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Taking teacher professional development to scale: A case study of three intermediary organizations
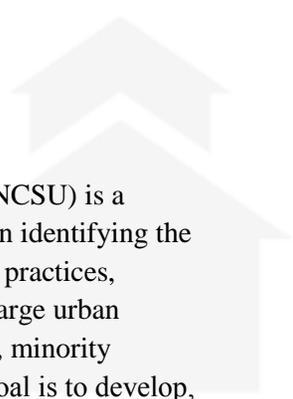
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Taking teacher professional development to scale:

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Abstract

This research reports data from a comparative case study of three intermediary organizations facing the particular challenge of scaling up teacher learning. The turn of the century launched the 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. This study focused on what happens when professional development founded in such communities grows rapidly and across wide geographic spaces, the new and often unforeseen challenges they faced, and the strategies they used to manage challenges that emerge from growth. 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.

Introduction

A 2009 *New Yorker* article, "What's the Recipe?" explores the current fascination with cookbooks, suggesting that a recipe provides not only information about how something is made, but "assurance that there [is] a way to make it" and further, an "implicit belief" that the author can show the home-cook how to do it. However, the article reveals a key point that serves as a parallel when exploring 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?'"
(http://www.newyorker.com/arts/critics/atlarge/2009/11/23/091123crat_atlarge_gopnik).

Whereas cookbooks offer a guide for reproducing dishes, few roadmaps identify how to replicate school designs and support teachers in learning and implementing the designs' curriculum; simply, there is no recipe. It is this space – the "how to" of replicating school designs and the teacher professional development 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 impact 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 intermediaries, 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 Act), ideas (such as those created by the New American Schools Development Corporation), and money (such as the Bill & Melinda Gates Foundation funding of school designs) (Glennan, Bodilly, Galegher, & Kerr 2004). McDonald, Klein, & 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 figure out how to admit other people [teachers] to the intimacy of our knowing…[and] how to use this as a bridge to their understanding and their use of what they understand" (p. 24). Additional research (Schmidt & Datnow, 2005; Stringfield & Datnow, 1998;) emphasizes the importance of positively impacting teachers' practice and addressing the process of teaching and learning at the classroom level in successfully scaling up school designs.

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, 2009, 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 intermediaries relies on the work of teachers to implement their visions of reform and must therefore invest heavily in helping teachers learn and execute their designs. 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, Riordan & Klein, 2011). In addition 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 insights into how to grow teacher learning communities that are relevant beyond their particular contexts.

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 development founded in such communities grows rapidly and across wide geographic spaces, the new and often unforeseen challenges and the strategies they use to manage challenges that emerge from growth.

We asked the following:

- How do intermediaries meet the learning needs of teachers while going to scale?

- How has going to scale impacted professional development 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 grow teacher learning communities as they go to scale?

Literature Review and Theoretical Framework

Below we describe two areas of literature that helped us frame our research. The first focuses on organizational scale 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, 2002; Datnow & Stringfield, 1998; Glennan, Bodilly, Galegher, & Kerr, 2004; McDonald, Klein, & Riordan, 2009;) and a strong base of research about how to support teachers in learning new content, practices, and beliefs (Ball & Cohen, 1999; Desimone, Porter, Garet, Suk Yoon, & Birman 2002; Hawley & Valli, 1999; Kazemi & Hubbard, 2008; Lieberman & Grolnick, 1996; Lieberman & McLaughlin, 1992; McLaughlin & Talbert, 2006; Putnam & Borko, 2000; Warren Little, 1999; Wilson & Berne, 1999), 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 teacher professional development. Some literature suggests scaling up instructional reforms is *all about* teacher learning, as the success of such reforms relies on the ability of each teacher 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).

Thompson & William (2008), in their study of scaling up a classroom-based intervention, write "No matter how good an intervention's theory of action or how well designed its components, the design and implementation effort will be wasted if the intervention does not actually improve teachers' practices…This is the challenge of scaling up" (p. 1). This kind of learning cannot be scripted but must be *known* in the sense of knowing suggested by McDonald et al. above. 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, Buchanan, & Sterling, 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.

On the surface, each intermediary in this study seems to have circumvented the problem of learning 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). Historically, even well intended efforts to affect the core relationship of schooling have resulted in largely hybrid practices (Cohen, 1990/2001; Dewey, 1938/1997; Elmore, 2004). 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). McDonald, Klein & 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 et al. 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; Seeley Brown & Dugiud, 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.

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 COP's 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, p. 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, Seeley Brown & Dugiud, 1991). This is essential for organizations like the intermediaries in these studies that try to help members navigate non-traditional pedagogical practices. We can 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 COP's. They include: 1. *Stewarding Competencies or Innovation:* Seeley Brown & 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 & Schon, 1978; Wenger, 1998a). However, geographic and technical challenges of managing this innovation grow as well. 2. *Sharing and Growing knowledge:* As COP's 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 & Dugiud 1991, Wenger, 1998a, 1998b, West 2009). 3. *Retaining knowledge*: Wenger suggests that COP's 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" (Amin, Ash, & Roberts, 2008, Wenger, 1998a, p.5). 4. *Identity Homes*: COP's can be seen as places where people *become* practitioners; it is in the act of becoming and "insider" or a "member" of the community that learning happens (Lieberman & Miller, 2008; Seely Brown & Dugiud, 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 development beyond one or two schools. Our research indicates that these organizations have been effective at supporting teachers in implementing changes from professional development into their curriculum and teaching (Klein, 2008, Klein & Riordan, 2009, Klein & Riordan, 2011). Although not always with complete fidelity, the strategies engaged by the intermediaries engendered alignment between the vision of the organization and the 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.

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

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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.

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). First we describe the intermediaries involved in these studies, followed by data sources and analysis.

The Intermediaries

The following table summarizes the key design elements of each organization.

Table 1: Description of Intermediaries.

Intermediary	# of Schools	Core Principles	Model of Teacher Learning
Big Picture Learning	70 Schools in 17 States	Advisory, Individualized learning, Project based curriculum, Internships	Building communities of practice, Teacher inter-visitations, Expert teacher led workshops, mentoring.
Expeditionary Learning Schools	150 Schools in 29 States	Curriculum centers on "learning expeditions," fieldwork,	School-based professional development led by EL school designers (coaches). Also includes professional development at regional and national conferences.
Internationals Network for Public Schools	14 Schools in 2 States	Serve recently arrived immigrant students, experiential learning, language and content integration	Teachers engage in collaborative learning, study groups, mentoring, inter-visitation, teacher led workshops and committees, distributed leadership.

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 in the field. Teachers stay with their 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 support 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 (1941). Hahn promoted meaningful education through direct and engaging experiences, service, and adventure. EL is a whole-school transformation model informed by core practices: learning expeditions, active pedagogy, culture & character, leadership and school improvement, and school structures. Coursework is rooted in long term case studies, called "learning expeditions" in which students explore content in-depth, and engage in out-of-classroom fieldwork, speak with experts, produce projects and 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 approximately 150 schools in 29 states across the country.

EL's professional development "emphasizes active teaching and learning, student and faculty engagement, and a demanding and supportive school culture" (http://elschools.org/design/index.html). 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 -70 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 (http://elschools.org/design/index.html).

The Internationals Network for Public Schools (INPS).

INPS schools are public high schools structured to meet the academic and emotional needs of recently

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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 of work and research projects 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. Professional development is planned by a professional development committee, consisting of a teacher representative from each school. The majority of conference workshops are developed and led by teachers. The first INPS school opened in New York City in 1985 and as of 2011 there were fourteen INPS schools, including twelve schools in New York City and two schools in California.

Data Collection and Data Sources

Data Sources.

Data collected from these 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 Jaffe-Walter, 2008; Klein, 2007; Klein, 2008; Klein & Riordan, 2009; Klein & Riordan, 2011. Table 2 includes a summary of data collection from these three studies.

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	20 days professional development observations	5 days professional development observations

	observations 10 days classroom observations	15 days classroom 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

During 2008-2009, 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 that explored 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 Appendix A for the interview protocol.

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, the following codes emerged: differentiation, cross-fertilization of practices, images of practice, fidelity and variation, tools, bridging intermediary and local schools, and accountability structures. Some codes: differentiation, cross-fertilization of practices, and fidelity and variation had also arisen in the original studies. Other codes: images of practice, tools, bridging intermediaries and local schools, and accountability structures emerged specifically from the new interviews conducted. Researchers collectively defined and clarified codes, generated hierarchies of codes, developed interpretations across categories, and verified findings. We created four larger codes related to the literature about scaling up and communities of practice. Our scaling-up codes were informed primarily by McDonald, Klein, and Riordan (2009), Schmidt & Datnow (2005), and Glennan, Bodilly, Galegher, & Kerr (2004); communities of practice coding was grounded in research from Wenger (1998; 2006). In some instances, the codes overlapped; for instance, one code we discuss in our findings is "the fidelity challenge," a challenge identified in the literature about scaling up, but also a challenge of how well and deeply a community of practice can teach the design.

There are limitations of our study, namely the significant differences between the three organizations. They are in different stages of scaling up, for example, INPS has fourteen schools while EL has one

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hundred and fifty schools. However, given the limited work on teacher learning within school networks and a landscape in which organizations continue to grow designs for schooling, we feel this study makes an important contribution to the literature.

Findings

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, and we found that each challenge and strategy applied to all three intermediaries. Table 3 summarizes the strategies used by each intermediary.

Table 3: Comparison of strategies used by intermediaries.

Strategy	Big Picture Learning	Expeditionary Learning Schools	The Internationals
Increasing Opportunities for Teacher Learning	x	x	x
Tapping Teacher Leadership	x	x	x
Differentiating Professional Development		x	x
Creating Regional Hubs	x	x	x
Designing sequenced professional development opportunities from novices to experienced		x	
Building and Supporting Innovation			
Sustaining and deepening practices & growing new schools	x	x	x
Sharing pioneering practices at national conferences	x	x	x

Utilizing technology: curriculum, student product archives, and active pedagogy	x	x	x
Spanning boundaries: coaches as connectors and transmitters of innovation	x	x	x

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[1]. 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 becomes: how do you help teachers learn about these complex school designs when smaller COP's 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 seemed so far from the design that it suggested to us that the organization might need to demand greater fidelity to its practices (Klein & Riordan, 2009). In this particular instance, the teacher had assigned the term, "learning expedition" to 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, key aspects (such as fieldwork and experts) were missing. We believe 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 was significant about 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. Instead of growing one large COP, the organization has to meet the

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[1] This was less true for EL, which started with 10 schools in five cites around the country.

challenge of creating many smaller ones simultaneously, and managing the quality of all of them. Here we saw how these communities of practice were able to maintain the role of being "identity homes" even as they grew to scale. Teachers were able to become practitioners in the community without the community being so large that the organization is not able to monitor for fidelity.

The fidelity challenge spans the work not only of schools, but of the growing number of coaches and others who work to develop schools. Tom Van Winkle, chief operating officer of EL, 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 huge challenge for us because – I would be lying if I said that the quality of work of school designer A is exactly the same as the quality of work of another school designer. They're all coming in with different experiences. We do our best to hire the best.

Smart hiring is one part of the equation, though 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 tools and that "what makes EL" in Denver resembles "what makes EL" in Asheville? Elliot Washor, one of the co-founders of BPL shared the idea of using "heuristics" or "rules of thumb" that help in problem-solving. Unlike some of EL's structured teaching strategies, these experienced 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 integrity of the design. At different points BPL has struggled to know when innovation had gone too far that the design was being compromised. Key to their design is that students' coursework is integrated, they do not take "classes" in math and science, but rather, the content knowledge emerges from student projects developed in their internships. Yet, in California and other states, state exam pressures pushed some BPL schools to offer math classes. In some instances BPL has accepted the inevitability that local context pressures place 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. However, these policy decisions do not go to the aspect of the fidelity challenge that we describe here, that which is one of teaching and learning the design.

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. This is related to the teaching challenge 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 be able 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 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).

However, after their expansion to opening new schools in California, the network is providing instructional coaches to work with principals and new teachers. While they have engaged coaches to support new principals, using instructional coaches with teachers is a departure from INPS' model of professional development. Instructional coaches are understood to be a temporary support, what the organization refers to as a "new geography scale up strategy" intended to support the new California network to learn INPS core principles. In the days when the network was limited to a few schools in New York City, the strategy of engaging experienced teachers who transmit the core commitments and institutional knowledge about practice to staff within new schools was effective. As the network went to scale they 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 community of practice 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 we saw a greater need to make explicit and transparent the institutional learning that has grown over time within the network of schools in order to support schools to implement core design principles. The work of COP's 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 also 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 as if the challenge for INPS as they grow is to find new ways to make the institutional knowledge that has been implicit and has traveled through interpersonal relations, transparent. As Lave and Wenger 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" (1991, p.102).

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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 8 yearly professional development institutes, it now must offer 15, in different locations, and create new ones that differentiate for new and experienced teachers. The strong early communities of practice that were able share, grow, and retain knowledge without formal structures may be less able to do this quickly and effectively. We found 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 that 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 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?

This effort to be responsive while scaling up teacher learning, was an attempt to somehow grow the COP to a larger scale. But COP's 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 becomes less able to know the intimate practices of the individual schools and teachers. And yet if the intermediary tries too hard to participate in those local, daily practices it cannot respond effectively in areas where they may be able to have more impact.

Strategies

Increasing opportunities for teacher learning.

One strategy all three intermediaries drew on to manage the challenges described above was finding multiple ways to broaden opportunities for teacher learning as they continued to scale, building on the transformative potential of broader COP's as described in the literature (Argyis & Schon, 1978). One strategy was increasing opportunities for teacher leadership, opportunities not as readily available when only a few schools existed. In going to scale, 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 both for teachers to advance their learning of the design as well as 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 collaboratively to design and implement professional development and to support new schools. In addition to involvement on the professional development committee, which plans professional development, teachers from existing INPS are part of new school planning teams

As INPS grew from one school in 1985 to fourteen schools in twenty years within the five boroughs of New York City, one element of the organization's scale up strategy involved using teacher leaders to help carry the culture to new schools[2]. 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 approach[3] (Jaffe-Walter, 2008). Richard 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).

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 community of the New York City network 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, to reflect on practice and contend with pressing challenges.

BPL also uses this strategy to help them in the early stages of scaling up to provide new opportunities for teachers who had 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 regions 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.

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 New York City 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 has grown at a

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2 One article (Jaffe-Walter, 2008) uses the term "culture carriers" to describe this work,

3 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.

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much faster pace than this model allowed for. Providing more extensive learning opportunities for scale is not simply a matter of funneling them towards leadership. Not all teachers in these networks can, or want to, leave the classroom.

As each of these intermediaries has grown, 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 has to happen in our school because it's so different.

For the BPL network and INPS in particular, the organizational design is so specific that there are few outside experts who 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. 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 always 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 (as defined by BPL), may end up doing little to help pass along their expertise in a way that is both palatable and relevant.

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 what they learn and share with their local community.

EL has made also experimented with how to provide learning opportunities to meet the needs of diverse teacher learners as they scale 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 of their national institutes in regional areas or on-site with one school faculty. We also suspect that this helps the challenge of scale in communities of practice, focusing on multiple smaller communities as opposed to bigger less wieldy ones. Those communities seemed more likely to effectively share

knowledge that they grow and coaches were then able to do some 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 targeting assessment practices rooted in best practices (Black & Wiliam, 1998; O'Connor, 2005, 2007; Stiggins, 2005). The initial institute, "Student Engaged Assessment," provides a foundation for the subsequent offerings: "Creating Quality Assessments" and "Grading & Reporting" (the latter of which 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" (McDonald, Klein & Riordan, 2009, p. 29). For those further along in their learning, there are opportunities to take "on the actual responsibilities of ownership" (p. 29).

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

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

One EL teacher told us 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 helped to support 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 unique philosophy of the organization. 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 deepen and grow as learners, to build their capacity and sense of ownership. Rising to and meeting this challenge has begun to provide teachers with diverse learning opportunities.

Building and supporting innovation.

As organizations grow their designs, early adopters can become laboratories for those newcomer schools adopting the design, and leaders and teachers can learn from those newcomers. Similarly, newer schools may innovate and improve practices and share with others in the larger network. Sharing of practices

across schools builds the institutional capacity of individual schools, and innovations may further spread through national conferences, site 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, and how to build professional development in the schools. Teachers shared practices both formally through these workshops and informally throughout the day as they talked with their peers from different locations throughout the country. 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.

While experienced educators carry the culture of the network of schools 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 COP's while also carrying back new energies and 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 they scale up. 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. In much of education, the collective memory of teachers' knowledge and practice is largely lost from generation to generation. COP's "preserve tacit aspects of knowledge that formal systems cannot capture," 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 begun collaborating on a network that will allow members to share curriculum. At the heart of this network will be an on line collection of student work as well as the "embedded learning that went around it." Van Winkle, COO of 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.

This website, EL Commons, now houses an extensive student product archive, teacher-created learning expeditions, shared school documents (e.g.: schedules, faculty handbooks, professional development sessions), key organizational documents, and planning tools to support teachers' in creating and documenting their work. Though this hub was introduced recently (March 2011), it offers opportunity for a collective memory of practice organized around the intermediary's school design.

Although distinct communities of practice may innovate too far from the design, they are important in helping organizations "harness innovative energy" (Seeley Brown & Dugiud, 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 (Seeley 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 as teachers and principals, seemed to help secure outside sources of innovation into an organization (Daft, 1989; Seeley Brown & Dugiud, 1991). These individuals often seemed to 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 tried to carry best practices from one school to another and from the schools back to the organization. For instance, in New York City, one Expeditionary Learning 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 as well as 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 help with the responsiveness challenge.

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Conclusion

While research on scaling up teacher learning is in its nascent stages, we believe it is at the heart of scaling up school designs. The intermediaries in this study highlight the challenge of building and sustaining innovation because their particular visions of teaching and learning are not represented in conventional 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. Again and again we found that when communities became too large (although we did not unearth a particular magical number) that teacher learning suffered. All three organizations found ways to keep COPs small even as they grew. There is some assumption that the *"typical*, large organization is unlikely to produce discontinuous innovation"* (Seeley Brown & Dugiud, 1991, p. 54). But in fact, there is literature to suggest that scaled up COPs can provide fertile ground for invention.

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 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, identifying the challenges and strategies of scale allows intermediaries in encountering them to think more deliberately about strategies they employ; our research points to 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 can act to as a structure for archiving best practices and sharing innovations across contexts, and by employing coaches as boundary spanners as a means of transmitting 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. Margaret J. Wheatley (1992) indicates that systems benefit from clear articulation of outcomes. To that end, organizations engaged in scaling-up would do well to continue re-visiting and reassessing their missions to determine if the "recipe" in place will yield the desired outcome. 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 and 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. Each of the intermediaries revealed

distinct teacher learning practices and positioned teachers in different ways in the organizational work of scaling up. 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 also 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 guides the creation of practices and support of schools at the heart of these organizations.

Appendix A: Interview Protocol

1. How does your organization currently support teacher professional development?

2. What are the skills you focus on in order to help teachers implement your school design?

3. Is leadership development/teacher capacity building a part of your professional development model? How?

4. How has going to scale (or getting bigger) changed your professional development?

5. What are the challenges of growing professional development?

6. What are the benefits? How does getting bigger facilitate teacher learning?

7. What do you think are the challenges for coaches? Principals? Teachers?

8. How do you use technology to help grow your professional development?

9. How does your organization support teachers who are new to the design in developing skills to be an effective teacher of the design? How does your organization support veteran teachers?

10. Are there challenges related to funding for pd that are affected by where they are in Gates funding cycle?

11. What are the strategies you are using to meet these challenges?

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