More than a Network: Building Professional Communities for Educational Improvement

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Executive Summary

This chapter is a case study of the Carnegie Foundation for the Advancement of Teaching's Pathways™ program. The goal of Pathways is to improve the success rate of community college students who place into developmental mathematics. Currently, only five percent of students placing into developmental mathematics receive college-level credit one year later. To try and dramatically improve these outcomes, Carnegie formed a network of community colleges, professional associations, and education researchers in the summer of 2010. The aim of the network is to develop and implement two new course sequences, or "pathways," that overcome persistent barriers to student success.

But the new curriculum and course structure of Carnegie's Pathways programs, known as Quantway™ and Statway™, is not what most distinguishes them from other education reforms or research-practice partnerships. What makes these programs unique is the strategy of building a particular kind of professional network, what Carnegie refers to as a *networked improvement community* (NIC), to organize and lead an array of continuous improvement processes. The idea of a NIC came from the work of Douglas Engelbart (1992), who wrote about strengthening the capacity of technology organizations to work together to accelerate their ability to improve. However, Engelbart's writings never detailed the specific structure and tools for network learning and improvement. Building on his work, Carnegie has partnered with the Institute for Healthcare Improvement (IHI) to adapt resources from improvement science (e.g., Kenney, 2008; Langley et al., 2009) to education contexts.

Like Design-Based Implementation Research (DBIR), NICs are concerned with building capacity to change education systems. At root, DBIR is an approach to research and development that is defined by its focus on problems of practice (principle 1) and developing capacities to

sustain systemic change (principle 4). To this end, DBIR promotes an approach to inquiry that focuses on iterative, collaborative design (principle 3) and the development of practical theory (principle 2) (Penuel, Fishman, Cheng, & Sabelli, 2011). NICs are a *social mechanism* through which the collaborative designs and practical theories produced by DBIR can become live resources for the improvement of systems. For DBIR-type work to address practical problems sustainably and at scale, an organizing structure is necessary which has the capacity to put such resources to productive use.

The innovation of a NIC is using a highly structured network of education professionals, in collaboration with designers and researchers, to address a practical problem. The focus on education professionals distinguishes the Pathways NIC from forms of inquiry led by researchers. Professional leadership helps NICs tap into the innovation capacity of front-line workers and accelerate improvement. Whereas traditional educational inquiry looks at improvement over the course of academic terms or years, NICs measure improvement over weeks and months. Professional leadership of the network helps ensure network activities prioritize problems of practice, especially the challenge of effective implementation.

In a NIC, effective implementation means improving a process (e.g., teacher questioning strategies) within the system (e.g., community colleges in the network) with the overall goal of *achieving efficacy with reliability at scale*. Research knowledge is often critical for improvement, but a NIC's knowledge demands are disciplined by its improvement aims. To be a NIC priority, knowledge should inform the actions or decisions of NIC members or leaders in ways that help the network achieve its aims. In this sense NICs are engaged in problem-disciplined inquiry as a feature of professional practice. The most important feature of a NIC is a common problem or challenge around which the work of the network is organized.

The Pathways NIC consists of a number of different roles and organizing structure. First, NICs require a coordinating hub as "an initiator of activity and an integrative force for the overall enterprise" (Bryk, Gomez, & Grunow, 2011, p. 156). Currently Carnegie is serving in this capacity, at least in the early stages of NIC development. But the long-term goal is for hub responsibilities to progressively transition from Carnegie to a leadership body within the Pathways network. Second, there is a general network membership comprising teams from different colleges. The Pathways network consists of twenty-six community colleges and four universities located across eight different states. And third, there are NIC-affiliates who are engaged by the hub around specific NIC-related goals. These include expert advisors on instructional design and development, lesson study, and math education. It also includes contract design work writing and reviewing lessons, developing assessments, and building and adapting online instructional platforms. And it involves partnerships with organizations committed to similar work. These partnerships provide key relationships for finding and attracting members, as well as settings to share and discuss the work.

The network organizing activity of the Pathways hub is guided by four main elements, each of which plays a key improvement-related function in the operation of the NIC.

A *rapid analytics infrastructure* is a core capacity of the hub that helps collect, manage, analyze, and share data across the network. This plays several important improvement functions. Common measures are critical for understanding whether or not local changes are, in fact, improvements. This data helps explain performance differences across classes, instructors, colleges, regions, and the network at large. A closely related function of the hub analytic capacity is using variation in performance to predict how scaling a change to the curriculum, to instructional practice, or to the online instructional platform is likely to affect student outcomes

when tried in a new classroom or college. In doing so, the hub is regularly examining three major sources of variation in outcomes: characteristics of students, classroom instruction, and institutional context. In essence, this infrastructure is the backbone of a centralized, network-wide learning system with the capacity to leverage the immense amount of system data to guide improvements. The analytics infrastructure can also help individual instructors and students better understand their own performance through periodic reports and instructional dashboards.

Common *tools and routines that enable disciplined inquiry* are critical to coordinating member activities across a dispersed professional network. They facilitate network learning and engagement that is essential to scaling improvement within an education system. Routines are regularly followed procedures with an established or prescribed way of acting or doing that serve to coordinate the work of people within an organization or distributed across organizations but engaged in joint work (Feldman & Pentland, 2003; Sherer & Spillane, 2011). Routines are not mindless in the sense that something is routine, but rather the concept evokes effortful accomplishments or a way of channeling action (Feldman & Pentland, 2003). Carnegie incorporated routines in multiple aspects of the NIC's work, spanning the different levels of activity. They range from classroom level routines of interaction embedded in instructional materials to protocols that guide lesson study in college-based professional communities to modes of network-wide inquiry into variation in performance. In each case, concrete tools and/or artifacts are designed to anchor routines. Tools in this sense provide parameters that enable and constrain work practices in the NIC (Barley, 1986; Wertsch, 1991). Channeling the work of participants toward a common set of practices is central to improvement work such that it aims to promote implementation of core practices with integrity, that is, in a manner that remains true to its essential ideas and guiding principles, while being responsive to local conditions and context.

Candidate improvement knowledge can come from many different sources. *Innovation conduits* are a way promising ideas inside or outside of the network are identified, tested, refined, and scaled. Carnegie uses several strategies for channeling ideas from education professionals, designers, researchers, and people or organizations in other fields. Ninety-day cycles were originally developed by Procter & Gamble based on the recognition that lots of important innovations were happening outside the company. The challenge was to "move the company's attitude from resistance to innovations 'not invented here' to enthusiasm for those 'proudly found elsewhere" (Huston & Sakkab, 2006, p. 60). IHI adapted P&G's strategy and made it their main approach to research and development. A very different innovation strategy is the *Carnegie Alpha Lab Research Network*. The lab's goal is to engage academic researchers from diverse fields in helping to improve community college students' success in developmental math. By providing a structure through which researchers can work on problems and priorities set by the Pathways, the Alpha Labs produce cutting edge research that deepen understanding of problems and test theory-based solutions. The hub facilitates relationships with Pathways colleges, provides access to Pathways data, helps identify funding sources, assists in research grant writing, and provides forums for sharing research findings.

Lastly, NICs require a *culture that embraces a collaborative science of improvement*. This culture includes contextual elements and the broad social surround necessary for a sustainable NIC. It supports the development of professionals committed to collaborative inquiry around a shared problem. Faculty need to see themselves, and be seen by others, as reflective practitioners engaged in improvement and committed to working with other network members in trusting relationships around shared problems of practice in developmental math. The NIC culture must also provide participants with valued psychic incentives to sustain membership.