The Five Dimensions for Attaining Scale: Implications for Higher Education Initiatives

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Overview

- Defining “Scaling Up” and Its Challenges
- A Framework to Aid Designing for Scale
- Implications for Higher Education Initiatives

Scaling Up Products

- Adapting an innovation successful in some local setting to effective usage in a wide range of contexts
  - Fast food as example
- Need not be one-size-fits-all;d can be personalized
  - Apps as illustration
- Technology as a lever for scale

1976

2013

The Spectrum of Web 2.0 Media

- ***Sharing***
  - **Social bookmarking**
  - **Photo–video-data sharing**
  - **Social networking**
  - **Writers' workshops and fan fiction**
- ***Thinking***
  - **Blogs**
  - **Podcasts**
  - **Online discussion forums**
  - **Twitter**
- ***Co-Creating***
  - **Wikis–collaborative file creation**
  - **Mashups–collective media creation**
  - **Collaborative social-change communities**

Knowledge Diffusion (Rogers)

- Compatibility
- Simplicity
- Trialability
- Observability
- Opinion leadership

Not Proof of Effectiveness

Scaling Up in Education

- In contrast to experiences in other sectors of society, *successfully* scaling up successful programs has proved very difficult in education
- The more complex the innovation and the greater the influence of setting, the more likely a new practice is to fail crossing the "chasm" from its original setting to other sites
  - Avoiding the "replica trap": the erroneous strategy of trying to repeat everywhere what worked locally, without considering challenges of size and contextual variations in needs/resources
    - Problems of magnitude
    - Problems of variation -- not adoption, but adaptation

Scale is a Difficult Problem

- Scaling to each site requires *adaptation* to local context and culture
  - "Tower of Babel" as a symptom of deeper confusion
- What scales is not an innovation, but *a model* of an innovation
  - Similar to, but different from a franchise

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Sources of Leverage for Scaling

- *Depth:* evaluation and research to understand and enhance causes of effectiveness
- *Sustainability:* robust-design to enable adapting to negative shifts in context
- *Spread:* modifying to retain effectiveness while reducing resources and expertise required
- *Shift:* moving beyond "brand" to support users as co-evaluators, co-designers, and co-scalers
- *Evolution:* learning from users' adaptations about how to rethink the innovation's model

Exploring the Process of Scaling Up

What are the steps—and traps—in moving from innovation to broad-based adoption and consequential change?

Dimensions of Scale	Depth	Sustainability	Spread	Shift	Evolution
Taking an educational innovation completely to scale involves five dimensions that reflect different aspects of making an intervention effective in one setting useful across a wide spectrum of contexts.	Getting to scale produces deep and consequential changes in practice. Requires evaluation and research to understand and enhance the causes of effectiveness.	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.	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.	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.	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** What are the sources of the innovation's effectiveness? What conditions does each source depend on for success? How sensitive is each source to these conditions? How consistent is the innovation with the current political and cultural context of educational improvement?	**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** How much is the overall power of the innovation affected by reducing its cost or the knowledge required to implement it? How much power is retained in a light version that requires fewer resources or less expertise of its users? How can developers support light users to achieve full effectiveness?	**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?	**Rethinking the Model** How can developers unlearn their initial beliefs, values, and assumptions about the innovation, and generate willingness to start the innovation process over again? How can developers facilitate reconceptualization and discontinuous evolution? How can developers form a "community of reflective redesign" with other innovators?
Traps to Avoid Evolving along each dimension requires the developers of the innovation to overcome traps that have both cognitive and affective aspects.	**Trap of Perfection** Developers should not seek an unattainable goal of perfection at the cost of deflecting resources from other dimensions of scale. (The great should not be the enemy of the good.)	**Trap of Mutation** Developers should ensure that the ways they modify the innovation to adapt to various inhospitable contexts do not undercut its core conditions for success.	**Trap of Optimality** Developers should realize a somewhat less powerful innovation that reaches much greater numbers of users is a step forward.	**Trap of Origination** Developers should not attempt to control the original innovation in ways that deter adaptation and further innovation by users.	**Trap of Unlearning** Developers' unwillingness to take a fresh look can prevent genuine evolution.

Source: Christopher Dede, Harvard University Graduate School of Education; Cynthia Coburn, "Rethinking Scale: Moving Beyond Numbers to Deep and Lasting Change," *Educational Researcher* (2003).

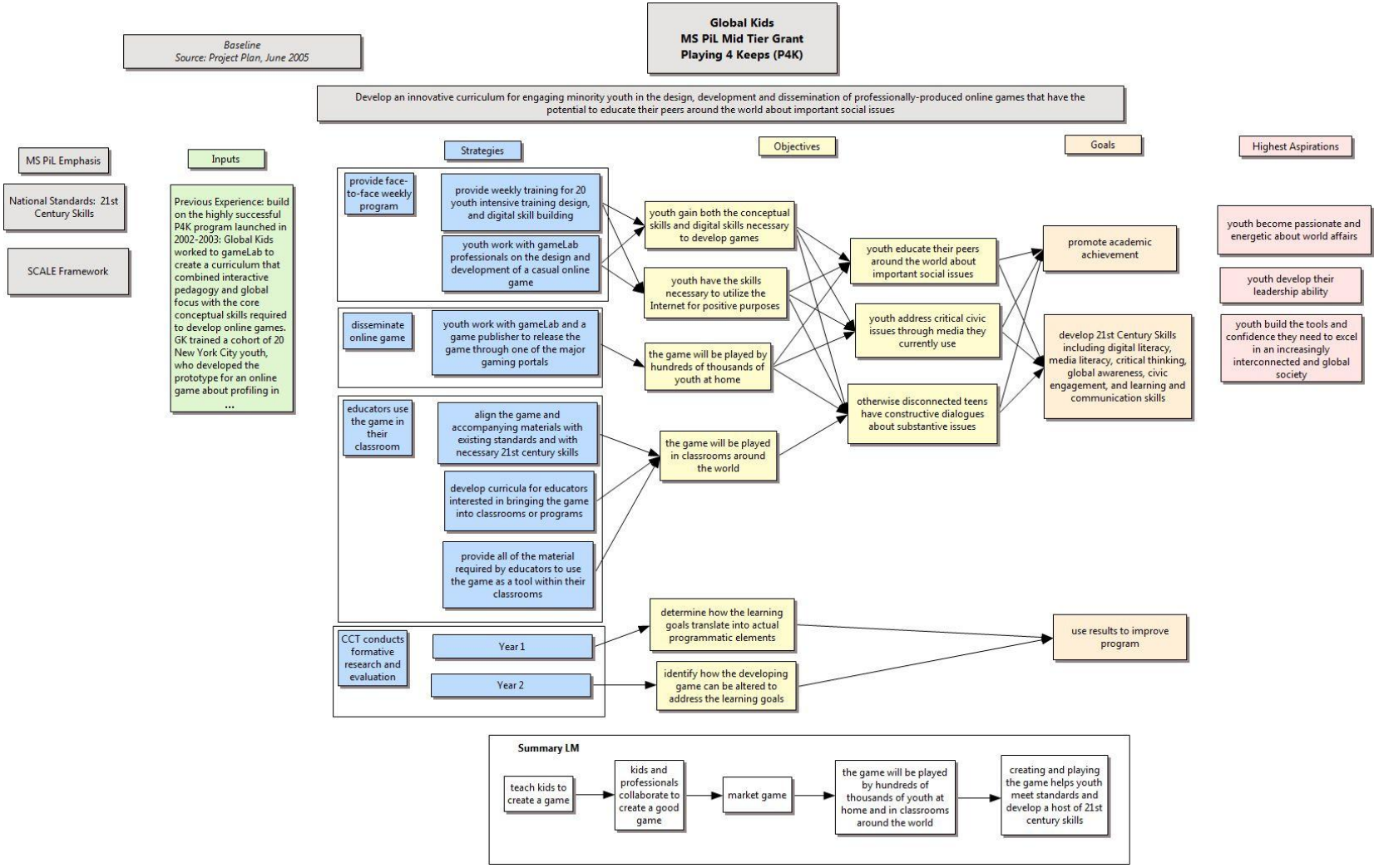
Illustration by Patrick Corrigan

Depth Dimension of Scale

- How effective is the innovation?
- What are the sources of the innovation's effectiveness?
  - On what conditions for success does each source depend?
  - How sensitive is each source to attenuation or absence of a particular condition for success?

Trap of Perfection

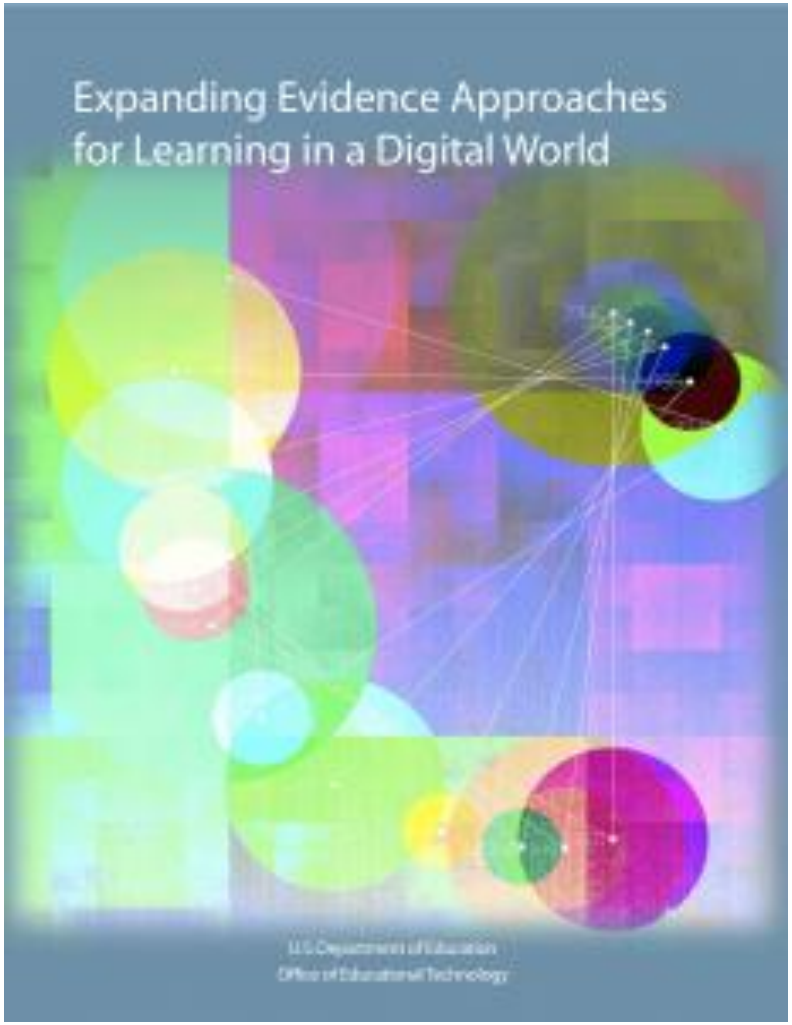
P4K Baseline Logic Model



"Success Metrics" Provide *Depth*

- Other Institutions View Program as Model
  - The more defined the depth, the easier it is for an institution to determine where this innovation fits in its priorities
  - The greater the depth, the more desirable
  - The more the reasons for depth are articulated, the more clear whether the adapting institution has the conditions for success

US Department of Education (2013)



Sustainability Dimension of Scale

- How can the innovation be modified so that it functions in various types of inhospitable conditions?
  - How typical is each condition for success in my target population of users?
  - How can I support “hybrid” users in evolving towards conditions for success that enable full effectiveness?

    Trap of Mutation – Don’t Want to Lose Depth

Sustainability Dimension of Scale

- Examples from Templates for Effective Practice
  - Participating institutions in Kankakee CC college and career readiness initiative: *tone of alignment work must be collaborative, not one-sided*
  - SIUC streamlining degree programs: *campus course articulation and course equivalencies*
  - UIS concurrent enrollment model: *double safety net of learning center, tutoring, library, advisement resources*

Spread Dimension of Scale

- How can I modify the innovation to retain effectiveness while reducing resources and expertise required?
- How much is the overall power of the innovation affected by reducing its cost or the knowledge required to implement?
  - How much power is retained in a “light” version of the innovation that requires fewer resources or less expertise of its users?
  - How can I support “light” users to evolve towards sufficient resources and expertise to achieve full effectiveness?

Trap of Scaling the Project, Not the Model

Knowledge Diffusion (Rogers)

- Compatibility
- Simplicity
- Trialability
- Observability
- Opinion leadership

Proof of Effectiveness
Transformation

Spread Dimension of Scale

- Examples from Templates for Effective Practice
  - Larry Abele degree maps: *If possible, don't have faculty do these*
  - City Colleges of Chicago Level UP Summer program: *Have support staff to handle administrative tasks (student applications, gathering of pre and post test scores, etc.)*
  - UIC transitional mathematics instruction: *Students accept a challenge if they are provided the tools to succeed*

Shift Dimension of Scale

- How can I move beyond “brand” to support users as co-evaluators, co-designers, and co-scalers?
- How can I support users going beyond what the originators have accomplished?
  - How can I build users’ capacity as co-evaluators? As co-designers? As co-scalers?
  - How can users form a “community of practice” that helps answer questions about scale?

Trap of Origination

Shift Dimension of Scale

- Examples from Templates for Effective Practice
  - Transitional mathematics instruction at UIC: *the pace of instruction is determined by the students*
  - Kankakee CC first year college experience course: *Instructors may use any reasonable, practical, and effective methodology they choose to teach and assess the course*
  - SIUC streamlining degree programs: *creative course integration within accreditation programs*

Evolution Dimension of Scale

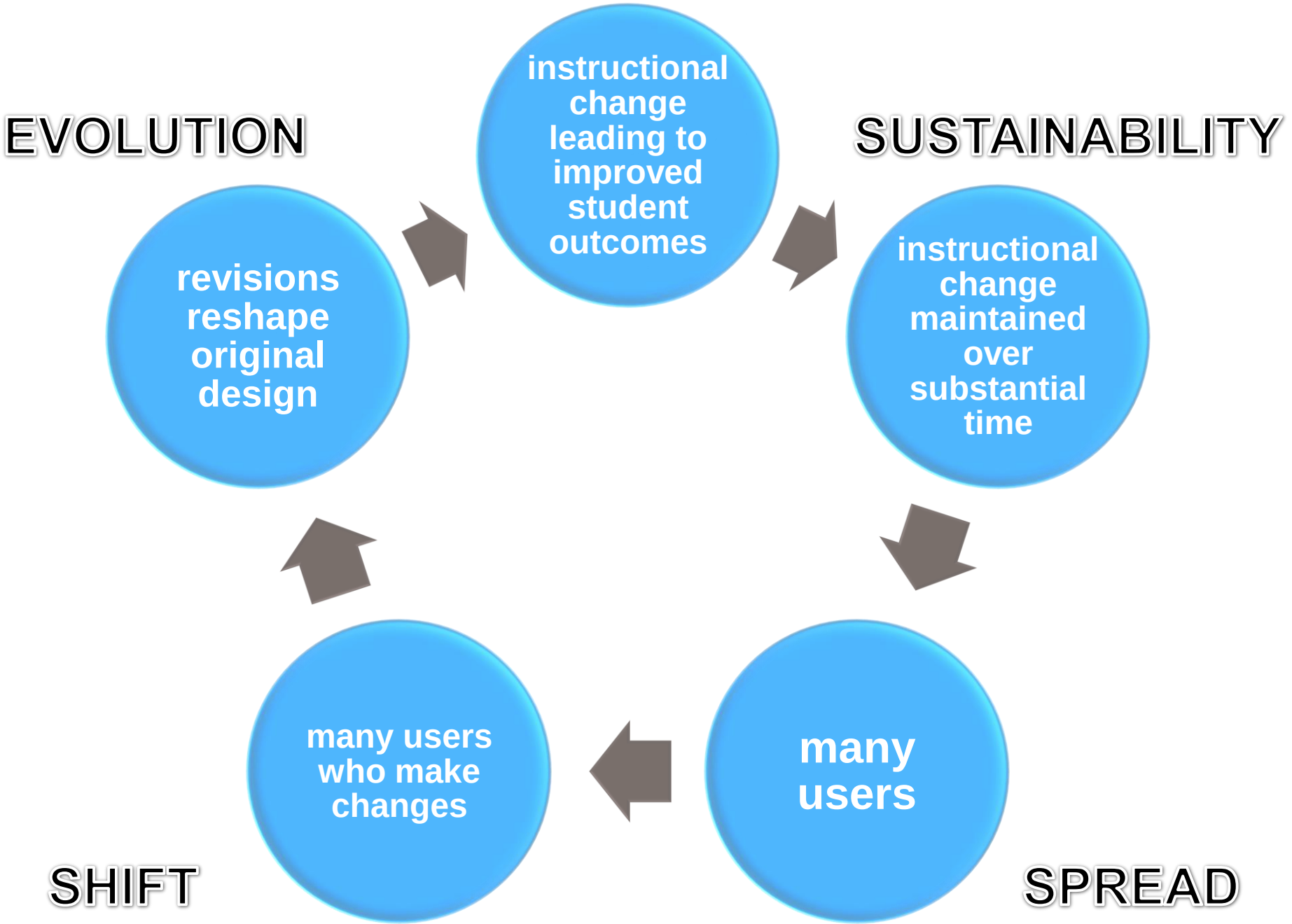
- How can I unlearn my beliefs, values, and assumptions about the innovation?
  - How willing am I to start the innovation process over again?
  - How can I “make the familiar strange” to facilitate reconceptualization and discontinuous evolution?
  - How can I form a “community of reflective redesign” with other innovators?

Trap of Unlearning

“Lessons Learned” Provide *Evolution*

- Other institutions’ adaptations of initial program are next-generation models
- A Community of Practice develops around implementing this ecology of models
  - Spectrum of Dual Credit Programs is an illustration of evolution

DEPTH


EVOLUTION
SUSTAINABILITY
instructional change leading to improved student outcomes
instructional change maintained over substantial time
revisions reshape original design
many users
many users who make changes
SHIFT
SPREAD

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Planning for Scale

What are your goals in scaling up your model (internally and externally)? To whom do you hope to scale? Describe what "scale success" would look like.

What actions might you take to DEEPEN the power of your model?

What actions might you take to make your model SUSTAINABLE?

What actions might you take to SPREAD your model?

What actions might you take to facilitate SHIFT and EVOLUTION of your model?

Where are you strongest on these dimensions? Weakest?

Implications for HE Initiatives

- Evolve current thinking about scale
- Think about adaptation and "light" versions
- Use technology as a scaling mechanism
- Share strategies with each other
- Think outside the box

Heuristics for HE Initiatives

1. Examine your project model to identify threats that might prevent going to scale.
2. Determine what proportion of your resources to allocate to depth, sustainability, and spread
3. Monitor adaptations and work to foster shift and evolution.

Organic Scaling “like a Weed”

Common Challenges/Concerns

- Tension between fidelity and necessary adaptation
- Impact of adaptations and diverse contexts on learner outcomes
- Effectively using formative data to intervene/correct course
- Facilitating transfer of “ownership” of the innovation & sustaining momentum/growth

The High-End Model

Classrooms + "Situated" Learning + Community

Issues with:

- Scalability
- Affordability
- Access

The Promise of Online (or Blended) Education

If effective (retention, mastery), potential capabilities:

- Serves a broad range of learners; greater diversity than co-located students
- More opportunities for social capital and for links to workplace and life
- Self-improving via research and continual feedback

Possibly ***Massive***

National Science Foundation (2013)

Advances in technology and in knowledge about expertise, learning, and assessment have the potential to reshape the many forms of education and training past matriculation from high school.

Massive: Reduced Cost with Large Group of Learners

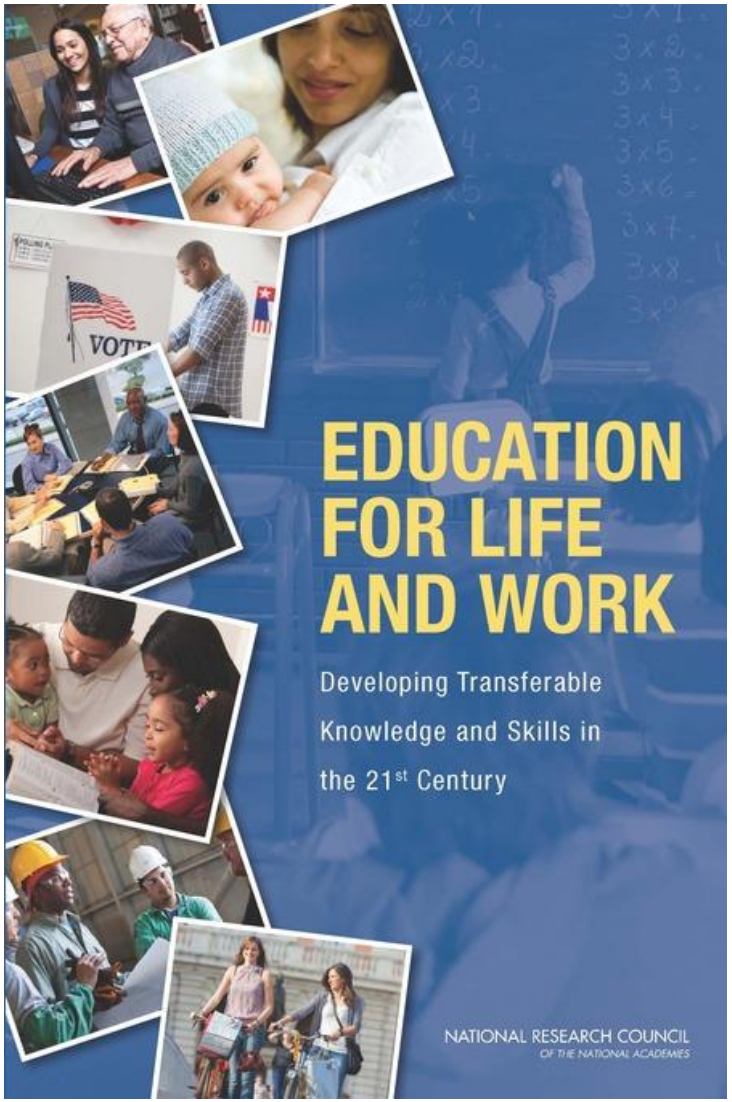
- Reduced instructional presence
  - Adaptive materials *limited* to certain types of subjects and instructional goals
- Sufficient social reinforcement to aid retention
- Sufficient peer contribution to increase mastery
- Sufficient situated learning to inculcate expertise

Limits of Tutoring System Model

- Effective for subjects based on procedural skills (e.g., mathematics, grammar, vocabulary, computer programming)
- Does not work for parts of the curriculum that are not reducible to algorithmic recipes (e.g., reading comprehension, creative writing, design, inquiry, collaboration, leadership)

National Research Council (2012)

Today's children can meet future challenges if their schooling and informal learning activities prepare them for adult roles as citizens, employees, managers, parents, volunteers, and entrepreneurs.




COGNITIVE
analysis
decision-making
critical thinking
adaptive learning
executive function
reasoning/argumentation
problem solving
active listening
interpretation
communication
innovation
information and communications technology (ict) literacy
creativity
INTERPERSONAL
social influence with others
responsibility
assertive communication
leadership
empathy/perspective-taking
trust
interpersonal competencies
self presentation
coordination
conflict resolution
service orientation
negotiation
collaboration
cooperation
teamwork
INTRAPERSONAL
adaptability
integrity
appreciation for diversity
intellectual interest and curiosity
self-monitoring
continuous learning
artistic and cultural appreciation
initiative
self-evaluation
productivity
professionalism/ethics
flexibility
metacognition
physical and psychological health
self direction
citizenship
grit
work ethic/conscientiousness
self-reinforcement
responsibility
perseverance
career orientation

Dimensions of Advanced Knowledge and Skills

Cognitive Outcomes	*Intrapersonal Outcomes*	*Interpersonal Outcomes*
Cognitive processes and strategies	Intellectual Openness	Teamwork and Collaboration
Knowledge	Work Ethic and Conscientiousness	Leadership
Creativity	Positive Core Self-Evaluation	Communication
Critical Thinking	Metacognition	Responsibility
Information Literacy	Flexibility	Conflict Resolution
Reasoning	Initiative	
Innovation	Appreciation of Diversity	

Program Logic Models: Kellogg

The program logic model is defined as a picture of how your organization does its work – the theory and assumptions underlying the program. A program logic model links outcomes (short- and long-term) with program activities/processes and the theoretical assumptions/principles of the program.

Flow of Logic Model

Resources/Inputs →

Activities →

Outputs →

Outcomes →

Impact →

If/Then

Vision

Leadership

Home and Community Beliefs

Home and Community Resources

Physical and Technical Infrastructure

Support Personnel

Professional Development

Intended Curriculum & Instructional Model

Policies and Standards

School Leadership

Principal Beliefs

School Culture

Principal Preparedness

Teacher Beliefs

Teacher Preparedness

Classroom Resources

Students

Enacted Curriculum

Dwyer, Russell, Bebell (2003) Elementary Teachers' Use of Technology

http://www.bc.edu/research/intasc/PDF/ElmTeachUseTech.pdf

Dissemination by Fidelity of Implementation

Fidelity is Defenestrated

Mechanistic Models are Brittle

HYPOTHETICAL CASE: WITHIN DISTRICT SCALE

Context
Large urban school district with 11 high schools

Scale what?
Four years ago, a high school English teacher in one of the eleven high schools found that students' ability to write continued to be on the decline, so each week she started requiring all students to read a novel, write a three page essay about the novel, and write a news article. She also required them to write in their journals daily. In response, the teacher made the commitment to her students that she would return their work to them within two days. The teacher ended up calling her approach "The English Edge."

Over time, the Superintendent and the school board noticed a trend in this teacher's students the SAT scores. All the students who had had The English Edge scored better on the writing tests.

The Superintendent publicly announced that all high school English teachers (approximately 100 teachers) would now use The English Edge.

You are on the scale design team to make this happen within the next 12 months.

Approximate Budget
$50,000

- **Is this model scalable? Why or why not?**
- **How could a variant of this model be made scalable?**

Jenkins' Framework for New Literacies

- ***Play* — Experimenting with one's surroundings in problem solving**
- ***Performance* — Adopting alternative identities for improvisation and discovery**
- ***Simulation* — Interpreting and constructing dynamic models of real-world processes**
- ***Appropriation* — The ability to meaningfully sample and remix media content**
- ***Multitasking* — Scanning one's environment and focusing on salient details**
- ***Distributed cognition* — Fluently using tools that expand mental capacities**
- ***Collective intelligence* — Pooling knowledge with others toward a common goal**
- ***Judgment* — Evaluating the reliability and credibility of different information sources**
- ***Transmedia navigation* — The ability to follow the flow of stories and information across multiple modalities**
- ***Networking* — The ability to search for, synthesize, and disseminate information**
- ***Negotiation* — The ability to travel across communities, respecting multiple perspectives, and following alternative norms**