Implementing Innovative Learning Environments Using Design-Centric Research-Practice Partnerships: Citizen Science as a Context

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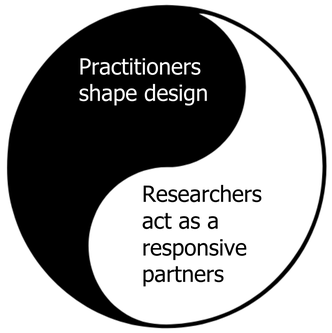
Rationale

Advancing educational change is a practical challenge for both academy and field (Coburn & Penuel, 2016). In recent years there is a growing interest in Design-Centric Research-Practice Partnerships (DC-RPPs) as a means to cope with this challenge.

DC-RPPs are mutualistic collaborations between researchers and practitioners aimed at designing and implementing new learning solutions (Coburn et al., 2013; Kali et al., 2018). However, engaging in such partnerships introduces difficulties (Penuel at al. 2015; Sannino at al., 2016):

- Intersecting Communities of Practice
- Different ideas, perspectives and practices
- Varied commitment towards forming a change

What strategies can support productive DC-RPPs?



The exploration of strategies that support productive DC-RPPs is still in its infancy (Akkerman & Bruining, 2016; Mckenney, 2016; Kali et al., 2018)..

Methodology

Design-based implementation research (DBiR): a methodology that uses iterational interventions to improve design as well as test theoretical conjectures (Kali & Hoadley, in press).

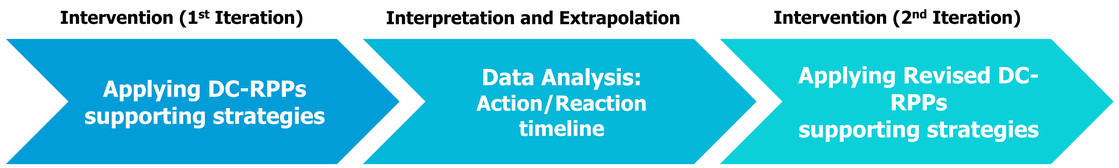
Action/reaction timeline: a data analysis methodology in which practitioners' and researchers' learning is interpreted as action-reaction progressive developments (Kali et al., in press).

Research Description

Three DC-RPPs were established in three different schools. The DC-RPPs' main objective:

Develop and implement a CS-based learning environment, involving students in data collection and analysis of a scientist-led research.

	1st Iteration (School A)	2nd Iteration (Schools B, C)	
Scientific research	Identifying jellyfish distribution patterns	Monitoring mammal populations using footprints	
No. of teachers	4	3	2
Students' grade	4th and 5th (~60 students)	4th grade (~70)	9th grade (~60)



Research Goal and Theoretical Lenses

Research Goal

To expand the theoretical and practical knowledge of strategies that can support productive DC-RPPs, in the context of Citizen Science (CS) based innovative learning environments.

Theoretical Lenses

Integrating theoretical lenses:
Strategies that have been explored in the context of DC-RPPs, along with unexplored ones.

Has been Explored	Integrated strategies to support DC-RPPs	New
Boundary Crossing (Akkerman & Bakker, 2011; Akkerman & Bruining, 2016) a sociocultural theory that describes how boundaries can facilitate learning between communities	❑ Developing personal mastery ❑ Encouraging team learning ❑ Working in multiple organizational levels ❑ Nurturing the role of a boundary crosser ❑ Applying boundary objects	**Organizational Learning** (Senge, 1990) An organizational theory that concerns with becoming a learning organization

Preliminary Findings

Strategies to support DC-RPPs	1st Iteration: Examples for Findings	Insights	2nd Iteration: Examples for Revised Strategies
Developing personal mastery	**Action**: teachers experience difficulties and hesitations adjusting to new teaching practices and ideas **Reaction**: research-team adds scaffolds by offering several pre-designed learning materials for the practitioners	• **Gradation** in the introduction of new practices • Providing **scaffolding** as a basis for co-design	• Providing **pre-built learning modules** to the teachers while assessing the **suitable level of innovation** • Setting the **DC-RPP as a sandbox** for experimenting with new practices and tools for both teachers and researchers
Applying boundary objects	**Action:** a lack in teachers' responsiveness and in collaborative working habits **Reaction**: research-team creates a DC-RPP online messaging group while encouraging collaborative discourse	• Using online **collaborative tools** from start, to make it a partnership norm • Encouraging **an open and transparent** relationship between all partners	• Creating multiple online messaging groups and a joint online folder with the DC-RPPs artifacts for **collaborative use** along the process • Researchers taking a **proactive communicating** role while encouraging others to do so as well