

Empowering Design Based Implementation Research: The Need for Infrastructure

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Chapter Description:

This chapter posits that several types of infrastructure are necessary for successful, sustainable DBIR, including conceptual frameworks that attend to issues of scale, human capacity, technical support, policies, organizational learning, and long-term funding and sustainability. In addition, the chapter discusses the roles that feedback loops, intermediary organizations, and multiple timescales play in systemic educational improvement, and describes how attention to these different infrastructural needs can lead to sustained improvements and support their evolution over time.

## Executive Summary

The complex nature of the education system, and the influences—internal and external—that act upon it, make the implementation of improvements hard to sustain. The system tends to return to its “norm” unless supportive stable structures and coherent conceptual frameworks are present. Such *infrastructures* can be conceived as a framework: a set of interconnected elements that facilitate the *integrated* development of an initiative, provide a *continuing* narrative for this development, create *shared responsibility* for its implementation and facilitate its sustainability. In addition, to integrate research capacity and build the appropriate sustainable infrastructure, funding is needed for both researchers and practitioners at higher levels and for longer periods of time than are typical for research awards in education.

The chapter starts by framing the space in which DBIR takes place and the role of researchers in this process, continues with a discussion of each of the different infrastructure components proposed, and concludes with a section on the importance of integrating these frameworks into policy. The authors argue that making a DBIR infrastructure visible helps to promote a collaborative culture with shared processes and responsibilities, rather than placing the onus for change solely on individuals, as well as establishes a collaborative culture with shared processes that facilitate “successful failures” and proof-of-concept trials.

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improvements, and attention to these infrastructural needs can lead to sustained improvements and support their evolution over time.

*DBIR Researchers act as intermediaries between research and practice.* A DBIR infrastructure can be conceived as a space between practice on one hand and policy on the other. This middle ground acts as a problem solving space distinct from—but informed by and mediating among—the practices and evidence standards of researchers, the models and exigencies of practitioners, and the ideological and political dimensions of policymakers.

*Conceptual frameworks delineate infrastructure components:* To achieve scale, designers need to take into account activities along the following dimensions: *Depth, Sustainability, Spread, Shift (in Ownership), and Evolution*. The dimensions are interrelated in complex ways and do not describe a linear progression through phases.

*Information technologies are crucial in supporting and creating infrastructure.* An effective infrastructure shifts the onus of change from individuals to institutions. This increasingly requires appropriate and pervasive information technologies to enable routines difficult to achieve otherwise. It is important that the DBIR collaboration includes organizational staff that can work through the differing requirements of accountability, efficiency, democratizing access, and the technological and instruction-related aspects of the infrastructure. In addition, Web 2.0 media can contribute capabilities for communal bookmarking, photo/video sharing, social networking, wikis, and mashups that could become powerful capabilities for research and collaboration, and could cultivate shared wisdom. The particular type of wisdom called for in DBIR has at least five dimensions: Cognitive, Practical-experiential, Inter-personal, Ethical, and Meta-cognitive.

*Feedback and timescales play important roles in achieving DBIR goals.* We know that what does and does not happen in schools depends on how the different elements of schooling— instruction, materials, policies, assessment—interact with each other, often at different timescales. Aligning the “components of practice” is not enough to attend to the integrated “messiness” of schooling and of students’ worlds outside of school, which are fundamental to each student’s choices and achievement. The education system is more than formal education; it includes external stakeholders, including parents and policymakers, and the media – all of which contribute stereotypes and expectations as a critical background. Feedback loops are a characteristic of systems, and drive either adaptation (when reinforcing) or resistance (when not) to change. The authors argue that the difference between change and sustained improvement often reflects the unnoticed feedback loops that work outside the education system and at different timescales; these can result in policy resistance.

*Looking outside the formal education system is important.* By focusing primarily on either the formal or informal system, education research has not taken advantage of the methods used by other disciplines to understand the adaptive behavior of multifaceted, complex enterprises. Tools for embedding the DBIR process as part of a sustainable infrastructure can be found in the field of policy informatics; they highlight the importance of empowering *local* groups to manage the changes proposed, as well as the role that intermediaries (spaces, organizations) play in supporting the process.

*Conclusion: How to Support Sustainable DBIR Research Collaborations.* DBIR has two parallel goals: contribute to knowledge and enhance the likelihood of sustainable improvements in practice. Thus, financial support of sufficient length and level for both researchers and implementers must be provided. Research should support more exploratory work than in

traditional scaling-up projects, because of the need to be in local contexts long enough for collaborations to build trust and achieve structural changes. Methodological challenges posed by educational change limit our ability to understand and build upon knowledge from successes and failures; these must be reduced.

Time and effort for setting up research collaborations between researchers, and between researchers and practitioners is subject to long timelines for generating useable knowledge and testing it in practice. The timescales can be of the order of a decade, so levels of support should make it possible for senior researchers and senior education administrators to develop common questions, evolve new methodologies, and promise sustained conversations.

Knowledge of “what” is needed is not enough; we need to generate knowledge and models of “how” (theories of action) and tools for stakeholders to use that can lead to practical action, reflection, and revisions. In this process, conceptual models of infrastructure, supportive policies, and funding strategies play a vital role.