Advancing education through innovation in teaching, learning and leadership, the Friday Institute (FI) brings together students, teachers, researchers, policy-makers, educational professionals, and other community members to foster collaborations in improving education.
Friday Institute Evaluation Team

Staff: 2 Leads, 10 Researchers, 4 GRAs, 2 CED Faculty

Projects: ~22 (...if RttT counts as 1)

Awards: Current $6.5M; Proposals $1.7M
Friday Institute Evaluation Team

Conducts large-scale research and evaluation studies of innovations in school, districts, and community college settings that inform state and local decisions about educational policies, programs, and funding.
GOAL: Improve STEM education by implementing hands-on citizen science – “real science” in middle school classrooms

NSF-funded Math Science Partnership (MSP) study (Award #1319293)
Citizen Science
Citizen science is science in which the public, be they 8 or 80, engages in the process of doing science, science that contributes to our collective body of knowledge and is both novel and can be built upon.
Students Discover Partners

- NC State University
- North Carolina Museum of Natural Sciences
- Durham Public Schools
- Madison County Public Schools
- Pitt County Schools
- Pender County Schools
- Alamance-Burlington School System
- Duplin County Schools
- Wake County Public School System
- Kenan Fellows Program
- The William & Ida Friday Institute for Educational Innovation
- Your Wild Life
- The Science House
One of the great challenges of educational improvement is the difficulty of scaling-up locally successful innovations to a wide variety of settings while maintaining effectiveness, affordability, and sustainability (Dede, 2005).
Students Discover Scale Research Team

• **Purpose**: Examine the process for moving the citizen science curriculum innovation (process/product) from the more ideal settings of original implementation to a variety settings where conditions for success may be less favorable.

• **Role**: Embedded researchers constantly probing about modifications to the innovation to improve scalability across contexts.
You have a proven innovation that you want to scale... How can you ensure that it will be effective on a large scale? This table outlines the process of scaling up an innovation, from identifying key dimensions of scale to overcoming potential traps.

### Dimensions of Scale
- **Depth**
  - Getting to scale produces deep and consequential changes in practice.
  - Requires evaluation and research to understand and enhance the causes of effectiveness.

- **Sustainability**
  - Sustaining scaled growth means maintaining these changes in practice over substantial periods of time.
  - Requires robust design to enable adapting to negative shifts in context.

- **Spread**
  - Scaling up is achieved by diffusion of the innovation to large numbers of users.
  - Requires modifications to retain effectiveness while reducing the resources and expertise required.

- **Shift**
  - Ownership of the innovation is assumed by users, who deepen and sustain the innovation via adaptation.
  - Requires moving beyond “brand” to support users as co-evaluators, co-designers, and co-scalers.

- **Evolution**
  - The innovation as revised by its adapters is influential in reshaping the thinking of its designers.
  - Requires learning from users’ adaptations about how to rethink the innovation’s model.

### Sources of Leverage
Each dimension provides leverage for the scaling process by evolving the intervention to increase its power, durability, applicability, and flexibility.

### Evaluation and Research
- **Robust Design**
  - How can the innovation be modified so that it functions in various types of inhospitable conditions?
  - How typical is each condition for success in the target population of users?
  - How can developers support varied users while evolving toward conditions for success that enable full effectiveness?

### Reducing Resources and Expertise
- **Moving Beyond Brand**
  - How can developers support users going beyond what the originators have accomplished?
  - How can developers build users’ capacity as co-evaluators, co-designers, and co-scalers?
  - How can users form a “community of practice” that helps answer questions about scale?

### Traps to Avoid
- **Trap of Perfection**
  - Developers should not seek an unsustainable goal of perfection at the cost of deflecting resources from other dimensions of scale.
  - The goal should not be the enemy of the good.

- **Trap of Mutation**
  - Developers should ensure that the modifications they make to the innovation do not compromise its effectiveness.
  - The goal should not be the enemy of the good.

- **Trap of Optimality**
  - Developers should not attempt to control the original innovation in ways that deter adaptation and further innovation by users.
  - The goal should not be the enemy of the good.

- **Trap of Unlearning**
  - Developers’ unwillingness to take a fresh look can prevent genuine evolution.

Source: Adapted from work by Michael Fullan and Co-operative Education, Collaborative "Scaling Up What Works: Moving Beyond a Focus on "Team and Learning Change" (edutopia) (2006).
Scale Research Components

Identify the Innovation
- The Process
- The Product

Utilize DBIR Approach
- Interviews
- Observations
- Surveys
- Evidence of Impact
- Network Analysis

Facilitate Scale Support Activities
- Scale Workshops
- Leadership Meetings
- Formative Research Memos
- Network Mapping Work Sessions
Students Discover Logic Model

Overall System
Initial Findings

Several *challenges* impacted the health of the overall system:

- sporadic and inconsistent communication among project partners
- lack of clarity on partner roles
- competing definitions of “citizen science”
- differing conceptualizations of “scale”
- tensions between partner priorities
Subsystem 1: Teachers and Scientists

1. KFs, museum educators, & scientists create authentic, citizen science projects
2. KF teachers implement authentic, citizen science projects in their classrooms
3. Partners design PD for implementing authentic, citizen science projects
4. THS and KF train non-KFs, summer program teachers on authentic, citizen science projects
5. Non-KFs, summer program teachers implement authentic, citizen science projects in their classrooms
6. Partners, teachers, students participate in Online Community of Practice authentic, citizen science projects
7. Class
7a. Guide student research
8. Students
8a. Increased in 5
8b. Increased in real projects
Subsystem 1: Initial Findings

Several *challenges* impacted the health of the Teacher-Scientist System

- lack of existing citizen science projects from which curriculum modules could be developed
- no outward facing data submission mechanisms
- temporary nature of the postdoctoral scientist position
- misalignment between the research areas and middle school curriculum standards
- lack of administrative support at the school and district
Subsystem 2: Professional development providers-teachers

1. KFs, museum educators, & scientists create authentic, citizen science projects
2. KF teachers implement authentic, citizen science projects in their classrooms
3. Partners design PD for implementing authentic, citizen science projects
4. THS and KF train non-KFs, summer program teachers on authentic, citizen science projects
5. Non-KFs, summer program teachers implement authentic, citizen science projects in their classrooms
6. Partners, teachers, students participate in Online Community of Practice authentic, citizen science projects

 subsystem 2
Subsystem 2: Initial Findings

Several *challenges* impacted the health of the Teachers-Professional Development Providers System

- communication or coordination between teams
- postdoctoral scientist leaving
- provide professional development for citizen science projects that were ending
Lessons Learned

- **Resonates** with educators and policymakers
- Identifying *the innovation* can be difficult
- Educational innovations need to be studied in **nested learning contexts** with focus on forming district partnerships
- Works well with a **design-based implementation** approach
- Mixed methods with **qualitative** emphasis
- Annual scale workshops that do a deep dive on a single dimension (depth then sustainability then spread then shift then evolution)
Questions/Comments

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