Infrastructuring As a Practice for Promoting Transformation and Equity in Design-Based Implementation Research

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How can we support the equitable transformation of educational systems through design research?
## Design-Based Implementation Research (DBIR)

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Infrastructuring

Organizing Conditions for Social Innovation

• Focus on cultivating long-term partnerships with diverse individuals and groups
• Matching people and resources to stakeholders and their agendas
Infrastructuring

Organizing Conditions for Social Innovation
- Focus on cultivating long-term partnerships with diverse individuals and groups
- Matching people and resources to stakeholders and their agendas

Ongoing Re-Design of Infrastructures
- Learning from and planning for how organizational structures and processes will influence use of innovations
- Defining design as continuous with implementation: “patchwork” support design
## Essential Layers of Theory

### Supports for Learning
- Vision of high quality teaching and learning
- Materials
- Technology tools
- Participant structures
- Forms of talk

### Supports for Implementation
- Teacher and leader learning
- Organizational routines
- Policies
- Technology systems
- External patterns
## Essential Layers of Theory

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*Vision of high quality teaching and learning, Materials, Technology tools, Participant structures, Forms of talk, Teacher and leader learning, Organizational routines, Policies, Technology systems, External patterns*
Developing Theory

• Instructional Guidance Infrastructure (Hopkins & Spillane, in press)
  – standards, curriculum, and assessments and their relations to one another
  – strongly influence teachers’ decisions to implement new materials

• What we hope to learn through design
  – What can design networks do to change IGIs to support equitable implementation of new curriculum materials?
  – What are limits of what networks can do?
What is the Inquiry Hub?

• A set of projects funded by the National Science Foundation & Moore Foundation.
  – To design and study digital curriculum materials that can help teachers implement new standards.
What is the Inquiry Hub?

• A long-term partnership of Denver Public Schools, UCAR, CU Boulder, and BSCS
  – We work on district challenges together, applying what we know from research to develop solutions collaboratively.
How We Are Organized

• Multiple design teams, each responsible for a sequence of lessons
• Teams are linked by a coherent “storyline” used to structure project-based units
• External partners provide both feedback and input on units (scientists, Denver Parks and Recreation)
Organizing Conditions for Social Innovation: *Building Capacity*
Organizing Conditions for Social Innovation: *Safety for Teachers*

- Creating space in agendas for raising concerns related to district requirements
- Adjusting lesson templates to reflect principals’ requirements
- Under-designing (Fischer) lessons to authorize modification after design
- Protecting from negative evaluations from observations
What We Have Learned

• What can design networks do to change IGIs to support equitable implementation of new curriculum materials?
  – Support trust building between district leaders and teachers by surfacing *and* addressing concerns
  – Create digital materials that can be easily adapted by teachers for their school context and students

• What are the limits of what networks can do?
  – Many infrastructural components cannot be modified; networks must adjust designs, conform to them, or under-design to enable implementation
“Diversions” to modify components of the instructional guidance infrastructure in the district and the design process

Focus was on expanding agency of participants in classrooms:
- Helping build a “working infrastructure” for teachers to use curricula
- Connecting to student interests and experiences
Modifying the Pacing Guide

<table>
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<tr>
<th>Unit of Study</th>
<th>Length of Unit</th>
<th>Time Frame</th>
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<tr>
<td>1: Ecosystems: Interaction and Interdependence in Living Systems</td>
<td>40 50-minute classes</td>
<td>August–Early October 2015</td>
</tr>
<tr>
<td>2: Evolution: Patterns and Products of Change in Living Systems</td>
<td>35 50-minute classes</td>
<td>Mid-October–December 2015</td>
</tr>
<tr>
<td>5: Reproduction and Inheritance in Living Systems</td>
<td>36 50-minute classes</td>
<td>April–Mid-May 2016</td>
</tr>
<tr>
<td>6: Growth, Development, and Differentiation in Living Systems</td>
<td>7 50-minute classes</td>
<td>Mid-May–June 2016</td>
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Designing Assessment Tasks

Biology Semester Final Course Assessment
2014-2015

NAME: ______________________
STUDENT ID: _____________
SCHOOL: _________________
TEACHER: ________________
PERIOD: ________________

Effort #2
Connecting to Student Interests

• Surveyed current students on potential phenomena to anchor unit on evolution:
  – What would captivate and sustain the attention of their peers?
What We Have Learned

• What can design networks do to change IGIs to support equitable implementation of new curriculum materials?
  – Infrastructure components change rapidly, and design networks must be nimble to influence them
  – Time and expertise needed to align components can come from the outside
  – Incorporating student voice into design can enhance direct connections to student interests

• What are the limits of what networks can do?
  – Some opportunities can easily be missed because of the speed with which changes are required
Potential Contributions to Theory

• On instructional guidance infrastructures’ roles in shaping teacher decision making
  – Infrastructural components offer “resistances” that circumscribe agency of design teams to address concerns
  – The resistances are encountered when the design network attempts to change components

• Elaborating the concept of infrastructuring in US educational contexts
  – What actors? Which standards? Which systems?
Learning More from DBIR

• Need for greater capacity in research field
  – Deciding on a focus for joint work that (1) addresses a problem of practice and (2) has potential for building knowledge
  – Engaging with implementation theory

• Preparing future school and district leaders for the work
  – Qualifying external research partners
  – “Seeing the system” and acting to change it (Bryk et al., 2015)
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<tr>
<td>Education Development Center</td>
<td>Interactive STEM Partnership in Auburn (ME)</td>
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<tr>
<td>University of Washington</td>
<td>Partnership for Science and Engineering Practices (WA)</td>
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<tr>
<td>University of Colorado Boulder</td>
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[http://researchandpractice.org](http://researchandpractice.org)
Research Practice Partnership Forum
A Series in Google Hangouts on Air

Getting a Partnership Started
October 15, 2015, 3pm-4pm MT