Thematic Working Group #9:

Supporting Sustainability and Scalability

in Educational Technology Initiatives:

Research Informed Practice

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Purpose

Aims of the TWG9 Working group on *Supporting Sustainability and Scalability in Educational Technology Initiatives: Research Informed Practice* were to (a) develop a better understanding of what we mean by sustainability and scalability in the context of educational technology initiatives; (b) establish a foundation for research approaches that would apply in these contexts; (c) identify challenges faced in this work; and, finally (d) provide key recommendations to researchers and policy makers for future work in this area.

The purpose of this document is to inform policymakers of the challenges related to sustaining and scaling technology innovation in education. Since digital technologies change very quickly, it is incumbent on researchers to provide insights and strategies to enable rapid and nimble scaling of effective technology use in instructional settings, and to identify key factors that support sustaining these effective practices over time. We take as given that technology plays (and will continue to play) an important role in education. Thus, it is imperative that we better understand how technological innovations in schooling can be implemented in ways that are sustainable and scalable.

In the sections below we better define the idea of sustainability and scalability, provide three key foundational guidelines and end with a set of short term and long term challenges and recommendations.

Sustainability

Sustainability relates to the degree to which an innovation implementation can be maintained over time.

Sustainability requires project design that incorporates co-design, partnerships, iterative intervention—research cycles, and attention to complex relationships among opportunities and constraints in the intended context(s). The goal of this work is to ensure that educational innovations with technology endure within these constantly

evolving context(s); and draw on active stakeholder ownership by students, parents, teachers, administrators, researchers and policy makers.

Scalability

Scalability addresses application of innovation implementations to new contexts and different levels in educational systems.

Scalability of technology innovation can be defined by two dimensions: horizontal (across contexts) and vertical (moving between levels of an educational system). Designing for scalability needs to consider implications of implementing innovations that afford vertical and/or horizontal adaptation, adoption, replication and reinvention of digital technology use in teaching and learning across educational systems. Designing for scalability requires consideration of, and work in, the cultural context to legitimize both horizontal and vertical scaling of technology integration.

Note: See Appendix A for a visual representation of our framework for thinking about sustainability and scalability of innovative practices.

Three key guidelines

Technological innovation implementation is deeply contextual; with implementation of a given innovation playing out differently in different contexts and across multiple iterations within the context. This implies that innovation implementation changes when extended across and/or within contexts. Therefore, top-down approaches that seek fidelity of innovation implementation across situations are not consistent with what we know about innovation diffusion. What is needed is a perspective that identifies the core elements of an innovation while respecting the adaptation inherent in implementation over time and across contexts. Thus:

1. There is a clear tension between adapting and promoting fidelity of innovation implementation across contexts.

The reason for strong influence of context is the high level of variability between educational systems and structures. Further, it is clear that the deepest understanding of a given educational context is held by key stakeholders who are operating at a local level. At the school level this would be school leaders, principals, teachers and students; at the district by administrators like superintendents and curriculum directors; and at the government level by policymakers like legislators and their education advisors. We also need to attend to and include industry partners. Each of these stakeholders may have different, but legitimate, perspectives on issues relating to technology innovation. This local, situated knowledge must be honored and represented when moving forward with designing, implementing and researching technology integration efforts. Thus:

2. We need strong stakeholder and researcher partnerships

When we develop such partnerships, which bring stakeholders and researchers together to collectively study and understand educational innovations and their impact, we will be able to:

3. Develop evidence-driven approaches to scalable and sustainable innovation design.

Challenges and Recommendations

Given this broader context and guidelines, the team worked together to identify a series of challenges and provide short- and long-term recommendations.

Challenge 1: Establish productive partnerships among all stakeholders to advance capacity building for ICT use in schools.

Short Term Recommendations

- Co-design research with real commitment and ownership from stakeholders at all levels
- Develop and model strategies and procedures for developing productive partnerships

Long Term Recommendations

- Develop feedback loops to inform the process and maintain innovations
- Help stakeholders at all levels better understand the value of research (this requires building active communication strategies into the process)
- Develop iterative cycles of research that include multiple stakeholders and attention to context

Challenge 2: Identify research approaches that are sustainable and scalable and/or that support sustainability and scalability.

Short Term Recommendations

- Provide opportunities and support for scholars to synthesize research that address technology integration efforts that have been successfully scaled and sustained.
- Provide opportunities and support for scholars to develop literature review across multiple studies that have been successfully scaled and sustained to identify patterns and principles.

Long Term Recommendation

- Build a comprehensive body of knowledge scalable and sustainable research designs and findings to inform decision-making and policy.
- Build on and adapt technology integration and research designs that have successfully scaled and sustained

Challenge 3: Scale technology integration based on impact found in research literature rather than isolated politically-driven policy initiatives.

Short Term Recommendations
- Use research to deconstruct fads and communicate appropriate research findings to stakeholders;
- Develop a team that can respond quickly to policy initiatives on the basis of accumulated research results.

Long Term Recommendation
- Actively involve policymakers and industry partners early and throughout the process.

Appendix A

Seeing Innovation, Scalability and Sustainability

Innovations get richer, more nuanced, complex as they become embedded in contexts over time. At the same time, as innovations spread into other contexts, mutate and they change to meet new needs and contextual demands. How do we think about scalability and sustainability of educational innovations, in particular with respect to fidelity and variability?
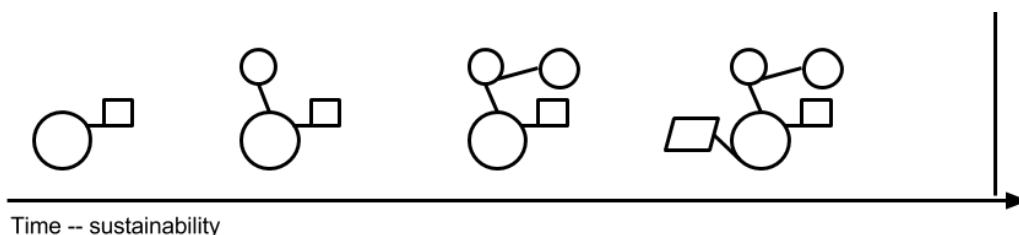

Time -- sustainability

Figure 1. Sustainability of an innovation showing how it gets richer and nuanced over time.

These shifts and changes are illustrated above (see Figure 1). On the horizontal, we have time (left to right) where the innovation becomes richer and more embedded in a specific context. This represents sustainability, indicating greater embeddedness of an innovation in a context, that continues to grow and sustain over time.

The vertical axis appears when we look to the idea of scalability, namely when the innovation spreads into other contexts.
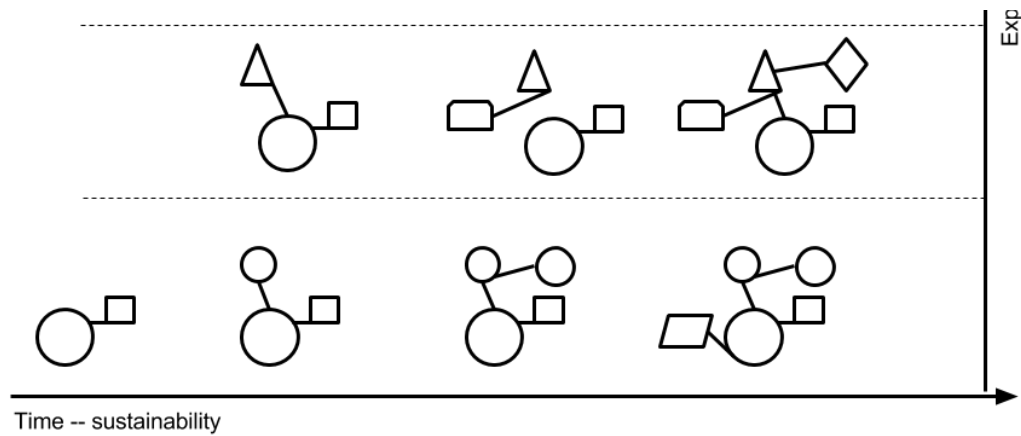

Figure 2: The innovation spreads into a new context – and grows and mutates over time.

Scalability is represented in Figure 2, in a vertical shift. We can see the original innovation on the far left, in the bottom row. The second row illustrates its application in a new context. Changes, shown in changes in the shape of the innovation, result from new issues and possibilities of the new context. The innovation in the second context, as it also becomes sustainable over time, becomes more embedded and rich.
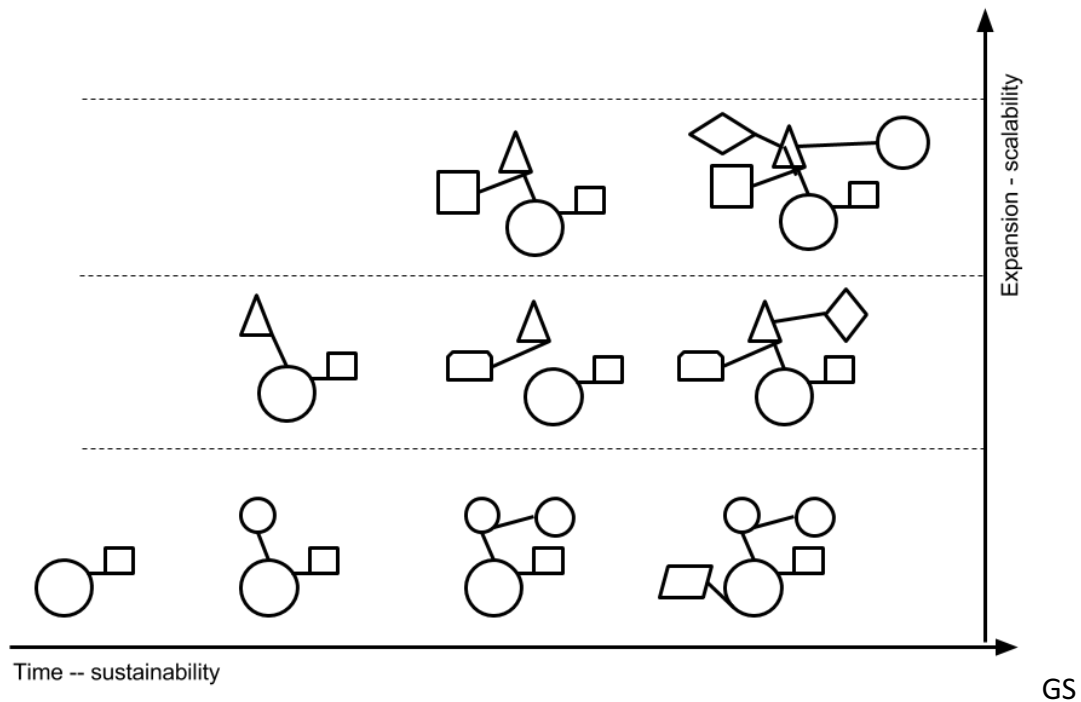
Figure 3. A complete image of the process of sustainability and scalability.

Each time the innovation is applied in a new context, the process repeats, as represented in Figure 3.

An important consideration of scaling and sustaining innovations over time is the tension between fidelity to the innovation and adaptation in new contexts – how does the innovation need to change and how do we make those decisions? Research shows that innovations cannot be simply transferred and translated and imposed onto new contexts. Thus, replicability of an innovation becomes harder to achieve and fidelity needs to go to more abstract elements that determine the essential elements of the innovation.

Figure 3 demonstrates this process of growth and change – and provides a way to think about sustainability and scalability together. However, to do this, it is necessary to consider how programs and initiatives are able to change and innovate. We recommend thinking about these as responsive to new contexts and innovating in response to needs of new environments.