed in the project. If the problem is stated in terms that only other researchers would recognize as important, then it is not a DBIR project. Instead, ideally, the research plan should indicate who has helped define the problem of practice and describe the process used to define the problem. Because problem definition is ongoing, the plan should also describe how and when the team will revisit its problem definition.

Question 2: How will implementation evidence be used to inform iterative design?

Many projects use evidence of student learning to improve resources, materials, and tools. Few, however, develop evidence of how educators implement tools that is then used to inform refinement of the tools. Implementation evidence should focus on what educators choose to implement, how they adapt materials to fit their circumstances, and why they make the choices and adaptations they do. It should be informed by theory (see Page 4 guidance), which is used to help inform iterative design. An implementation research study does more than develop evidence of fidelity, since fidelity analyses give little insight into why educators make the choices they do about implementation or into the organizational conditions that shape implementation.

Where to Learn More About DBIR

<http://researchandpractice.org>

<http://learndbir.org>

Web sites with readings, presentations, and case studies of DBIR

<http://nsse-chicago.org/yearbooks.asp>

NSSE Yearbook on Design-Based Implementation Research (2013)

The [free](#) introductory chapter provides the origins and key features of the approach.

The chapter on [theory and methods](#) provides an overview of potentially useful theories and methods of DBIR.

The [evidence framework](#) chapter provides some guidance for developing a systematic plan for developing and warranting claims in DBIR.

Two journal articles provide an overview of the approach:

Penuel, W. R., Fishman, B. J., Cheng, B., & Sabelli, N. (2011). [Organizing research and development at the intersection of learning, implementation, and design](#). *Educational Researcher*, 40(7), 331-337.

Penuel, W. R., & Fishman, B. J. (2012). [Large-scale intervention research we can use](#). *Journal of Research in Science Teaching*, 49(3), 281-304.



Key Features of Design-Based Implementation Research

Teams can use this version of the features as a way to investigate what aspects of their proposed projects follow a DBIR approach.

Teams form around a focus on persistent problems of practice from multiple stakeholders' perspectives.

- Teams are comprised broadly and can include teachers, school and district leaders, researchers, students, and community members.
- Identifying problems requires ongoing negotiation, with careful attention to issues of authority and power in who defines problems and possible solutions.
- Problem identification can benefit from carefully orchestrated processes to identify root causes, key change drivers, and practical theories of action.

To improve practice, teams commit to iterative, collaborative design.

- The ultimate aim of design is to improve teaching and learning practice, at scale, even though the work can start small.
- The objects of design are not only curricula and programs they also include the professional development and other supports needed to implement curricula and programs with integrity.
- Design process should allow teams to “get things basically right fast” and/or “fail early and fail often.”
- Design process should be participatory, involving as many of the relevant stakeholder groups as is feasible.

As a strategy for promoting quality in the research and development process, teams develop theory related to both classroom learning and implementation through systematic inquiry.

- DBIR gives a central role to produce research and evidence that informs (but does not determine) changes to design.
- Theory both guides and emerges from design and the implementation of programs and curricula.
- For any given problem of practice, multiple theories are likely to be needed but especially a theory of implementation.
- Any resources, materials, or tools developed through DBIR embody testable conjectures about learning and implementation.

Design-based implementation research is concerned with developing capacity for sustaining change in systems.

- One strategy for promoting sustainability of designs is to develop capacity through intentional efforts to develop organizational routines and processes that help innovations travel through a system.
- Capacity for continuous improvement is an attribute of the larger system that includes researcher, not just the field of practice.

DBIR Questions and Methods Mapped to Different Phases of Research



Phase of Research	Potential Research Questions	Potentially Useful Methods / Data
<i>Exploratory:</i> Negotiating the Focal Problem of Practice	What problem of practice should be the focus of our joint work?	Analyses of available data from multiple sectors Research evidence related to domain learning Perspectives and values of stakeholders (including non-school actors) Improvement science methods: Root Cause Analysis Change Laboratories
<i>Design and development:</i> Co-design	What should be the focus of our work? To what extent do teams leverage the diverse expertise of stakeholders? What co-designed tools might help address the shared problem of practice?	Documentation of design rationales Participatory design routines Ethnographic analyses of the co-design work
<i>Design and development:</i> Early implementation research	How do implementers adapt the innovation to their local contexts? How do implementers use the innovation to reconstruct their practice? What are the appropriate measures of impact from early cycles of improvement?	Observations and analysis of implementation Interviews Practitioner documentation of enactment Principled assessment design (e.g., evidence-centered design, construct modeling)
<i>Efficacy</i>	What is the potential impact of the innovation on teaching and learning? What mediates impacts on learning?	Randomized Controlled Trials Interrupted Time Series Designs Explanatory Case Studies
<i>Effectiveness and Scale Up</i>	What supports are needed to implement the program effectively across a system? What are the conditions for sustainability?	Experimental comparisons of different means of support Explanatory comparative case analysis



Potentially Relevant Theories and Frameworks for DBIR

The list below is a sample of theories and conceptual frameworks that are relevant for use within and across different levels of systems. The list is not exhaustive, but comparing theories across frameworks can give proposal teams a sense of how theories differ, depending on the level they target.

Theories and Frameworks Related to Children and Youth's Learning

Leveraging everyday ways of thinking and doing to support disciplinary learning (Nasir, Rosebury, & Lee, 2007)

Local instruction theories developed for teaching particular ideas (Gravemeijer, 2004)

Productive persistence and learning (Yeager & Dweck, 2012)

Supporting learning across settings (Azevedo, 2013; Bell, Tzou, Bricker, & Baines, 2012; Ito et al., 2013)

Learning as making and producing (Kafai, 2006)

Theories and Frameworks Related to Teacher Learning

Pedagogical design capacity development (Brown, 2009)

Theories of curriculum use (Davis & Krajcik, 2005; Remillard, 2000, 2005)

Professional learning communities (Grossman, Wineburg, & Woolworth, 2001; Horn & Little, 2010)

Teachers Related to Organizational Change and Diffusion

Sensemaking (Coburn, 2001; Weick, 1995)

Institutional theory (DiMaggio & Powell, 1983; March & Olsen, 1984; Spillane & Burch, 2006)

Distributed leadership (Spillane, 2006; Spillane, Halverson, & Diamond, 2001)

Social capital theory (Coburn & Russell, 2008; Frank, Zhao, & Borman, 2004; Lin, 2001)

Theories that Relate Changes Across Levels of Systems

Learning as transformation of participation in changing practices (Lave, 2012; Lave & Wenger, 1991; Rogoff, 1995)

Cultural-Historical Activity Theory (Cole & Engeström, 2006; Engeström & Sannino, 2010)

Learning in complex adaptive systems (Eidelson, 1997; Lemke & Sabelli, 2008; Maroulis et al., 2010)

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