



Scaling up Teacher Professional Learning: How to Grow Teacher Knowledge while Growing School Networks

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This research reports data from case studies of three intermediary organizations facing the challenge of scaling up teacher learning. The turn of the century launched scaling up efforts of all three intermediaries, growing from intimate groups, where founding teachers and staff were key supports for teacher learning, to large multi-state organizations. The authors drew on data from three earlier qualitative studies of professional development at Big Picture Learning, Expeditionary Learning, and the Internationals Network, and reveal some of the benefits and challenges of taking teacher learning to scale.

Keywords: teacher learning; professional communities of practice; scaling-up, school design organizations;

A 2009 *New Yorker* article, “What’s the Recipe?” explores the fascination with cookbooks and raises a key point that parallels the exploration of teacher learning communities: “The space between learning the facts about how something is done and learning how to do it [is] large...The recipe is a blueprint but also a red herring, a way to do something and a false summing up of a living process that can be handed on only by experience...We say ‘What’s the recipe?’ when we mean ‘How do you do it?’”(Gopnik, 2009).

There are no recipes for how to replicate school designs and support teachers in learning and implementing the designers’ curriculum. Thus, we look to organizations that do this work to show us how it might be done and to capture their doing so that they might serve as guides. It is this space – the “how to” of replicating school designs and the teacher professional learning needed to effectively grow reform - that interests the authors of this research.

Recent educational reform focused on re-designing high schools and on improving teacher quality

in ways that influence student learning, attendance, and graduation rates, has moved to the forefront of educational policy (Darling-Hammond, 1997; Darling-Hammond & Prince, 2007; Hanushek & Rivkin, 2004). The growth of new school design organizations, or intermediary partners that provide curricular designs, professional learning, school coaching, and other assistance to schools, over the past two decades reflects the need to build both school and teacher capacity to help students develop necessary 21st Century skills and knowledge. There is a growing body of literature about scaling up educational reforms, a relatively recent phenomenon made possible by a unique mix of policies (such as the Obey-Porter Acts¹), ideas (such as those created by the New American Schools Development

¹Legislation passed in 1997 and named after its congressional sponsors that helped to ready the educational market for comprehensive school reform and new designs for teaching and learning. Obey-Porter offered up to \$50,000 per year for 3-years to schools willing to adopt designs (Keltner, 1998).

Corporation), and money (such as the Bill & Melinda Gates Foundation² funding of school designs) (Glennan, Bodilly, Galegher, & Kerr 2004). McDonald, Klein, and Riordan (2009) highlight “teaching and learning the design” as one of eight challenges intermediary school designers face in scaling up. The challenge for school designers is to help others develop a nuanced and deep understanding of an often complex teaching and learning design, and then effectively use those practices at the classroom level (Schmidt & Datnow, 2005; Stringfield & Datnow, 1998).

This research reports findings from case studies of three intermediary organizations engaging in scaling up their school design (meaning, opening new schools that replicate an original design for schooling) and consequently scaling up teacher learning. We define intermediaries as groups that “focus their work specifically on supporting learning improvements” and who “occupy a distinct position between central offices and schools where they aim to leverage changes at both levels” (Honig & Ikemoto, 2008, p. 329).

The intermediaries in this study, Big Picture Learning (BPL), Expeditionary Learning (EL), and the Internationals Network for Public Schools (INPS), also serve as secondary school designers and support networks of schools and teachers in implementing a specific design for schooling. This sub-set of non-profit intermediaries supports national networks of *both* public and charter schools, and establishes memoranda of understanding with each school in order to articulate specific curricular, coaching, professional learning, branding, and marketing services to school partners. Each intermediary is deeply mission driven, with supporting students, teachers, and leaders at the heart of their designs. All rely on the work of teachers to implement their visions of reform and must therefore invest heavily in helping teachers learn and execute their designs; it is in the interest of all three intermediaries to promote teachers’ learning because such learning engenders commitment to the design and increases teachers’ investment in professional growth in service of students’ success. Teacher learning is essential to the survival of these designs particularly because nothing about the design is scripted for teachers; they need a strong understanding of the design in order to implement it and have relied heavily on building communities of practice to do so (Klein, 2007; Klein & Riordan, 2011). There is evidence that their professional development has been effective in helping teachers transform their practice (Klein & Riordan, 2009). Because of this, we believe all three intermediaries offer relevant

insights into how to grow teacher learning communities beyond their particular contexts.

While our work here relates to teacher learning within specific types of organizations, we believe that our findings offer portable lessons related to teacher learning within other organizations that are in the process of scaling. The work of scaling designs for schooling is complex and it may be tricky to transfer learning from one context to another. However, a Gates Study of Small Schools reveals that intermediaries that were able to establish effective supports for teacher learning and to empower teachers to learn from one another in their schools were more likely to have a higher incidence of effective instructional practices (Fanscali et al., 2009).

The turn of the century launched the scaling up efforts of all three intermediaries, (sparked largely by funding from the Gates Foundation), growing from intimate groups, where founding teachers and staff were key supports for teacher learning, to large multi-state organizations. This study focused on what happens when professional learning founded in such communities grows rapidly and across wide geographic spaces. We examine the new and often unforeseen challenges these organizations face, as well as the strategies they use to manage these emergent challenges. We asked:

- How do intermediaries meet the learning needs of teachers while going to scale?
- How has going to scale impacted professional learning practices and communities of practice?
- What are the challenges of bringing teacher learning communities to scale?
- What strategies do the intermediaries use to strengthen and develop teacher learning communities as they go to scale?

Literature Review and Theoretical Framework

We used two areas of literature that helped us frame our research. The first focuses on scaling up and offered an understanding of scale as both a challenge of growing a school design across contexts and as a challenge of scaling up teacher learning. The second, on communities of practice, helped us make sense of exactly how these intermediaries provide support for scaling up teaching and learning - how, below the surface of the organization’s design, they help the people using the design to do it well.

Learning and Scale

While there is an emergent body of literature about scaling up school designs (Datnow, 2000; Glennan et al., 2004; Klein & Riordan, 2009; Stringfield & Datnow, 1998) and a strong base of research about how to support teachers in learning new content, practices, and beliefs (see Phillips, Desimone, & Smith, 2011 for a good discussion of this literature), there is less literature about the intersection of the two: the organizational challenges and opportunities presented when intermediaries engaged in scaling their designs are simultaneously scaling up

²The Bill and Melinda Gates Foundation invested heavily in new school design and replication in the early part of the 21st Century (McDonald et al., 2009). All of the intermediary organizations in this research initially received Foundation funds to scale-up (replicate) their designs for schooling.

teacher professional learning. Some literature suggests scaling up instructional reforms is *all about* teacher learning, as the success of such reforms relies on each teacher's ability to learn the design well enough to implement it in real contexts with particular content and unique groups of students (Coburn, 2003; Datnow & Castellano, 2000; Elmore, 1996; McDonald, Buchanan, & Sterling, 2004; Schmidt & Datnow, 2005; Wylie, 2008). This literature builds on a strong foundation of research that finds that teacher learning and inquiry supports the collective capacity of schools to design and implement effective practices (Little, 1999; McLaughlin & Talbert 2001; Crockett, 2004). They find that teacher learning is most effective when efforts are sustained and coherent (Cohen & Hill, 2001) and a consistent part of reform efforts rather than a one-shot workshop (Darling-Hammond & Richardson, 2009).

Researchers and practitioners alike recognize that scaling up is far more complex a process than simply increasing numbers of schools (Coburn, 2003; Viadero, 2007). Coburn's (2003) work on re-thinking scale includes four dimensions: depth, sustainability, spread, and shift to reform ownership. Three of these are integrally connected to teacher learning. *Depth* involves the degree to which reforms "effect deep and consequential change in classroom practice" change that requires learning on the part of teachers, as most teachers interpret reforms through "prior knowledge beliefs, and experiences" (Coburn, 2003, p. 4). *Sustainability* is closely related in that teachers who have achieved deep classroom change are more likely to sustain these changes, "when there are mechanisms in place at multiple levels of the system to support their efforts" (Coburn, 2003, p. 6). Coburn (2003) identifies ongoing learning opportunities as a significant structure for sustaining reforms. Finally, *shift to reform ownership* happens when there is a shift in "authority and knowledge of the reform from external actors to teachers, school, and districts" (Coburn, 2003, p. 7).

Similarly, Thompson and Wiliam (2008), in their study of scaling up a classroom-based intervention, suggest that the real challenge of scaling up is to improve classroom practice. Elmore (1996) and McDonald (1996) refer to this as *scaling down* "to indicate the process whereby a spreading reform challenges habitual practice in the new contexts and habitual practice yields to new ways of working" (McDonald et al., 2004, p. 82). Scaling down involves not only "spread" of ideas, but "penetration," meaning that *knowledge and skill* are disseminated across a network, and also deeply absorbed by teachers on the ground (Klein & Riordan, 2009). A challenge facing these three organizations is that teachers' practice cannot be scripted but must be *known* deeply, experienced through *practicing it*, and then developing intimate understanding of the *what, why, and how* of classroom instructional decisions (Cochran-Smith &

Lytle, 1999; McDonald, 1992; Schön, 1983). We were particularly interested in adding to the body of knowledge about scaling up referred to in the studies above: scale that is not merely about increasing numbers of schools in districts across the country, but scale that involves changes in practice, shifts ownership from the intermediary to the teacher, and is sustained over time.

On the surface, each intermediary in this study seems to have circumvented this problem by creating school designs structured to support a particular philosophy of teaching and learning. In addition, these schools have purview over the teachers they hire, allowing them to hire those who profess "buy-in" or an interest in the design's approach to teaching and learning. And yet, as with recipes where process yields varying results, even in these instances intermediaries struggle to help teachers learn how to implement and sustain the design (Klein & Riordan, 2009). In his famous article, "A revolution in one classroom: The case of Mrs. Oublier," David Cohen (1990/2001) describes a professional development reform effort that attempted to influence the core relationship of schooling between the student, the teacher and the content, but resulted in a fundamentally distorted hybrid practice. The concern is not only how to start 25 new schools but how to sustain them in ways that do not result in "sinister caricatures of the original" (Elmore, 2004, p. 20).

The literature on scaling up provides some indication of what the particular challenges of scaling up might be (Datnow & Castellano, 2000). Klein and Riordan (2009) describe a series of challenges intermediaries face as they scale up. Three of those challenges seemed particularly relevant to our work: the fidelity challenge, the challenge of teaching the design to others, and the ownership challenge. The fidelity challenge involves finding a balance between fidelity to the design and adaptation pressures from local contexts (Viadero, 2007; Wenger, 2004; Wylie, 2008). We understood this as a challenge of implementation. How do teachers implement the design in a way that helps maintain that balance between fidelity and adaptation? How much adaptation is permissible before the design is compromised? The second challenge, the teaching challenge, is one of coaching and knowledge dissemination – finding people able to articulate the design and work with teachers to support their learning of it. This challenge also involves knowing how to use coaches or teachers who are instructional leaders, how they can spread communities of practice, and how they can impact the fidelity challenge. It also involves managing the knowledge that grows from scaled up communities of practice (Drucker, 1998; Seely Brown & Duguid, 1991; Senge, 1994; Wenger, 2004). Finally, the ownership challenge involves being able to instill the same sense of "ownership" in newer adopters and larger communities of practice that exist in original smaller ones

(Klein & Riordan, 2009). Local ownership promotes both balancing fidelity and adaptation *and* the teaching of the design to others (who are also needed to teach it); absent this ownership, the design risks dissolution or may become “Frankenstein-ian,” adaptations straying into a pieced-together hybrid of the original design.

One of the concerns about much reform and its relationship to scale is that it is tougher to bring to scale innovations that impact the basic relationship between teachers, students, and knowledge (Elmore, 2004). The three intermediaries in this study recognize that simply changing the structure or school design will not change practice in the classroom, no matter how well meaning the teachers (Fine, 1994). Thus emerges the focus on teacher learning as a premise for reform. Elmore (2004) writes that the problem of sustaining scale of any educational reform is in changing the “core patterns” of schooling, which he defines as “how teachers understand the nature of knowledge and the student’s role in learning, and how these ideas about knowledge and learning are manifested in teaching and classwork” (p. 8). We were interested in the challenges and opportunities of scaling up reforms that change the core dynamic of schools and we see this as centering on teacher learning and transfer.

Professional Communities of Practice

In thinking about the challenges and strategies of scaling up teacher learning communities in particular, we turned to the literature on professional communities of practice (COP). Much of the professional development facilitated by these intermediaries has been built around developing COPs in and across schools. In COPs, “members...are informally bound by what they do together—from engaging in lunchtime discussions to solving difficult problems—and by what they have learned through their mutual engagement in these activities” (Wenger, 1998a, pp. 4-5). Communities of practice are particularly effective at helping members navigate work problems and processes that are “non-canonical” or outside the espoused practice of the organizations (Davenport & Prusak, 2000; Rulke, Zaheer, & Anderson, 2000; Seely Brown & Duguid, 1991). This is essential for organizations like the intermediaries in these studies that try to help members navigate non-traditional pedagogical practices. We think of the challenge of scaling up teacher learning as a challenge in scaling up school-based and local COPs. Thus, this body of literature was effective as a frame for exploring possible strategies as well as the challenges for scaling up teacher learning.

To make sense of challenges faced and the strategies used by the three intermediaries in this study, we looked to literature identifying important functions of COPs. They include: 1. *Stewarding Competencies or Innovation*: Seely Brown and Duguid (1991) argue “that, through their constant adapting to changing membership and changing circumstances, evolving communities-of-practice are significant sites of innovating” (p. 41). As

intermediaries scale up, potential for innovation increases and can lead to organizational transformation (Argyis & Schön, 1978; Wenger, 1998a). However, geographic and technical challenges of managing this innovation grow as well. 2. *Sharing and Growing knowledge*: As COPs grow, their repertoire of collected practice, particularly knowledge of and about practices related to “*noncanonical*” practices grows as well (Scribner, Cockrell, Cockrell, & Valentine, 1999; Seely Brown & Duguid, 1991; Wenger, 1998a, 1998b; West, 2009). 3. *Retaining knowledge*: Wenger (1998a) suggests COPs become “living” homes for knowledge in a way that is distinct from the work of written documents, as “Communities of practice preserve the tacit aspects of knowledge that formal systems cannot capture” (p. 5; Amin, Ash, & Roberts, 2008). 4. *Identity Homes*: COPs can be seen as places where people *become* practitioners; it is in the act of becoming an “insider” or a “member” of the community that learning happens (Lieberman & Miller, 2008; Seely Brown & Duguid, 1991; Wenger, 1998a).

Each of these intermediaries has made significant progress in understanding how to help teachers *both learn about* the design *and learn how to do it*, and past research efforts have documented these strategies (Klein & Riordan, 2009). In our research efforts we witnessed the challenges of helping teachers become intimate “knowers” of these ambitious designs. However, we also observed the power and energy engendered by expanding professional learning beyond one or two schools. Our research indicates these organizations have been effective at supporting teachers in implementing changes from professional learning into their curriculum and teaching (Klein, 2008; Klein & Riordan, 2009, 2011). Although not always with complete fidelity, the strategies engaged in by the intermediaries engendered alignment between the organization’s vision and practices in the classroom, a challenge that has evaded school reformers historically (Cuban, 1993). The research presented here draws on both the strategies as well as the challenges of scaling up teacher learning.

Research Context

The Intermediaries

Big Picture Learning (BPL). BPL schools are premised on the notion that learning should be based on students’ passions and that teachers should serve as coaches in connecting student interest with academic content. Most BPL schools serve students in grades 9-12 and secondary students spend two days a week at internships of their choice and build projects around their work. Teachers stay with students for four years and help design individual learning plans for each student along with the student, his or her mentor, and his or her parents. Central to being a successful advisor is the ability to find academic content in internship work experiences and advisors must be content area generalists. Currently there

are approximately 70 schools in 19 states across the country.

Professional development at BPL schools employs a variety of strategies to help support teachers. Because BPL schools are so non-traditional in their design, teachers have few images or experiences to help them figure out what it means to be a teacher there. Strategies for supporting teacher learning are geared towards building professional communities of practice and include: networking teachers through informal and formal professional development opportunities, the regular use of case studies and story-telling, regular observation days for teachers to visit other teachers and schools, direct instruction through workshops usually led by experienced teachers, and a buddy system that pairs experienced with new BPL teachers.

Expeditionary Learning. EL schools are rooted in the vision of Kurt Hahn, educator and founder of Outward Bound, an outdoor educational organization established in 1941. Hahn promoted meaningful education through direct and engaging experiences, service, and adventure. EL is a school transformation model informed by five dimensions – curriculum, instruction, assessment, culture & character, and leadership – supported by core practices that describe best practices in each dimension. Coursework is rooted in long-term case studies, called “learning expeditions” in which students explore in-depth content, engage in out-of-classroom fieldwork, speak with experts, engage in projects to create products, and present their work to authentic audiences. EL Schools are both elementary and high school, although for the purposes of this study only secondary schools (grades 6-12) were included. Currently there are over 130 schools in 29 states across the country.

EL’s professional development emphasizes “adult learning [that is] active and engaging” (Expeditionary Learning Schools, 2010, para. 2). Central to all professional development is: literacy across the curriculum, teachers experiencing instruction and content as students, character development, and opportunities for reflection. Professional development occurs primarily on-site at schools, where EL school designers (coaches) work with school leaders and teachers for approximately 30 or more days per year. The school-based professional development is complemented with other opportunities, including regional and national institutes, conferences, school site seminars and educator Outward Bound courses, totaling about 15 days a year.

The International Network for Public Schools (INPS). INPS schools are public high schools structured to meet academic and emotional needs of recently arrived English Language Learners from over sixty countries. Their approach to learning integrates language development and content as students work collaboratively in heterogeneous groups on interdisciplinary projects and also complete internships within their local communities.

Teachers work collaboratively in teams to develop curriculum that incorporates students’ diverse linguistic and cultural knowledge. INPS’ model of authentic assessment requires that students develop portfolios that they defend to panels of peers and community members. INPS’ professional development model includes conferences, regular inter-visitations across schools and teacher initiated study groups. Teachers are involved in the planning and leading of professional development conferences and workshops. The first INPS school opened in New York City in 1985 and as of 2015 there were nineteen INPS schools across the country.

Table 1
Description of Intermediaries

	Big Picture Learning	Expeditionary Learning	International Network for Public Schools
# of schools	70 in 17 states	Over 130 in 29 states	17 schools in 2 states
Core principles	Advisory, individualized learning, project based curriculum, internships.	Curriculum centers on “learning expeditions” or case studies with fieldwork, experts, and authentic student work.	Serve recently arrived immigrant students, experiential learning, language and content integration.
Model of teacher learning	Building communities of practice, teacher inter-visitations, expert teacher led workshops, mentoring.	School-based professional development led by EL school designers (coaches). Also includes national and regional professional development institutes and national conference.	Teachers engage in collaborative learning, study groups, mentoring, inter-visitation, teacher led workshops and committees, distributed leadership.

Methods

This research used qualitative, case study methods that are particularly useful when “the boundaries between phenomenon and context are not clearly evident” and when “there will be many more variables of interest than data points” (Yin, 1994, p. 13). Case study methodology is well suited for studying intermediaries in the context of scaling up because it helps capture emergent properties of organizational life in the process of change (Hartley, 1994). Not intended to be the study of an entire organization, case study research is designed to focus on particular issues, features or phenomenon (Yin, 1994). It provides a holistic view of phenomenon since it involves many sources of evidence. This study

triangulated different forms of qualitative data reflecting the experiences of different actors within intermediaries (teachers, coaches, intermediary personnel) in the context of scaling up. By bringing together three case studies of teacher learning within intermediary organizations, we hope to highlight the complex nature of teacher learning and its relationship to school design. Although at different stages of scaling up, these intermediaries face challenges that are similar and transferable to other organizations. The goal of this study was not evaluative, to analyze the “success” of each of these three organizations, nor was it a comparative case study. Rather, we were interested in looking deeply at these three organizations to make sense of some of the trends we were noticing across them. Future research might look to evaluate the effectiveness of these strategies.

This research draws on data collected between 2003-2008 from three earlier studies on professional development across the three organizations: BPL, EL, and INPS. It also includes additional data collection between 2008-2010 that focused on the benefits and challenges of scaling up teacher professional development at the organizational level (principals, coaches, and organizational leaders).

Data Collection and Data Sources

Data sources. Data collected from prior studies that took place 2003-2008 focused largely on teachers’ experiences of professional development within intermediary organizations. More detail about the methodology of these studies can be found in: Klein, 2007; Klein, 2008; Klein and Riordan, 2009; and Klein and Riordan, 2011. Table 2 includes a summary of data collection from these three studies³.

During 2009-2010, using a new theoretical framework that combined the literature from scaling up with the literature on teacher learning communities, as well as new research questions, we conducted additional data collection with individuals who worked within the intermediaries. We conducted semi-structured interviews exploring how the organization supports teacher professional development, the challenges of growing professional development, the specific challenges facing coaches, principals, teachers, the use of technology in professional development and how teacher learning has changed as the organization has grown and the benefits of going to scale (See the Appendix for the interview protocol).

³Teachers for each study were chosen in the following way. For BPL: All teachers in the intermediary in the Rhode Island schools at the time of the study were invited to participate via an open email/letter opportunity. Seventeen were interviewed for the study. For EL: All teachers in the intermediary in the NYC schools at the time of the study were invited to participate via an open email/letter opportunity. Twenty five were interviewed for the study. For INPS: Researchers worked with the principal in participating schools to identify a diverse sample in terms of grade level and subject area.

Table 2
Description of three original case studies

Data Source	Big Picture Learning	Expeditionary Learning	Internationals Network for Public Schools
Interviews	17 teachers 4 principals 2 cofounders 3 staff members	25 teachers 2 principals 2 coaches	16 teachers 7 principals 1 coach 3 executive director 2 intermediary personnel
Observations	31 days professional development observations 10 days classroom observations	20 days professional development observations 15 days classroom observations	5 days professional development observations 12 days classroom observations
Artifacts and Documents	500 pages: Curriculum, documentary data, internal case studies, website documents	300 pages: Artifacts related to PD, student work, professional development agendas, online planning tools, school designer updates	200 pages: Professional development agendas, committee meeting minutes, historical documents

Data Analysis

The constant-comparative method of qualitative data analysis (Glaser & Strauss, 1967) was used to code, sort, and categorize data. Researchers returned to original data with new codes based on research questions for the new study and individually reviewed them. Mining the prior data with an eye towards scaling up teacher learning, a number of common codes emerged that were either a challenge these organizations faced or a strategy they used. Some codes arose from the original studies and others from the new interviews conducted. Researchers collectively defined and clarified codes, generated hierarchies of codes, developed interpretations across categories, and verified findings. We ended up with four overarching codes within the categories of “challenges” and “strategies”: “the fidelity challenge,” “the responsiveness challenge,” increasing opportunities for teacher learning,” and “building and supporting innovation.” We define these codes in our findings section and give examples within.

Our scaling up codes were informed primarily by: McDonald et al. (2009), Schmidt and Datnow (2005), and Glennan et al. (2004); communities of practice coding was grounded in Wenger’s writing (1998a, 1998b, 2004).

Findings and Discussion

Our data reveal a number of significant findings about both the challenges of bringing teacher learning to scale and the strategies organizations are using to support their work. We found each challenge and strategy applied to all three intermediaries.

Challenges

The fidelity challenge. Early on in BPL and INPS, the original founders knew all the teachers, principals, and most of the students in its schools.⁴ Especially when school designs require major shifts in thinking about teaching and learning, fidelity to the design engendered by close, organic professional communities of practice is a powerful means of helping newcomers learn the philosophy and practices of the intermediary. However, at each organization's current scale, learning the design must occur through structures that help guard fidelity even as experimentation is encouraged. The issue that emerges is how to help teachers learn about these complex school designs when smaller COPs no longer suffice in supporting fidelity to the model.

We saw this challenge expressed at multiple levels in EL schools: the classroom, the school, and the organization. In one teacher's classroom implementation of a particular professional development practice strayed from the design, suggesting to us that the organization might need to require greater fidelity to its practices. In this particular instance, the teacher used the term, "learning expedition" for a project that involved students in creating their own city-states, following a study of Ancient Greece. While there were components of what EL considers to be a learning expedition in the project, other aspects (such as fieldwork and experts) were missing. These data suggested that this was an issue of both fidelity and learning; it misrepresented learning expeditions to the students and therefore distorted the design, and interviews with the teacher indicated a lack of understanding of what comprised an expedition, and a genuine belief that she was implementing the design correctly. More than just getting the terminology right or wrong, this example illustrates the fidelity challenge at scale.

At the school level there have been successful examples of veteran faculty members orienting new members to the school's EL practices. For instance, at one EL school, several days during summer planning are devoted to targeted teacher-led demonstrations of shared classroom practices and shared language. Incoming teachers learn about expectations from other teachers and model their behavior on the community's norms; they earn trust and "admission" into a professional learning community by mirroring the school-wide practices. As

newer members successfully appropriate and reflect the language and instructional strategies embraced by the larger community, they become members of that community and contributors to it. One EL teacher indicated, "I learned about creating learning targets (goals or objectives), how to run a 'building background knowledge workshop' with students (a strategy for engaging students in new content) and use discussion protocols, which were new for me. All of the other [veteran] teachers here use them successfully and it's important to learn so we have shared practices - it helps to be consistent with kids." Because EL schools are spread across the country, the organization has to meet the challenge of creating many smaller COPs simultaneously, and manage the quality of all of them. Data suggested how these communities of practice maintained the role of being "identity homes" even as they grew to scale. Teachers were able to become practitioners in their school-based community, which allowed them and the organization's coaches to monitor for fidelity at a smaller scale. An EL teacher told us about how this worked in her individual school:

Fridays we stay until 3 and...we meet as a faculty and we're taught: first we watched an actual lesson being given by someone and then we broke it down for each of the steps, what's required, why is it important, how do we use it, and then we got to take our lessons that we've [the 7th grade team] written and change them together as a group to fit into the gradual release of responsibility [I do, we do, you do] model.

As a school, the teachers became monitors of fidelity for themselves and EL coaches reinforce practices or redirect misconceptions as needed.

The fidelity challenge spans not only the work of schools, but of the growing number of coaches and others who work to develop schools. Tom Van Winkle, Managing Director of School Services, identified this as a key challenge in the current state of scaling up:

I think one of the things it means as an organization is that we have to be very tuned into making sure what our school designers do in schools is fairly consistent across the board...I would say that that's a challenge for us because – the quality of work of school designer A isn't exactly the same as the quality of work of school designer B. They're all coming in with different experiences. We do our best to hire the best.

Smart hiring is one part of the equation; another is, as Van Winkle expresses, "tuning" and striving for consistency across school contexts. How does an organization going to scale ensure that coaches communicate practices using similar language and that "what makes EL" in Denver resembles "what makes EL" in Asheville? To support consistency in coaching, EL created the Director of School Designer Support position,

⁴ This was less true for EL, which started with 10 schools in five cities around the country.

which spearheads targeted training for all new coaches in the organization. Supports consist of “on-boarding,” familiarization with staff materials (housed in an online site), participation in EL institutes and school-based site seminars (with other new and veteran coaches), and ongoing video/conference calls. Veteran coaches are further supported at the regional or national level through a mentorship program, with coaches establishing clear goals and check-ins to monitor progress, seek feedback and support, and engage in reflection. Now several years into this initiative, data indicate that EL’s school coaches experience increased consistency of training and feel more supported in their work.

We heard this as a continual and constant challenge for teachers, however. Many times our data suggested teachers engaged in what we would call “token” implementation or fidelity to the design – using terms like “building background knowledge,” but perhaps engaging in a practice that didn’t demonstrate as much fidelity to the design as the organization would like. Some others felt pressure based on the needs of their students to make other adaptations. When talking about implementing expeditions into her class, one teacher told us, “If we don’t build their skills then it doesn’t matter how interesting the projects are. The kids will not be able to read the material that’s in front of them and they will fail tests, and they’re going to keep failing tests. And it becomes really difficult for them to work independently.” EL has met these challenges by increasing training and support as well as developing a greater online repository of models and tools – both teacher-generated and EL-staff developed.

Elliot Washor, one of the co-founders of BPL shared the idea of using “heuristics” or “rules of thumb” that help coaches in problem-solving. Unlike some of EL’s structured strategies, these experience-based techniques are more likely to offer generalizations as opposed to prescribed tools. The tension here is allowing for the kinds of innovation that foster improvement of the model but knowing when to insist on fidelity for the design’s integrity. At different points data suggest BPL has struggled to know when innovation had gone so far that the design was being compromised. Central to their design is that students’ coursework is integrated, they do not take “classes” in math and science, but rather, content knowledge emerges from student projects developed in their internships. Yet, in California and other states, state testing pressures pushed some BPL schools to offer math classes. In some instances BPL has accepted the inevitable local context pressures placed on their schools, but early into their scale up they also devised “distinguishers” that expressed their core principles of teaching and learning. These distinguishers, along with a memorandum of understanding, help mark the limits of innovation for any school within their network.

In managing the fidelity challenge, these organizations rely heavily on coaches to work with schools on design implementation; the coaches train leaders and teachers – they are the managers of innovation. However, as schools are added nationally, and the schools themselves continue to add grades and scale up, sheer numbers challenge an organization’s capacity to inculcate all teachers into the culture, discourse, and design. Further, growing organizations need to consider the additional layer of professional development for coaches themselves. As described in the literature, coaches cannot always be found from within the existing organization and in this case, the very people entrusted with teaching the design are people who need to be taught it deeply enough to share it.

Within the original New York network, INPS has not relied on instructional coaches; instead teachers who have specific areas of experience and interest have led inter-visitations, study groups and workshops. Within the New York network, schools have built capacity through the use of teacher leaders. Those teacher leaders are the “living homes” of knowledge that Wenger (1998b) describes. Engaging teachers to develop and implement teacher learning also exponentially increases the number of relationships individual teachers can draw on for support on an ongoing basis (Warren Little, 1993), helping to share the knowledge of the organization (Seely Brown & Duguid, 1991).

INPS has provided opportunities for teachers to develop leadership capacity through network professional development activities. One assistant Principal who was formerly a teacher leader speaks to this:

I have worked at three Internationals: Brooklyn, Flushing and now here at Lafayette. For each of these schools, I served as the representative from the schools on the Internationals professional development committee. It was the first leadership opportunity that I had. It gave me a chance to work with other teachers and to decide what kinds of professional development that we would offer and facilitate.

The intermediary’s professional development structures serve a dual purpose of supporting leadership development as well as encouraging the flow of institutional knowledge about signature practices across schools within the network.

While the use of teacher leaders to develop new schools was effective in the New York Network, the network faced challenges when it opened new schools in California because of the lack of seasoned educators on the West Coast. The network addressed this challenge by using instructional coaches but acknowledged that this was a departure from the INPS model and understood it to be a temporary support or what the organization calls a “new geography scale up strategy” to start the first two schools on the West coast. In the days when the network

was limited to schools in New York City, the strategy of engaging experienced teachers who transmitted the core commitments and institutional knowledge about practice to staff within new schools was effective. As the network went to scale, it required coaches who could connect the intermediary and new geographies creating connections between individual schools.

INPS has worked to support the development of a smaller COP in California that will become an identity home for the California schools by creating new opportunities for collaboration and teacher learning in those schools. The intermediary has supported professional development events for the California schools as well as teacher study groups and inter-visitations in which groups of teachers from across schools work collaboratively to reflect on and develop their practice. However, given the small number of California schools and structural challenges, such as being in different districts with different schedules, the California network does not have the depth of knowledge and the shared memory for practice that the New York network currently has.

As intermediaries grow in size, data from this study suggested a greater need to make explicit and transparent institutional learning that has grown over time in order to support schools to implement core design principles. The work of COPs as “living homes” and sharing “non-canonical practices” may not be effective at a large scale. Claire Sylvan, executive director of INPS speaks to the lessons of growth:

It has taught us the importance of writing down more things. What other people might call “codify.” It has taught us that there are things that we can put into writing instead and share in that way instead of relying exclusively on osmosis through interpersonal contact. That, said we will never abandon interpersonal relationships as part of this.

Sylvan is careful to point out that codifying knowledge does not mean creating rigid guides for establishing practices in new schools:

We don't have scripted workshops in Internationals because we have always had this implicit common knowledge, now what we have done is put that together in one place with the full expectation that it won't look exactly the same for anybody.

It seems the challenge for INPS as they grow is to find new ways to make institutional knowledge that has been implicit and has traveled through interpersonal relations, transparent.⁵ As Lave and Wenger (1991)

explain, “Transparency in its simplest form may just imply that the inner workings of an artifact are available for the learners’ inspection: The black box can be opened, it can become a ‘glass box’” (p. 102). While our data don't point to an optimal size for a network of schools, evidence suggests that geographic spread (when schools are *both* far from a cluster of other network school *and* far from the original hub school) may contribute to challenges of instilling ownership.

The responsiveness challenge. Deeply connected to the fidelity challenge is what we call the “responsiveness” challenge. In year one, with a handful of schools in one or two locations, an organization can identify and meet schools’ needs as they arise. In year two, after growing schools in other – perhaps more distant – locations, there are more requests, more emails, and on-site visits may be less frequent (as there are more schools to attend to). Year after year, scaling up challenges an organization’s capacity to respond to growing needs of leaders and teachers, thus impacting its ability to monitor fidelity. Where an organization once offered a series of eight yearly professional development institutes, it now must offer fifteen, in different locations, and create new ones that differentiate for new and experienced teachers. The strong early communities of practice that were able to share, grow, and retain knowledge without formal structures may be less able to do this quickly and effectively. Our data indicated all three of the intermediaries in this study struggled with this challenge and how to meet it.

Washor, of BPL, shared a story that illustrates the challenge of staying responsive and nimble while growing. In its early years of scaling up, the organization tried an innovative approach to professional development: they hired a documentary filmmaker to film a single advisory and then used the footage as a professional development tool. Schools around the country would watch an episode and then talk about issues arising from it in their schools and, using video conferencing, across the nation. They hoped this would be an opportunity to “grow knowledge” on a larger scale and find another way to be a “living home” for this knowledge. In describing what can be done “from the center” of the intermediary, Washor said,

We tried to run professional development where we had a video conference...but it was very difficult to do and people just basically sat there. We asked them questions and then we broke them up into their groups. But by the time they got there assembled, did the work - we did it live - it was three hours of their time. And it would have been better just to get the people to sit

⁵ Our findings indicate that among the networks we studied, it is important to create more resources and make learning more visible for new schools and new teachers. At the same time, it is important to

highlight that none of these networks advocate a scripted curriculum in their school design.

down and every teacher in the room and say, okay, this is my problem for the week, how do I help, how do you help me do this? And who's going to continue to help me?

As one researcher observed the video professional development, what Washor suggested was in evidence; the conversation felt stilted across networks and when conversation at the local hubs finally became animated it was often time to return back to the larger group, essentially shutting down whatever interesting discussion was happening among the teachers. One teacher indicated,

It was good to see someone else's advisory practices and sparked connections to my own advisory...but, I also want the opportunity to go deeper into my own struggles and successes and get feedback immediately from colleagues that I can use.

This teacher's insights identify a challenge of networking across wide geographic spaces. BPL's effort to be responsive was an attempt to grow the COP to a larger scale. But COPs may only be effective at a certain size; in the instance of BPL the scale of the learning community became unwieldy, and ultimately missed the mark. In an effort to manage the fidelity challenge there is inevitable anxiety when the center lacks knowledge of the intimate practices of the individual schools and teachers. Yet if the intermediary tries too hard to participate in those local, daily practices it cannot respond effectively in areas that may have more impact. More successful approaches seem to be those in which intermediaries differentiated support to schools, responding to particular contexts and/or strategically employed "cross-pollination" among schools in order to help them learn from one another in their varied stages of scale.

Strategies

Increasing opportunities for teacher learning.

One strategy all three intermediaries used to manage the above described challenges was finding multiple ways to broaden opportunities for teacher learning as they continued to scale, building on the transformative potential of broader COPs as described in the literature (Argyis & Schön, 1978). One strategy was increasing opportunities for teacher leadership, opportunities not as readily available when only a few schools existed. In scaling, none of the organizations were equipped with a sufficient number of staff or coaches who knew the design intimately enough to become teachers of it. In all three, whether by design or by circumstance, the organizations called on teachers to become coaches or teachers of the design. This was an opportunity for teachers to advance their learning of the design and for the organization to build leadership capacity from within, a strategy well illustrated by INPS.

INPS uses a distributed leadership model (Copland, 2003) that engages teachers to design and

implement professional development and to serve on new school planning teams. This model encourages leadership development and ensures that professional development responds to teachers' needs. As one math teacher explains: "I think that strength of our model is that it is shaped by teachers' input as opposed to the administration setting the agenda." As INPS grew to seventeen schools in twenty-years within New York City, one element of the organization's scale up strategy involved using teacher leaders to help carry the culture to new schools. These are teachers who teach in one INPS school and then migrate to start new schools, carrying the shared commitments, norms and practices that are central to the INPS approach⁶ (Jaffe-Walter, 2008). Elmore (1996) describes this strategy of school reform in which educators steeped in the practices of an exemplary school start other schools as "using the genetic material of their own knowledge and understanding" (p. 18). This links to our theoretical framework and Coburn's (2003) notion of shifting ownership from the intermediary to the teacher; increasing opportunities is part of shifting ownership

Using teachers to grow new schools not only enables the sharing of institutional knowledge across schools but also extends relationships that were developed within individual schools across the network, thereby encouraging the cross fertilization of ideas and ongoing informal support and collaboration. The broader network community is reinforced by regularly scheduled professional development activities such as inter-visitations and study groups that bring groups of teachers together across schools to spend time in each other's classrooms, reflect on practice and address pressing challenges. This work reflects Coburn's (2003) notion of depth, helping to deepen meaningful changes in practice within individual schools.

BPL also uses this strategy to help them in the early stages of scaling up to provide new opportunities for teachers who have spent at least four years in their schools. Many of the first group of advisors to "graduate" from a BPL school became coaches and principals in newer schools, many moving across the country to do so. In some instances those principals later went on to take leadership roles in around the country, as did one teacher from one of the early schools in Rhode Island, who became a local principal, and then regional director of the BPL schools in New Jersey. One advisor who moved into a coaching role indicated,

...because I had experienced being an advisor I built the skills needed to understand how to

⁶ Eight of the ten current principals in the International schools have spent more than five years teaching within INPS. Several began their careers as new teachers at International High School at LaGuardia Community College, one began with Internationals as a para-professional. In addition, one current assistant principal was a student in the first graduating class of the International High School at LaGuardia Community College.

coach others. It's easier when you've done it yourself and know the little steps that it takes, for instance, to create a learning plan with a student.

This teacher's insight suggests that organizations scaling up might first look internally for those people who "deeply know the design in concept and in practice [and] who can empathize with other adults who need to know it" (McDonald et al., 2009, p. 24).

But what happens when geography prevents educators from participating within the network, as Lave and Wenger (1991) suggest? When newcomers do not have access to the wide range of day-to-day activities, resources and opportunities for participation available to educators in the local network? How do they then become an "insider" of the teacher community and how do they come to "share ownership" of the design? In INPS, growing teacher leaders was successful while school openings were limited in number and confined to the local area, but the network had to recruit leadership and teachers from outside the network to start new schools in Oakland and San Francisco, as did BPL who grew at a much faster pace than this model allowed. Providing more extensive learning opportunities for scale is not simply a matter of funneling teachers towards leadership. Not all teachers in these networks can, or want to, leave the classroom.

As each of these intermediaries has grown, the needs of individual teachers have multiplied. Early professional development in intermediaries tends to focus on helping teachers learn about the school design but eventually experienced teachers may need different kinds of learning opportunities. A common model for providing new learning opportunities for veteran teachers is to urge them to lead professional development. And while many teachers embrace the chance to be leaders, intermediaries have felt some pressure to differentiate professional development beyond this. One teacher at BPL told us:

Once you're past your first year you become more expert and so, aside from teaching other people, you don't get much out of the professional development days and one gets very focused on experienced people sharing stuff with the less experienced people, which I think happens in our school because it's so different.

For the BPL network and INPS in particular, the organizational design is so specific that few outside experts can offer professional development, because it may often be too generic and too de-contextualized from the specific learning needs of teachers. Non-canonical practices passed on by strong communities of practice seemed rarely supported by such experts. In interviews, INPS teachers described how professional development from external providers was often not aligned with the needs of their students who are newly arrived immigrant students. One math teacher explained that network based

teacher learning structures and collaboration across schools were central to serving students:

One of our challenges is that our school is 100% ELL with a specific model, so even the state doesn't understand how we work. That's where Internationals (INPS) helps us - we're all in the same boat. Schools are team-based and collaborative. And Internationals is too. They bring us together to share what we've learned - we share problems that we have had and how we overcome them. When we come together, it's a more authentic approach.

This teacher emphasizes the need for learning structures that are responsive to the needs of students and teachers, in tune with the challenges of their particular experiences.

Early on in its growth BPL was resistant to going outside the organization for professional development. While both founders acknowledge the role of outsiders in the work at BPL and believe they can play a part in professional development, they qualified these statements with ones about the limits of outside experts. BPL staff and teachers were also concerned about *how* outsiders try to teach what they know. One principal told us,

I think we're most critical of pedagogical styles that are not really inclusive and there's a lot of times where we've had people come in and just try to transmit information...and people just lose interest really quickly because it's not grounded in the experience of our staff members and the students that they work with.

Outside experts with little understanding of context and community, and without effective pedagogical skills for a BPL classroom may do little to pass along their expertise in a way that is both palatable and relevant. Yet, the strategy of relying solely on practitioners within the network raises the possibility of 'in-breeding' as teachers within one context may transmit a limited number of practices or ones that may not be finely tuned.

While BPL is still committed to using what they call "inside expert practitioners" to lead professional development, as the organization has scaled up there has been a degree of change in experimenting with outside experts as teachers also need opportunities to be learners and not just leaders as they continue on in these schools. One regional area director told us his philosophy is to "identify the best possible PD opportunities for your folks - whether it's in or out of house," and he regularly sends his teachers to outside sponsored conferences, symposia, and institutes. His only request is that they bring back the learning and share with their local community. Evidence suggests mixed success with this approach, which can lead to mistaken implementation of practices (Klein & Riordan, 2009). When it works, however, as one BPL advisor expressed, it can transform practice: "After

attending a conference, another advisor shared examples about how to push students' thinking on their projects...I could immediately use the ideas about question-asking and connecting to Bloom's taxonomy in my work with my students..."

EL has also experimented with how to provide learning opportunities to meet the diverse needs of teachers as the organization scales up. However they now face the challenge of providing the necessary expertise to staff these workshops. One cost effective way they are managing this is by facilitating some national institutes in regional areas or with one school faculty. We suspect that this helps the challenge of scale in communities of practice, focusing on multiple smaller communities as opposed to bigger ones. Those communities seemed more likely to effectively share knowledge that they developed and coaches were then able to connect work between communities.

EL has also tried to provide advanced institutes for teachers nationally to maximize available resources, particularly in areas like assessment, differentiation, and leadership. For instance, they offer a sequence of professional development institutes focusing on assessment rooted in best practices (O'Connor, 2005, 2007; Stiggins, Arter, Chappuis, & Chappuis, 2005; Wiliam, 1998). The initial institute focused on student engaged assessment; "Assessment in Daily Instruction" provides a foundation for the subsequent offerings: "Creating Quality Assessments and Plans" and "Standards-based Grading & Reporting" (the latter focuses on school-wide structures for standards-based grading). The sequence differentiates professional development for novice and more experienced EL teachers and builds shared ownership of the design. For those in earlier stages of learning the design, professional development opportunities encourage the learner to put "aside misgivings and disbelief in order to try on ownership" (Klein & Riordan, 2009, p. 29). For those further along in their learning, there are opportunities to take "on the actual responsibilities of ownership" (Klein & Riordan, 2009, p. 29), again, illustrating Coburn's (2003) notion of going to scale and building the ever important, but often elusive, shift of ownership.

Reports from several participants, suggest that experimentation with differentiation of learning opportunities – off-site or school-based – may provide means for teachers to grow as learners and take risks. Van Winkle, of EL told us,

I think organizationally [offering differentiated professional development] is hard, but from the standpoint of the school and the growth of individual teachers, I think it's a real asset, because it enables the school coach to work with the school leadership to really focus on a particular individual's growth and what they need.

One EL teacher shared that she thought the opportunities for PD had the "potential to be transformative," but she wasn't sure they were there yet, that it still needed to be "more individualized" and that it was a "resource question" in that there needed to be more specialization among coaches and leaders.

BPL has also attempted to find ways to differentiate professional development for teachers. Over the years they have struggled to figure out how to help develop the "quantitative reasoning" in teachers' practice with students. One way they have supported teachers is through hiring an outside expert in this area to build capacity with teachers in schools. Like other coaches he is able to bring outside expertise while developing a strong understanding of the organization's unique philosophy. His work with particular teachers and schools allows him to differentiate professional development for teachers at different levels of practice.

Increasing differentiated professional development can be the most significant way intermediaries contribute to teacher development and learning. In large part, the educational system emphasizes support and learning of new teachers and intermediaries have had to follow suit, as the needs of new teachers are urgent and immediate. However, sustained change requires more attention to the needs of experienced teachers who also want to grow as learners, to build their capacity and ownership, which can then create more depth in the organization.

Building and supporting innovation. As organizations grow their designs, early adopters can become laboratories for newcomers adopting the design, and leaders and teachers can learn from newcomers. Similarly, newer schools may innovate and improve practices and share with others in the larger network. Sharing practices across schools builds the institutional capacity of individual schools, and innovations may further spread through national conferences, visits, informally, or via technology.

INPS' Sylvan contends that starting new schools encourages innovation and new energy as it provides learning opportunities for teachers in older schools: people mistakenly separate new school development from maintaining old schools:

I would argue that new school development continues to drive innovation and intellectual curiosity in your older schools. The creative energy of that new school - it's so exciting and why should you keep that for the new schools? Let it come back to the old schools. People get involved in the new schools, "Oh, I just met these new teachers and look what they are trying," and that brings new ideas into the old schools because the new schools are trying things out and there are no set patterns yet. You want them to do some of the core things but you

also want them to innovate. I include new school planning as an important part of our professional development along with conferences, RFPs...they drive innovation, and keep the energy up.

There was evidence from all three intermediaries that new schools can become fertile grounds for fostering innovation and expanding the possibilities within the collected repertoire of the network's practice as there "are no set patterns yet." One strategy both EL and BPL use to foster innovation is hosting an annual national conference. At these conferences, teachers, principals, and coaches from around the country present innovative practices to their peers in workshop formats. A recent national EL conference included workshops on assessment practices, literacy, leadership, and building professional community. Teachers shared practices formally through these workshops and informally throughout the day as they talked with peers from different locations. This also served as a means of building identity homes for new members as well as sharing some of the non-canonical practices across smaller communities of practice. Members, both old and new, become a part of a larger community identity (the national organization) in addition to their smaller school or regional community. One teacher spoke of her time there as one that fostered the highest level of engagement she had ever known at a professional learning experience. Speaking about a "slice" of a learning expedition she did about lobsters, she said:

Why am I so into this thing with the lobsters, because I am?! Everybody in this group is crazy about lobsters! When we did our presentation... we were behind this thing and had these paper lobsters and did the music and I was like... literally, it was one of the most fun things I did... I really liked the people I was with... And I think that we were just engaged. And so every time I was really engaged and then I thought about what made me engaged, those were the things that I want to do [with my students].

Her high level of engagement provided an important space for fostering innovation.

While experienced educators carry a network's culture with them, they also benefit from opportunities to create something new, to experiment with tried and true recipes, both fueling innovation and transforming their own identities as shapers of practice (Warren Little, 1999). By engaging teachers to work across schools, the intermediary supports the creation of new COPs while also carrying back new possibilities for practice to existing ones.

Providing opportunities for spreading innovation are not enough, and all three organizations have come up against how to sustain levels of innovation, as Coburn's (2003) theoretical frame urged us to look for. Doing this involves strategizing about building a collective memory

of practice, premised, it seems, on the belief that the power of shared ideas is enhanced through some means of documenting them. COPs "preserve tacit aspects of knowledge that formal systems cannot capture" (Wenger, 1998a, p. 5), but as intermediaries grow to scale, they may feel the need to *try* to capture these aspects. In particular, the intermediaries in this study have a very specific vision of teaching and learning and so meeting the fidelity challenge seemed to involve, for all of them, documenting ideas and practice. Creating a database of practices well aligned with the intermediary's philosophy of curriculum and instruction may help sustain innovation by providing models of what the organization's vision looks like in practice. Our data suggest it may also become a place for teachers to learn instead of starting from scratch.

Figuring out how to provide a warehouse of documented successful practice has led to innovative thinking particularly in the area of technology. EL has developed EL Commons, a website that allows members to share curriculum and student work. At the heart of this network is an online collection of high quality student work as well as the "embedded learning that went around it." Van Winkle, Managing Director of School Services with EL explains:

...the beauty of a network is you can see how your context might relate to someone else's context and what student projects they had their kids work on and what field experiences they had their students go on...And they see examples out there and then they also have the opportunity to communicate with those teachers. That system I think is a real advantage for a large network of schools.

EL Commons now houses an extensive student product archive, teacher-created learning expeditions, shared school documents (e.g.: faculty handbooks, professional development sessions), key organizational documents, and planning tools to support teachers' in creating and documenting work. EL has a director of resources who vets submissions, manages web content, and provides updates to the EL network on newly developed materials. While this hub was introduced relatively recently (March 2011), it offers opportunity for a collective memory of practice organized around the intermediary's school design. This may be the key to sustainability as well as a launching point for creativity.

Although distinct communities of practice may innovate too far from the design, they are important in helping organizations "harness innovative energy" (Seely Brown & Duguid, 1991, p. 54). Separate communities also facilitate differentiation. For instance, in one EL School, a group of teachers of varying levels of experience might engage in a form of Japanese Lesson Study to focus on a particular active pedagogy strategy that supports experiential learning. Or, an experienced

teacher may run an “EL 101” for those new to the design, sharing the learning gleaned from years of practice.

A final effective strategy for supporting innovation across all three intermediaries has been through the use of coaches who do the work of “boundary spanning” – work that links their organization with the external environment. Boundary spanning primarily concerns the exchange of information (Allen & Cohen, 1969; Daft, 1989; Malinowski, 1922) and boundary spanners attempt to influence external environmental elements and processes. They are often the stewards of innovation described in the literature on communities of practice (Seely Brown & Duguid, 1991), and those who manage the teaching challenge.

Our research suggests that boundary spanners, in the form of coaches, school designers, mentors, and sometimes teachers and principals, seemed to help secure outside sources of innovation into an organization (Daft, 1989; Seely Brown & Duguid, 1991). These individuals often bridge the gap between national professional development conference and individual teacher classroom. Boundary spanners additionally served to tighten the network, sharing information across school contexts. Across the organizations we saw how they carried best practices from one school to another and from the schools back to the organization. For instance, in New York City, one EL school designer (coach) typically supports several schools that are in various stages of scaling (e.g., a new start-up school, a high school at scale in its fourth-year, and another two-years into its scale-up process). As a result, a coach is positioned to share successful practices and concrete documents and materials from those schools further along in the scaling up trajectory. We observed one coach sharing learning expeditions, daily classroom pedagogy (workshop model lessons and Socratic Seminars), and structures to support leadership meetings (templates and protocols). This kind of feedback loop also seemed to support the responsiveness challenge.

Conclusion

We believe scaling up teacher learning is at the heart of scaling up school designs. The intermediaries in this study highlight the challenge of building and sustaining innovation because their visions of teaching and learning are not represented in textbooks and district professional development. However, the strategies they use for harnessing the potential of small COPs to transform and grow the organization are useful for others interested in sustaining innovation. Repeatedly, we found that when communities became too large, teacher learning suffered, and all three organizations experimented with ways to keep COPs small even as they grew. There is some assumption that the “*typical*, large organization is unlikely to produce discontinuous innovation” (Seely Brown & Duguid, 1991, p. 54). But in fact, there is literature to suggest that scaled up COPs can provide

fertile ground for invention. There are limitations of our study, namely the differences between the three organizations. They are in various stages of scaling up, for example, INPS has seventeen schools while EL exceeds one hundred and thirty schools. However, given the limited literature on teacher learning within school networks and a landscape in which organizations continue to grow designs for schooling, we see this study as an important contribution to the literature.

Most research about scaling up focuses on a single intermediary and including three intermediaries in this study allowed us to highlight the challenges and opportunities outside of very particular organizational contexts. We found that in line with our theoretical frame, that these organizations were thinking about scaling up in a particular way, scaling up as scaling down, in terms of knowing the teaching and learning of the design deeply, being able to sustain those practices, and transferring ownership of the design from the intermediary to the local teachers. We were able to step back from *how* the professional development is facilitated and the specific design challenges to build a broader understanding of *what* it means to scale up teacher learning.

For organizations and individuals engaged in this work, reflecting on the process of scaling up supports intermediaries to think more deliberately about strategies they employ; our research identifies a number of important strategies and tools. In particular, increasing opportunities for teacher learning through differentiating professional development, building teacher leadership, and creating regional hubs are important practices in the work of these organizations. Intermediaries also build and support innovation through national conferences, through technology that acts as a structure for archiving best practices and sharing innovations, and by employing coaches as boundary spanners to transmit teacher learning between hubs. These strategies and tools have limits but seem to offer the most opportunity in managing the challenges of scaling up teacher learning.

Additionally, scale necessitates a greater degree of systems-thinking, meaning that as organizations scale up it becomes increasingly important to identify patterns, cycles, and keep the overall goals in sight while managing inputs and facilitating interactions between smaller moving parts. Wheatley (1992) indicates that systems benefit from clear articulation of outcomes. To that end, organizations engaged in scaling up should continue re-visiting and reassessing their missions and visions to determine if the “recipe” in place will yield the desired outcome or whether tinkering is needed. Further, school design organizations may need to ramp up transparency and communication to make visible the “sleight of hand” components of growing schools and coaching leaders and teachers to successful implementation.

With a recipe, as we mention in the introduction, there is a gap between reading about *how* to create

something and actually creating it. The recipe does not guarantee the result. However, what we have learned from leaders, teachers, and the organizations in our study brings us closer to bridging the space between theory and praxis. Ultimately, navigating the challenges of scaling up a school design across multiple contexts requires tending. Our findings indicate that organizations tending to teachers' learning offer rich opportunities to deepen on-the-ground implementation. Further research is needed to explore how intermediaries engage teachers and build upon their collective knowledge in the work of starting and sustaining schools. Such research would provide a critical means of supporting intermediaries to be more intentional about how they bring their organizations to scale.

Despite differences, we also see across the intermediaries a common emphasis on the role of teachers as intellectuals and the collective capacity of teacher professional communities to transform schools. It is this vision for teacher learning that lives at the heart of these organizations.

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