Designing for Deeper Learning: Challenges in Schools and School Districts Serving Communities Disadvantaged by the Educational System

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Table of Contents

Executive Summary

Designing for and implementing deeper learning across classrooms and schools that serve communities disadvantaged by the U.S. educational system is challenging. This paper illuminates this challenge by asking the question: What would designers of interventions at the classroom, school, and district levels have to take into consideration when they want to powerfully set their organizations on a developmental path towards deeper learning?

The thinking put forth in this paper is closely informed by the experiences of a number of district change projects aimed at furthering deeper learning. The projects were funded by the William & Flora Hewlett Foundation and organized as research-practice partnerships (RPPs) in which improvement teams worked together to design interventions or change activities over a period of three to four years. The approaches taken by the projects differed widely. The purpose of this paper is to aid the thinking of deeper learning designers in their future undertakings by (1) putting forth a theory of improvement informed by prior research, (2) offering a matrix of concrete design tasks, and (3) exploring trade-offs of pursuing different approaches.

A Theory of Improvement

Realizing deeper learning in classrooms with a clear and consistent focus on attenuating inequities requires substantial shifts in the work of teaching. It is therefore imperative that any deeper learning initiative provide sustained, high-quality professional learning opportunities for teachers.

However, the influence of professional learning experiences on teachers' daily practices are heavily shaped by the broader school and district context in which the teachers work. This means that, under current circumstances in typical districts, there is a need for sustained professional learning opportunities for other role groups (e.g., principals, district leaders) and attention to ensuring that the school and district organizational routines and cultures support deeper learning.

In mapping the territory of designing for deeper learning, there are three **sites of development** that a design effort for ambitious instructional improvement must take into consideration: (1) teacher professional development, (2) school organizational development, and (3) district organizational development. Furthermore, designers need to be enabled "to see the system" across these sites of development.

Across these sites, interventions revolve around the **learning dimensions** of motivation and commitment, conceptual understanding, instructional materials, asset-based orientations and practices, and forms of inquiry in professional community. Important dimensions of school and district organizational development are mobilization of instructional leadership, programmatic focus and coherence, and systems and routines for iterative improvement.

Design Tasks and Trade-Offs

A matrix of design tasks for each learning dimension across the three sites of development makes designing more concrete. The system becomes actionable, but given the systemic complexity of the design challenge, potential activities are numerous.

It is rare that any given deeper learning initiative could cover the full spectrum of design tasks that the theory of improvement suggests. Given incontrovertible limitations in local capacity and collective energy, designing in the local context is the art of selecting a finite number of activities that unleash the drive to change in the desired direction. The design connects local needs assessment and analysis of germane obstacles and assets with powerful drivers of change given an organization's prevailing knowledge, sentiments, and emotions. During this process, designers face a series of design decision points:

- How many sites of development or learning dimensions are possible and useful to tackle and with whom?
- Can all relevant sites of development will be tackled at once, or would local needs or available resources suggest it is most impactful to concentrate on certain ones?

When making decisions, designers assume that a certain degree of reasonable change will result in addressing at least some of the design tasks, perhaps sequenced over a given period of time.

By analyzing their chosen set of activities for a given period of time in reference to the full spectrum of multi-level design tasks, designers can realistically assess what aspects of the deeper learning challenge are still unaddressed, what outcomes are realistic to expect, and what elements should be phased in over time.

Introduction

Projects that aim to make deeper learning a widespread reality in schools and classrooms serving students from communities that have been disadvantaged by the U.S. educational system need to be mindful of the track record of previous attempts and the enormous undertaking ahead of them. Given this challenge, what should designers of interventions at the classroom, school, and district levels consider when working to set their organizations on a developmental path towards deeper learning? To consider this question, a number of research-practice partnerships (RPPs) formed project groups to imagine which design features—e.g., activities, materials, programs, artifacts—should be included in an intervention.*

DEEPER LEARNING DEFINED

Deeper learning in the instructional core is characterized by students productively struggling with complex ideas that are important to them given their lived experiences. Students explore these ideas with voice, inquisitiveness, imaginativeness, and collaboration. Therefore, deeper learning in the interaction between students and teachers is the hoped-for outcome of the designed and implemented intervention.

* The thinking put forth in this paper was closely informed by the experiences of a number of change projects aimed at furthering deeper learning and funded by the William and Flora Hewlett Foundation. All these change projects were organized as research-practice partnerships. As part of this initiative, the RPPs joined a network that organized regular meetings over the duration of the grant.

From the start, the projects approached the challenge in different ways. While the projects were operating in different contexts and considering different developmental phases for deeper learning, the differences also reflected underlying ideas about what schools and districts need to do in order to make deeper learning a reality in schools and classrooms.

Practical Examples

This report considers three of these projects as practical examples to ground more theoretical reflections.

Project A* focused on advancing districtwide deeper learning instruction by mobilizing instructional leadership at the school and district levels. Materials and modules were to be co-designed in-house, thereby enabling instructional leadership teams to provide professional development and, in turn, create momentum for inquiry and experimentation around daily lessons with deeper learning features.

Project B emphasized advancing the understanding of school leaders on how school identity and culture can provide essential support in creating a suitable learning environment. A process of reimagining the school's identity and vision that would engage school staff, students, families, and community members in co-creating the momentum for deeper learning to take root in curriculum and pedagogy.

A third group, Project C, focused on developing citizenship skills among students through a standards-aligned "action civics" and project-based learning curriculum in social studies. A cadre of teacher-leaders and the provision of targeted coaching would spearhead the implementation of inquiry-based instructional units in grades 7, 10, and 12.

STRUCTURE OF THE REPORT

This report proceeds in the following steps:

1. Explication of the concept of deeper learning and how its application can address issues of equity
2. Survey of literature relevant for the multilayered and multidisciplinary challenge of accomplishing deeper learning in classrooms, schools, and districts
3. Discussion of the nature of a theory of improvement, that may provide a broad orientation for local change efforts
4. Development of a conceptual map of specific design tasks derived from this broad theory and a matrix of research-based design tasks
5. Examination of the experience of three deeper learning projects in reference to the matrix of design tasks
6. Reflections on how the approach may help designers make well-grounded design decisions, recognize potential implementation challenges, and learn from variation of current efforts across projects for further iterations until achieved results approximate more closely desired outcomes

* To protect confidentiality, we use these identifiers as pseudonyms.

The three projects' initial designs contained both similarities (e.g., development of instructional leadership, teacher teamwork) and differences (e.g., enhancing ordinary daily lesson practices, school identity, a comprehensive pedagogical framework in a particular subject area). A focus on lesson practices, school identity, or pedagogical frameworks can all be useful while addressing a specific slice of a more encompassing endeavor. But what constitutes this encompassing endeavor of fostering deeper learning in district and school settings?

The goal of this paper is to map out the encompassing nature of the design challenge so that designers come to (1) appreciate the spectrum of tasks to be addressed given the ambition and complexity of the deeper learning undertaking, (2) recognize the unique sets of tasks that specific designs tackle and the resulting trade-offs that may be required, and (3) draw from a common frame of reference for learning across projects that aim at deeper learning.

For researchers who often think about change from a conceptual angle centered on their area of specialization, this report offers a view of the broader conceptual terrain necessary in order to advance deeper learning as well as ideas for how to translate research ideas into more concrete design tasks. For practitioners or partners who may be well-versed in the practical side of change, the paper offers research-based knowledge that can deepen thinking, challenge assumptions, and reveal design tasks that they may have overlooked. It is assumed that design teams, especially those that function in the mode of research-practice partnerships, should begin their work by building on the existing research base.

When it comes to how design teams actually work together, designing may not begin with consulting the research or professional knowledge base. Instead, more practical considerations or creative imaginations may come first. However, at some point, referring to a design task matrix that draws from the relevant research and professional knowledge base seems advisable. This paper aims to assist design teams with this endeavor.

What Is Deeper Learning?

The movement towards deeper learning in America's schools is a movement away from what is often called "traditional" instruction in which a teacher delivers knowledge to students as empty vessels waiting to be filled. This type of shallow learning (1) relies on memorization of isolated facts or the reproduction of given processes that are of little relevance to the lives of learners, (2) is assessed using close-ended and unimaginative means such as multiple-choice tests, and (3) is contained in both time and space to the classroom.[1] Students may question whether they will use this learning in real life that, in turn, saps their motivation to engage.

In contrast, **deeper learning starts with and builds on students' curiosity and wonder, and it continues with them when they leave the classroom and go out in the world**. As described by the William and Flora Hewlett Foundation, the elements of deeper learning include six key competencies:

1. Mastering core academic content
2. Thinking critically and solving complex problems
3. Working collaboratively
4. Communicating effectively
5. Learning how to learn
6. Developing academic mindsets[2]

Deeper learning cultivates the intrapersonal and the interpersonal[3] and is characterized by connections to content areas that extend beyond vocabulary and facts to analysis and synthesis. Students engage in authentic activity in which they, for example, pose problems that are of significance, generate multiple

strategies, and consider which strategies make sense for what reasons. Because it matters, students care about learning, engage with the process, and work to learn.[4]

In classrooms characterized by deeper learning, the roles of both the student and teacher change. Students are explorers of the world and in charge of constructing knowledge.[5] The resulting motivation and work yield deeper engagement with subject matter and compelling opportunities for intellectual and social leadership for students. As such, deeper learning provides vital avenues for students to see themselves and their peers as people who generate worthwhile knowledge.[6] Teachers, in turn, change from "sage on the stage" to "guide on the side." They assume the role of coach or facilitator who helps students wrestle with and deepen their understanding of core ideas as they engage in authentic tasks.[7]

In classrooms characterized by deeper learning, students are explorers of the world and in charge of constructing knowledge.

Deeper Learning and Equity

The quest for student-centered progressive pedagogy has endured within professional circles since John Dewey's time.[8] Policymakers as well have periodically launched initiatives to expand the reach of cognitively ambitious instruction in American classrooms. The latest nationwide initiative is represented by the Common Core standards and attendant testing regimes that many U.S. state governments have adopted. The fanfare around progressive pedagogy contrasts with the relatively disappointing results of these professional and policy initiatives.[9] Often, the closer an educational innovation gets to the "technical core" of schooling (that which happens between teachers and students), the harder it is to achieve.[10] Implementation studies of instructional policies aimed at cognitively complex teaching and learning have shown the endurance of an entrenched pedagogy in schools and districts that emphasizes knowledge transmission, basic skill training, and teacher-centered instruction.[11]

It is well documented that schooling grounded in traditional pedagogy perpetuates both class and racial inequity.[12] Decades of research have shown that the entrenched pedagogy is especially prevalent in schools that serve communities of color and economically disadvantaged student populations. Part of the social reproductive function of schools stems from historically disadvantaged students, particularly students of color, being placed into different educational tracks than their advantaged peers.[13]

Many factors make instructional change an uphill battle: teachers' instructional skill set, deficit perspectives about students from poor communities and communities of color, students for whom English is not their first language, students from poverty-impacted communities,[14] the premium placed on control and smooth functioning by school and district leaders, and entrenched organizational routines and traditions.[15] As a result, White and affluent communities are provided more opportunities for meaningful learning, while communities of color and poorer communities often are not. The proximity to deeper learning as a norm of the system is not the same for all communities.

DEFINING EQUITY

This report uses the definition of equity found in the report ***Equal Opportunity for Deeper Learning*** by Pedro Noguera, Linda Darling-Hammond, and Diane Friedlaender. In this text, equity is described as "the policies and practices that ensure that every student has access to an education focused on *meaningful learning* (i.e., the deeper learning skills contemporary society requires in ways that empower students to learn independently), taught by competent and caring educators who are able to attend to the student's social and academic needs, and supported by *adequate resources* that provide the materials and conditions for effective learning." [16]

Against this background, it is imperative that attempts to implement deeper learning attend explicitly to issues of equity. The current reality of public school districts that primarily serve students of color from low-income families and immigrant students is not one that supports equal access to deeper learning. For this to occur throughout the current public school system would require major redesign of educational policies and economics at the macro level. This report, however, addresses the issue at the meso- or micro-levels of the educational system by using existing macro-structures of societal inequity as a point of departure to explore what reforms to advance deeper learning are possible given enduring political and economic inequities.

Educators have an important role to play in recognizing and working to mitigate against inequities in the distribution of educational opportunities in schools and that are reproduced by structures, routines, and practices.[17] Educational decision makers at the district, school, and classroom levels, too, can expand deeper learning opportunities for students under present macro-structural realities. Indeed, with the sunset of the No Child Left Behind law and the advent of the Common Core State Standards in many states, which together have increased the use of more complex assessments of learning and softened the pressure from performance-based accountability, state and federal policies leave room for, and even encourage, districts to focus on deeper learning.

The Design Challenge

Designing Interventions

Interventions are sets of sequenced learning opportunities for members of an organization that are created iteratively and repeated through trial and error until a satisfactory outcome has been accomplished. From a design thinking perspective, they are not features to be merely implemented with fidelity, but points of learning. Iterative trial and error, guided by theories of action and improvement, are at the core of designing. This section focuses on the initial "thinking" part of the design process—the phase of exploring, hypothesizing, or imagining the shape of a designed intervention. It is meant to aid designers towards a theory of action that helps them make causal connections between actions and outcomes in order to get from Point A—the baseline condition—to Point B—the envisioned outcome of a given change project.

Designing interventions for complex problems of practice calls for both intuition and rational deliberation. Designers take perceived human needs as their point of departure for inquiry.[18] They then make decisions according to what intuitively feels right in terms of the designers' envisioned end state and their analytical knowledge of how their field works. Rationality and intuition can be reconciled through a balance of "analytical mastery and intuitive originality in a dynamic interplay."[19] Thus, designers are theory- and research-based, as well as practical and creative.[20] When making decisions, designers move from theoretical insights to actionability by converting a global theory of improvement or change into a locally sound theory of action made up of discrete design tasks and potential trade-offs.

Theory, Theory of Improvement, and Theory of Action

Designs are "specifications of actions to be taken (often in a specified sequence) to achieve [an] intended consequence."[21] That is, designs imply causality between action and outcome. The literature on design-based social change uses the terms *theory*, *theory of improvement*, *theory of change*, and *theory of action* to represent this causality.

While the terms *theory of action* and *theory of improvement* are often used interchangeably, there are clear distinctions. Theories of improvement are action-oriented and more universal as they aim to be valid for a variety of contexts.[22] The theory of improvement details the core organizational arrangements, the roles, the mechanisms and processes, and the tools and materials that might be introduced in order to effect the desired changes. A theory of action, however, pertains to context-specific theories-in-use on the part of actors thinking about change in their specific context.* Thus, the strength of theories of improvement is that they can give broad action orientations to actors working in similarly positioned organizations, such as, for example, community colleges with large numbers of students enrolled in remedial mathematics.[23] Theories of action take account of necessary trade-offs within given localities, centrally deal with the tension between what is desirable and what is locally possible in terms of design features, and suggest rationales for sequencing change activities over time. As projects unfold, theories of action may change as new conditions emerge.

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Using a Theory of Improvement to Map the Design Challenge

Realizing deeper learning in classrooms, and with a clear and consistent focus on attenuating inequities, requires substantial shifts in the work of teaching—that is, how teachers plan for instruction and engage with students on a day-to-day basis. Therefore, it is imperative that any deeper learning initiative provide sustained, high-quality professional learning opportunities for teachers.[24] However, it is well documented that the influence of professional learning experiences on teachers' daily practices are heavily shaped by the broader school and district context in which they work.[25] For example, aspects of the workplace—such as the specific curricular materials that are provided, available time and capacity for collective learning in teacher teams, and principals' expectations—can all shape whether and how teachers are positioned to experiment thoughtfully with new forms of practice.

It is imperative that any deeper learning initiative provide sustained, high-quality professional learning opportunities for teachers.

In the next section, a broad theory of improvement is put forth based upon general consideration in the field about what matters when implementing deeper learning in classrooms that serve students whose communities have typically been disadvantaged through schooling. This theory is organized by "sites of development" and "dimensions of learning."

* See also the use of the term in evaluation studies. (Source: Fetterman, D.M. (2003). Fetterman-House: A Process Use Distinction and a Theory. In C. Christie (Ed.), *The Practice-Theory Relationship: New Directions in Evaluation*. San Francisco: Jossey-Bass.)

Sites of Development and Dimensions of Learning

Under current circumstances in typical districts, learning needs to take place among teachers wanting to deepen their instruction and within schools and districts with established organizational routines and cultures. Districts are the sites where authoritative decisions are often made with respect to professional development, school governance, resource allocation, curricular programs, and the local politics of educational reform and improvement. In mapping the territory of designing for deeper learning, we therefore consider **teacher professional development**, **school organizational development**, and **district organizational development** as three nested sites of development that a design effort for ambitious instructional improvement must take into consideration. Theories of improvement that capture developmental needs in relevant sites, therefore, enable designers to "see the system."[26]

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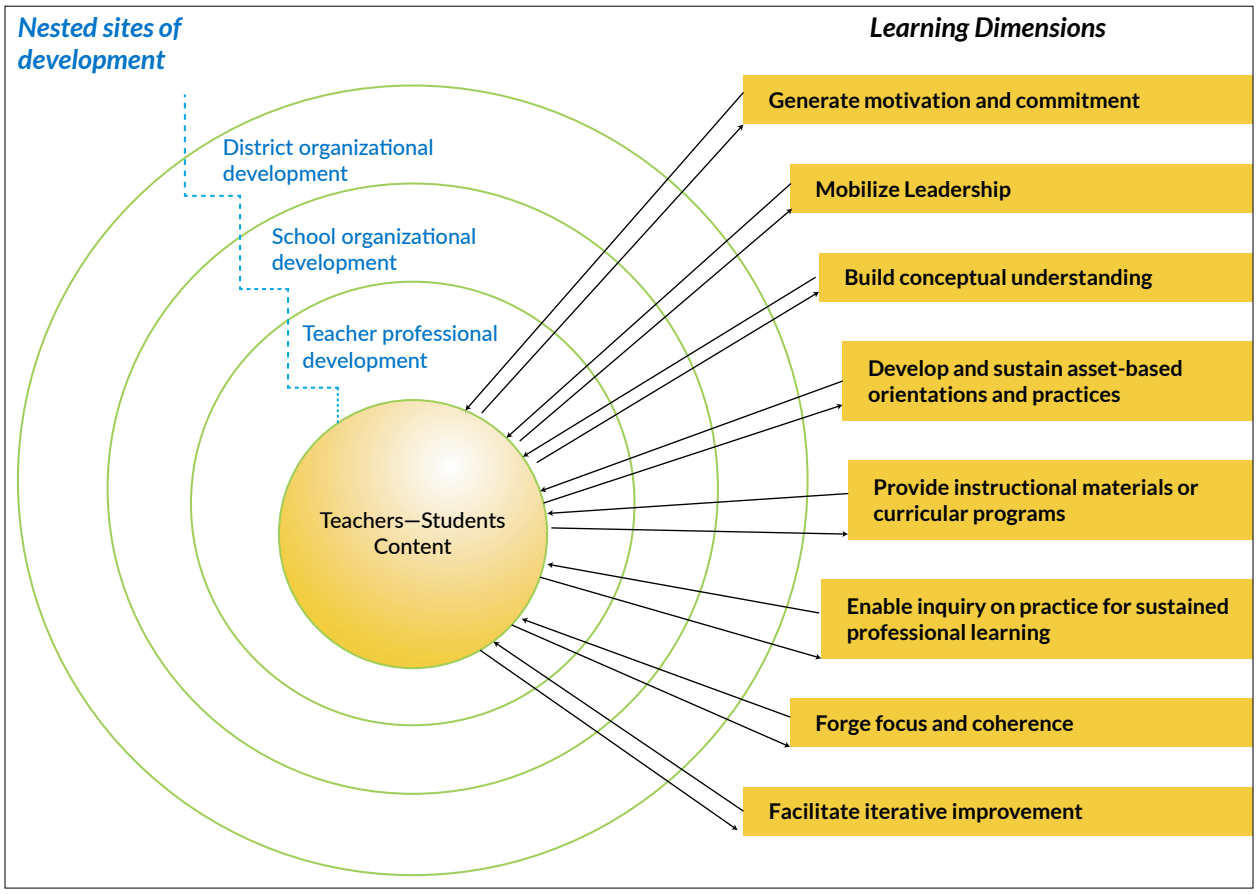
But what about the focus of the learning that needs to take place in these sites? The literature on ambitious and equitable instructional reform has identified a number of key learning dimensions that revolve around motivation and commitment, conceptual understanding, instructional materials, asset-based orientations and practices, and forms of inquiry in professional communities. Literature in the field of organizational development has named elements, such as the mobilization of instructional

leadership, programmatic focus and coherence, and systems and routines for iterative improvement as important dimensions of learning.

The nested sites of development and dimensions of learning are represented in Figure 1. The dimensions of learning cut across developmental sites, but in each site they weigh differently. Each site comprises unique strategies and organizational features that can potentially be leveraged to further deeper learning. Ideally, developments in the three sites build on each other, and developments in one create momentum for development in another.* It is important to note that there are two developmental sites not mentioned here that are at the core of the whole undertaking: (1) students developing new ways of learning and (2) teachers developing new ways of teaching. What goes on within classrooms and in teachers' minds when they plan their lessons cannot be directly shaped by a districtwide effort of instructional change; instead, they must be indirectly influenced via professional and organizational development. Therefore, student and teacher learning in the deeper learning mode are envisioned as outcomes.

Figure 1. Sites of Development and Dimensions of Learning for Designing for Deeper Learning



Dimensions of Learning

1. Generate Motivation and Commitment

For many teachers, developing knowledge, commitments, and pedagogies associated with deeper learning requires substantial changes to their current practices. Learning to support deeper learning equitably for students cannot be "done" to teachers; they must experience the work as worthwhile and meaningful.[27] As such, **a critical aspect of teacher professional development entails supporting teachers to generate the motivation and commitment needed to engage in hard work**. Teachers must be supported to surface and work on authentic issues—that is, the actual tensions and dilemmas that arise from working to support equitable deeper learning.[28]

Strength of motivation is dependent on desirability, efficacy, and problem awareness.[29] Teachers or educational leaders may find deeper learning pedagogy desirable, for example, because they favor it normatively or they find students' learning behavior convincing. They see themselves as efficacious when they believe that they will ultimately be able to handle deeper learning complexity and that their students can handle it as well. When they become aware of the tension between their existing practices and the desired ones, deeper learning becomes a problem that calls for new effort. Desirability, efficacy, and problem awareness with respect to deeper learning practices need to be consciously cultivated.

The school and district organizational contexts provide important sources of motivation for teachers to engage in deeper professional learning. Research about effective and improving schools and districts suggest that deeper sources of teacher motivation can be tapped when a typically fragmented bureaucracy transforms into a community marked by trust, shared ethos and identity, meaningful relationships, and collective commitments.[30] Deeper learning takes root more reliably and equitably in classrooms where the school or district community highly values it and brings attention to those exemplifying it.[31]

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2. Mobilize Instructional Leadership

Large-scale studies of school and district effectiveness and improvement have consistently found that leadership is critical at the level of school sites and the central office.[32] Academics tied to high standards and specific goals for teaching and learning tend to be core features of effective schools and districts,[33] contingent upon leadership practices that communicate and cultivate the desirability of an ambitious instructional vision,[34] and drive the creation of organizational routines that support improvement in teaching and learning.[35] The leadership practices through which principals influence teachers' instruction tend to, in turn, be shaped by the orientation and mentorship offered through their relationship with supervisors at the district level.[36]

According to research about cases of successfully enacting ambitious instructional reform, **deeper learning requires a shift away from management-oriented leadership to learning-focused leadership across the system**.[37] Learning-focused leaders—at the central office and school level—adopt an empathetic stance that sees everyone in the system (including themselves) as learners and fosters systemwide learning through the use of various types of evidence and inquiry.[38]

Instructional leadership for ambitious reform, however, usually cannot solely depend upon the actions of individual sites or district leaders, but rather calls for the shared responsibility within organizations. Important sites for this distributed leadership are instructional leadership teams[39] that collectively make decisions to guide school improvement efforts or organize professional learning experiences. In addition, instructional leadership also entails the cultivation of instructional coaches and skilled facilitators of professional learning. The extent to which professional learning experiences are productive depends on the skill and expertise of the person or people charged with facilitation.[40] There is a tendency to assume that a skilled teacher of children automatically makes for a skilled facilitator of adult learning. However, research shows that, just as becoming a skilled teacher requires sustained professional learning, so does becoming a skilled facilitator.[41]

Instructional leadership for ambitious reform calls for shared responsibility within organizations.

3. Build Conceptual Understanding

To support deeper learning for students, research indicates that **teachers likely need to deepen their conceptual knowledge of key elements of both deeper learning pedagogy and of the subject matter they teach**.[42] It is impossible to plan for and facilitate instruction that supports students to develop conceptual understanding in a given subject area without a robust understanding of its core ideas or concepts. However, research also indicates that conceptual understanding of a given subject matter, on its own, is insufficient. Teachers also must develop pedagogical content knowledge—or the knowledge of how it is that students tend to learn core understandings of subject matter.[43] For example, mathematics teachers need to know how young children develop increasingly sophisticated understandings of how to count large numbers;[44] this knowledge distinguishes teachers from other professionals, such as engineers or medical professionals.

Providing teachers with the continuous and applied learning needed for effective professional development requires organizational routines that protect time for building new knowledge through thoughtfully sequenced learning opportunities.[45] Moreover, while not necessarily needing to be experts in specific practices for every subject, leaders need rich professional learning that enables sufficient understanding of the elements of deeper learning pedagogy so as to clearly articulate a vision and the reasons for it.[46] Just as the research suggests that most teachers' practices are far from deeper learning, the research base about central office and school leader practices suggests that most of these are also far from what is needed to enable deeper learning. Most district and school leaders likely need to develop understanding of ambitious instructional reform in order to be enablers of it.[47]

Leaders need rich professional learning that enables sufficient understanding of the elements of deeper learning pedagogy so as to clearly articulate a vision and the reasons for it.

4. Develop and Sustain Asset-Based Orientations and Practices

Deep, conceptual knowledge of a subject matter does not, on its own, enable teachers to engage their students in deeper learning. At its core, instruction that supports deeper learning requires teachers to build instruction in response to children's existing knowledge and lived experiences, and supports students in experiencing instruction as personally meaningful.[48] Teachers must elicit and listen carefully to students' ideas so that they can make judgments about what ideas to pursue and when and why to pursue them. These decisions are made with respect to academic and social goals for students' learning, and necessarily vary depending on what a teacher knows about the specific students in any classroom.[49]

This approach to teaching requires teachers to build genuine relationships with their students and deeply value their students as having worthwhile ideas and experiences on which to build. Research has shown that an asset-based orientation is not common in schools that serve youth of color, youth who live in poverty, and youth for whom English is an additional language.[50] Developing an asset-based orientation, especially for White teachers who make up an overwhelming majority of the teaching force, often requires unlearning implicit and explicit biases[51] and learning how to forge genuine relationships with communities different than their own.[52]

Developing an asset-based orientation requires teachers to unlearn implicit and explicit biases and learn how to forge genuine relationships with communities different than their own.

In addition, professional learning experiences must be equity-oriented so that teachers are supported in understanding structural inequalities and processes of racialization in relation to schooling opportunities and learning how to critically examine and take responsive action in their own practices.[53] Research indicates that professional learning experiences that emphasize equity concerns and center content knowledge and instruction are often disconnected—a disconnect that is unsupportive of classroom instruction that advances equity. That is, it is unrealistic to "assum[e] that raising awareness of diversity and inequities will naturally lead to transformed teaching practices or that teachers will develop culturally responsive lessons without specific guidance on how connect cultural assets to their curriculum."[54]

School and district leaders play an important role in fostering a school ethos that invites asset-based orientations by meaningfully framing improvement goals and introducing discourses that challenge deficit thinking.

The school organization has the power to either enable or interfere with striving towards deeper learning for students that have been disadvantaged by the educational system by the discourses and commitments they foster. For example, school discourses and interactions may communicate low expectations and perpetuate deficit discourses about students of color who live in poverty.[55] In contrast, research that has attended to effective teaching in schools that serve a majority of students of color and students living in poverty have shown that cultivating engagement in deeper learning calls for a community committed to authentic relationships and culturally responsive instruction that validates students' identities and connects to students' funds of knowledge.[56] School and district leaders play an important role in fostering a school ethos that invites asset-based orientations by meaningfully framing improvement

goals[57] and introducing discourses that challenge deficit thinking.*[58] Forging commitments to improving and deepening students' learning also depends upon whether teachers have had experiences that develop beliefs in the faculty's collective efficacy to fulfill those goals.[59]

5. Provide Instructional Materials or Curricular Programs

Realizing these ambitious goals for teachers' learning necessitates an infrastructure in which experimenting with new forms of teaching and learning in a principled manner is actively encouraged and becomes the norm. **At the heart of this effort are instructional materials that have been explicitly designed to support deeper learning**.[60] However, teachers report that they often do not have these instructional materials,[61] which requires them to either create new materials or radically alter what they have. When teachers are provided ample time and support, generating new instructional materials can be a profoundly educative and empowering experience.[62] However, absent time and support, expecting teachers to create new instructional materials on their own is unlikely to reliably produce desired results.

When teachers are provided ample time and support, generating new instructional materials can be a profoundly educative and empowering experience.

Decisions about what materials to use often take place at the school or district levels and determine the cultural responsiveness and depth of intellectual challenge in the curricula and the extent of implementation of particular instructional materials or programs.[63] School and district organizational routines and artifacts also shape the guidance that teachers receive about how to organize and pace curricula across the school year, and the time and resources given to teachers to learn curricula.

6. Enable Inquiry on Practices for Sustained Professional Learning

To advance deeper learning with an explicit focus on equity, teacher professional learning experiences must be "close to practice" and organized around the materials teachers are actually using in their classrooms.[64] **Ambitious instructional reform is enhanced by the development of collegial teams that function as professional learning communities that routinely engage in dialogue about teaching and learning and undertake disciplined inquiry**.[65] In such communities, the same group of teachers have opportunities to work together on their practice over time.[66] This is crucial because supporting deeper learning for many teachers requires trying out new forms of practice, and doing so depends upon trusted relationships such that teachers come to see one another as resources and colleagues with whom they can lay bare their challenges.[67]

* The term *deficit thinking* refers to the notion that students (particularly those of low-income and/or racial/ethnic minority backgrounds) fail in school because such students and their families have internal defects (deficits) that thwart the learning process (for example, limited educability, unmotivated attitude, inadequate family support). The theory contends that poor schooling performance is rooted in the students' alleged cognitive and motivational deficits, while institutional structures and inequitable schooling arrangements that exclude students from learning are exculpatory. (Valencia, R. R. (Ed.). (1997). *The Evolution of Deficit Thinking: Educational Thought and Practice*. London, UK: Routledge.)

In addition, teachers will need coordinated opportunities to both investigate their current practice and experiment with new forms of practice.[68] In productive investigations, teachers generate artifacts of teaching and learning (e.g., student work samples, video recordings of instruction) and inquire into student learning and students' experiences of the classroom with respect to the instructional decisions they made (as opposed to suggesting that unintended learning outcomes are due to a deficit in the student). From these investigations, teachers generate authentic questions to pursue. In addition to interrogating practice, teachers also must enact new forms of practice with the support of others.[69] For example, teachers might work with a coach to try out how to elicit a range of student ideas or how to engage students in productive collaboration, or they might "rehearse" with colleagues how to introduce discussion of a potentially controversial topic.[70] To learn how to engage in ambitious forms of practice—and especially ones that challenge the status quo—teachers need opportunities to try out new forms of practice in context and with support.[71]

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Designing and implementing sustained, high-quality professional learning tends to require substantial shifts in "business as usual" in most schools and districts. Studies that have examined teachers' advice networks—that is, unofficial social networks in which educators share resources and pedagogy that have improved classroom instructional practice—have found that high-quality professional learning can generate important shifts in the "informal" ways in which teachers interact. Studies indicate, for example, that teachers are more likely to informally seek one another out and apply new instructional ideas in the classroom when they have regular opportunities to see models and get help from more expert colleagues.[72]

Crucially, the nature of teachers' interactions and the development of teaming capabilities are shaped by district-level and school-level leaders who allocate time, provide orientation or tasks for teams, shape opportunities to communicate with colleagues, and foster a climate of trust needed for undertaking joint work and collective learning.[73] Moreover, expectations and perceptions of collective responsibility for student learning are socially constructed in the organization,[74] but are also heavily mediated by the interactions that take place in formal collegial bodies, such as leadership teams, grade levels, or departments.[75]

7. Forge Focus and Coherence

In an incoherent educational system and a complex public organization beholden to multiple constituencies, the enactment of deeper learning depends upon the ability of central office and school leaders to forge coherence by guarding against disconnected and shifting reform initiatives[76] and instead maintaining consistent messaging, buffering against competing agendas, and allocating resources to align with their vision. However, forging coherence is more than a matter of messaging and resource allocation. Furthering deeper learning requires routines through which building-level and central office leaders engage in strategic planning and design professional learning for principals, teachers, and school teams (or procure consultants or mobilize others with the expertise within the organization). In this way, **enacting organizational coherence hinges upon coordinating the routines of various work groups across the system so that their tasks and learning contribute to a shared systemwide vision and goals**.

Studies examining the political dimension of ambitious reforms offer the caution that an ambitious agenda can easily become sidelined if the politics of change are not carefully attended to, especially in urban districts that serve large numbers of students of color, students for whom English is not their first language, and students from low-income backgrounds.[77] Ambitious reform, particularly one that aims at equitable and rigorous learning opportunities for all students, does not serve the interests of all groups equally and, thereby, can threaten the distribution of status and power in a district.[78] "Labor peace"* and widespread support across various stakeholder groups are commonly cited features of successful district reform.[79] Given the traditional structures of local governance by school boards, the strong influence of teachers' collective bargaining activity and efforts, and potential organizing efforts among reform groups or parent and community groups, crafting a coherent and consistent agenda tied to ambitious reform requires careful attention to engaging with multiple stakeholder groups and critics.[80] Reforms perceived as top-down or adopted without the support of powerful constituencies can foment resistance movements that can be time-consuming and distracting at best, or lead to leadership turnover and crushing of the agenda at worst.[81]

8. Facilitate Iterative Improvement

Deeper learning is not a program that can be implemented in one stroke. Rather, its complexity requires ongoing experimentation and improvement. Literature on design-based school improvement or improvement science describes a continuous learning infrastructure that undertakes work such as clear problem framing, needs assessments, practical measurements that enable a continuous data stream, and iterations based on data feedback.[82] Improvement efforts focus on using data to determine where and how to change a particular context and stipulate the need to revisit the evidence as changes to a system are implemented. Implementation of new ways of teaching and learning is optimally carried out through small scale, systematic tests of change in which implementers learn from their practice.

Deeper learning is not a program that can be implemented in one stroke. Rather, its complexity requires ongoing experimentation and improvement.

On the ground, iterative improvement calls upon teachers and administrators to embrace new practices[83] and new ways of approaching their work.[84] Just as deeper learning requires shifts in how educators think about what they do with students and what students can do, **iterative improvement requires educators to reflect on their own practice through the examination of evidence generated by it**. Educators trying new strategies for developing deeper learning competencies with students need to collect data on what is happening in classrooms or other forms of engagement, but they also need data to describe the causal logic chain—that is, the interventions done directly with students must be shown to lead to the outcomes (e.g., increased evidence of deeper learning competencies) through data collected at multiple levels. Often, schools are not well equipped to collect data on classroom practices in ways that can be analyzed and learned from. To support

* A labor peace agreement is an arrangement between a union and an employer under which one or both sides agree to waive certain rights under federal law with regard to union organizing and related activity. (U.S. Chamber of Commerce. (2016). *Labor Peace Agreements*, Washington, DC: Author. https://www.uschamber.com/sites/default/files/documents/files/laborpeaceagreements.pdf.)

iterative improvement, educators often need measures that are either adapted from current systems or generated for the explicit purpose of allowing people within a system to see how it works.[85] Additionally, actors in the system need to think about data in new ways, moving away from accountability-based sensemaking schemas that have dominated education for the past several decades and instead embracing a stance that prizes learning from the data in order to understand what needs to be improved.

To support iterative improvement, educators often need measures that are either adapted from current systems or generated for the explicit purpose of allowing people within a system to see how it works.

The development of the infrastructure required to support improvement efforts remains substantial for most schools and systems. Leaders have to facilitate the development of the technical, analytic, and social components[86] of an improvement apparatus that may run counter to long-standing ways of working across all three of these areas. The transformative work needed to accomplish these changes is formidable and often requires an outside analytic partner to execute successfully.[87] However, the externalities of fostering improvement mindsets and the accompanying needed infrastructure may pay dividends beyond deeper learning.[88]

Design Tasks

The charge of a deeper learning project is highly complex and thorny. It requires attending to design tasks at multiple levels of the system. *Design tasks* are here understood as generic placeholders on a higher level of abstraction for a set of planned, systematic, and repetitive activities; replete with artifacts, tools, materials, rules, norms, etc.; carried out by leaders, administrators, coaches, teachers, and so on. The design tasks shown in Table 1 should not be read as exhaustive, but as a well-founded compendium based on the review of the literature. Design tasks are not concrete enough to describe actual activities. But concrete activities can be attached to the design tasks to create momentum for the will and capacity to engage in new classroom practices.*

To give two examples, Table 1 might be read in the following ways:

1. In the dimension of motivation and commitment, the professional developer aims at demonstrating examples of desirable classrooms, the school leader forges an organizational ethos that lives through face-to-face interactions in the faculty, and the district signals strong authoritative messaging.
2. For the crafting of coherence, professional developers make connections between existing practices and desired new practices, school leaders make a connection between recognized urgencies and passions shared by the faculty and deeper learning as a fitting solution, and district leaders make sure that the concern for deeper learning is not submerged by contradictory initiatives or programs adopted by the district.

* Specifying design tasks makes the theory of improvement more concrete for designers as a roadmap that "makes the system actionable" for design.

Table 1. Design Tasks for a Districtwide Deeper Learning Initiative

LEARNING DIMENSIONS	SITES OF DEVELOPMENT		
	TEACHER PROFESSIONAL DEVELOPMENT	SCHOOL ORGANIZATIONAL DEVELOPMENT	DISTRICT ORGANIZATIONAL DEVELOPMENT
GENERATE MOTIVATION AND COMMITMENT	• Create desirability of deeper learning by demonstrating DL in action	• Forge ethos/ identity/ commitments to DL • Highlight site instructional exemplars, give recognition to innovators	• Communicate strong DL message • Create concrete exemplars and opportunities for districtwide distribution • Highlight standards of quality
	• Create problem awareness/ contrast between "what is" and what is desired	• Make limitations visible without antagonizing informative conversations	• Share baseline data districtwide
	• Appreciate bright spots, successes, and improvements	• Recruit and empower instructional leaders • Develop school demonstration sites	• Demonstrate and reward improvements
MOBILIZE INSTRUCTIONAL LEADERSHIP	• Cultivate model classrooms	• Convene instructional leadership teams • Call attention to DL instructional practices	• Recruit and support DL-competent instructional coaches or teachers on special assignment • Orient principals to focus on instructional development at their sites
	• Amplify the voices of pioneer teachers	• Recruit teachers to open up their classrooms for demonstrations • Empower instructional coaches and/or teachers on special assignment	• Engage in team learning for school supervisors and administrators responsible for professional development/ curriculum and instruction • Strengthen contact between district supervisors, site administrators, and teacher leaders
BUILD CONCEPTUAL UNDERSTANDING	• Familiarize with essential elements of DL pedagogy	• Communicate the essentials of DL pedagogy	• Build sufficient principal knowledge to be enablers of DL pedagogy
	• Deepen subject matter and pedagogical content knowledge	• Facilitate communication between colleagues around subject matter	• Organize summer academies or other sustained professional development
DEVELOP AND SUSTAIN ASSET-BASED ORIENTATIONS AND PRACTICES	• Develop awareness of deep-seated biases along lines of, for example, race, ethnicity, gender, class, language, and ableism	• Create climate of open communication, courageous conversations, and actions around structural disadvantage and equity	• Elicit, build on, and strengthen student voice and community voices
	• Pose challenges to limiting beliefs, biases, or assumptions about students • Support teachers to learn about and build on student assets	• Mobilize ethos of social justice, care, and commitment to students, their families/ communities, and teachers	• Communicate standards of equity in learning opportunities
	• Raise expectations of what students can do	• Surface and address existing inequitable patterns at the school	• Surface and address existing inequitable patterns districtwide

Table 1. Design Tasks for a Districtwide Deeper Learning Initiative, *continued*

LEARNING DIMENSIONS	SITES OF DEVELOPMENT		
	TEACHER PROFESSIONAL DEVELOPMENT	SCHOOL ORGANIZATIONAL DEVELOPMENT	DISTRICT ORGANIZATIONAL DEVELOPMENT
PROVIDE INSTRUCTIONAL MATERIALS OR CURRICULAR PROGRAMS	• Provide sustained professional learning to teachers on new materials	• Implement new curricular programs/materials schoolwide	• Procure materials, programs, consultants, partners from external sources
	• Facilitate opportunities to try out new curricular features with colleagues	• Create opportunities for teachers to develop and disseminate their curricular materials • Organize schoolwide or team-based professional development to learn to use new curricular features	• Provide funds for developmental activities • Solicit and curate teacher-created curriculum • Organize districtwide professional development on new curricular features
ENABLE INQUIRY ON PRACTICE FOR SUSTAINED PROFESSIONAL LEARNING	• Establish inquiry routines	• Form teams or learning communities • Strengthen team effectiveness • Communicate performance expectations	• Form and strengthen district teams and learning communities • Provide models, protocols, etc. to guide teams in inquiry on practice
	• Encourage collegial learning and exchange through sharing artifacts, experiences, outcomes • Encourage experimentation	• Allocate designated time slots • Develop school demonstration sites • Connect with external partners	• Create districtwide DL networks • Bring in external partners and/or consultants
FORGE FOCUS AND COHERENCE	• Draw connections between existing and new practices	• Make connections between the new DL vision and shared urgencies and passions at the organizational level	• Decide on focal districtwide initiatives and ensure that DL fits within them • Communicate a binding instructional framework
	• Capitalize on continuities, established insights	• Avoid/reduce initiative overload	• Protect DL from competing initiatives
	• Embed deeper learning into prior professional development initiatives and commitments	• Give DL a central place • Empower DL adopters, relegate pessimists to the sidelines	• Leverage assessments and forms of evaluation • Gain support from stakeholders and maintain a supportive political coalition • Capitalize on outside community support
FACILITATE ITERATIVE IMPROVEMENT	• Identify evidence of student learning with respect to teacher experiments	• Use evidence to establish baseline based on evidence	• Put a formative evaluation of DL initiative in place • Gather data from the ground up
	• Encourage principled inquiry, trial and error	• Use data (formative and summative) as feedback on improvement efforts	• Enable district leaders to understand and communicate empirical patterns to schools • Establish habit of data feedback

From Theory of Improvement to Theory of Action

If local designers could attend to multilayered design tasks in their fullness, research predicts that the design challenge would be met with a good chance of success. But districts and schools, especially in more disadvantaged environments, have limited resources, and it is rare that they could cover the full spectrum of design tasks suggested by the theory of improvement. Given incontrovertible limitations in local capacity and collective energy, designing in the local context is the art of carefully selecting a finite number of activities that can drive change toward the desired outcome. The totality of these activities composes the actual "design" that a given project pursues. The design connects local needs assessment and analysis of germane obstacles and assets with powerful drivers of change within the context of an organization's prevailing knowledge and sentiments. The end point of designing is the creative act of connecting such drivers to imaginative change activities that have a chance to be implemented in the local organizational context. And when this connection is attached to a rationale that makes transparent how designers intend to get from Point A to Point B, then a locally plausible theory of action is created. This theory of action may represent a design team's best thinking at a given point in time. As complex change processes are full of unforeseeable developments and surprises, theories of action may evolve and be revised from time to time.

Designing in the local context is the art of carefully selecting a finite number of activities that can drive change toward the desired outcome.

Designers within highly complex systems are, at the core, problem solvers who, in the face of ill-structured problems and persistent resource limitations, solve their design riddle backward rather than forward. They will, in all likelihood, not begin with an all-encompassing theory of the problem such as a more universal theory of improvement, but pragmatically with an idea of auspicious solutions, which in the minds of practical designers are promising activities. The array of design tasks displayed in Table 1 is meant to connect pragmatic thinking to, or refer back to, a more universal theory of improvement. As designers work through the array of desirable design tasks and make selections depending on local conditions, they intuitively may begin by imagining chances for local enactment or implementation. In a second step, upon deeper reflection, they may reassess whether their choices may achieve their aim. And as they strive to approximate activities to outcomes, being mindful of needs, obstacles, assets, and drivers, they in effect formulate a theory of action.

Trade-Offs and Sequencing

As designers move from a universal theory of improvement to a theory of action, they face a series of design decision points. At the outset, designers decide how many sites of development or learning dimensions are possible and useful to tackle and with whom. This calls for making a choice as to whether all relevant sites of development will be tackled at once, or if local needs or available resources suggest it is possible and most impactful to concentrate on certain ones. It is unlikely that designers or implementers in districts will have the capacity to work on the full spectrum of design tasks all at once. When making selections, designers assume that a certain degree of reasonable change could result if addressing at least some of the design tasks, perhaps sequenced over a given period of time. Cognizant of limitations those choices put on the scope and ambition of envisioned improvement, designers set a Point B to fit that horizon.

As previously laid out, the design tasks listed in Table 1 are not yet at a level of specificity that would allow for action. There are more decisions to be made. Some of the design tasks within a given learning dimension or site of development may sit in tension with each other, or might not be taken up simultaneously. Decisions about which design tasks to focus on—or which to focus on first—are not arbitrary. A promising theory of action is guided by principled reasoning informed by local needs assessments and knowledge of the organization's current capacity, knowledge, and culture. Still, each decision may entail trade-offs—a focus on one design task over another may offer certain affordances but also open up potential consequences that shape the scope of improvement possible within a given timeframe. Initial trade-offs that focus on one design task over another may be seen as necessary in an initial phase with intentions for other design tasks to be taken up in subsequent phases of design.

A promising theory of action is guided by principled reasoning informed by local needs assessments and knowledge of the organization's capacity, knowledge, and culture.

For instance, consider two design tasks in the dimension of "generating motivation and commitment" for teacher professional development: "creating problem awareness" and "appreciation for 'bright spots' and successes." While it might be tempting to take up both design tasks at once, these are two different psychologies of change that might need to be selected between or sequenced. Proceeding through one or the other has potential affordances and consequences to consider. Problem awareness may afford a

stronger sense of urgency for change, but if a local needs assessment indicates many teachers have a low sense of efficacy, a focus on problems might provoke defensiveness that inhibits learning. In this case, it might be prudent to begin with a focus on "appreciation." On the other hand, appreciation may be too weak of an impetus for motivating sustained and substantial learning in the long run. Hence, designers who begin with an appreciative approach might plan to transition to a problem-focused approach in a future design phase once a sufficient sense of efficacy has been established.

In the dimension of "building conceptual understanding" for teacher professional development, designers face a decision on how subject-specific to be. If taking up the design task to "familiarize with essential elements of deeper learning pedagogy," the design may aim to reach across subject areas, enabling collective learning about deeper learning for various teachers of many subjects and grade levels. However, a subject-neutral approach may be too superficial to allow for substantial changes to practice. If taking up the task to "deepen subject matter and pedagogical content knowledge," designers would likely focus on one subject deeply, which can open up more substantial learning for those teachers. However, this approach involves a trade-off by potentially leaving many subjects and teachers out of the picture. Some design teams might approach this as a sequence in which they focus in the first design phase on introducing all teachers to basic elements of deeper learning pedagogy, and then in a future phase zeroing in on one or more subjects. This decision has ramifications for the design tasks taken up in this dimension in the school organizational and district organizational developmental sites as well.

To "develop and sustain asset-based orientations and practices," designers face another decision for teacher professional development that has implications for the other developmental sites as well. Designers might decide to start by engaging in sitewide conversations about biases at a more general level, to first develop a set of lenses that then teachers (and leaders) develop to examine their current practice in subject-specific ways. This might be followed by subject-specific professional development in which teachers are supported to see their students as capable of engaging in deeper learning and to identify how their own expectations for students reflect biases. Alternatively, a design team may decide to focus on subject-specific professional development aimed at developing asset-based orientations and forms of practice. Reflective inquiry surfaces how teachers' biases are shaping what they are expecting of students, which can then be related to systemic inequities. In each of these cases, facilitating professional development that brings together issues of bias with critical inquiry into practice requires deep expertise. Designers will need to make decisions along these lines in light of an honest read on their capacity, relevant expertise, and people's current will and commitment. If local leadership capacity is not sufficient to support this work, then there is a need to bring in outside expertise. If relying on outside help, designers will likely face a scenario of selecting among consultants who tend to specialize either in organizing general discussions of biases for developing an asset-based lens but do not necessarily connect this to instruction, or in subject matter expertise that can help teachers recognize students' assets in particular subject-specific ways. Designers need to think through how to bridge between the specialized expertise that consultants bring and how to create sufficient time to do both.

Reflective inquiry surfaces how teachers' biases are shaping what they are expecting of students, which can then be related to systemic inequities.

When it comes to the learning dimension of "enabling inquiry on practice," designers face a trade-off between simplicity and complexity. They may wish to "establish inquiry routines" that stretch towards complex learning, for example, through lesson study. But what if local needs assessments reveal that learning communities are not well established and critical analysis of one's teaching is a threatening undertaking? In this situation, complex inquiry such as lesson study might overwhelm teachers and invite them to give up or to go through the motions. It might be better to focus on a simpler "collegial learning and exchange through sharing artifacts, experiences, and outcomes" that emphasizes what teachers are comfortable sharing—while knowing that this may enable only shallow collegial conversation that likely needs to be deepened in future design phases.

When it comes to providing instructional materials, designers face a trade-off in the realm of district organizational development regarding whether the materials should be sourced internally or externally. Is this a context in which an external program has a reasonable chance of being implemented? Or is such an approach likely to alienate teachers who value their expertise and autonomy as professionals? If the latter is the case, teacher-generated curricular materials may have more uptake and buy-in. However, this limits the intervention to the level of internal expertise available. If instructional capacity is limited in a particular context, designers may reason that it will be more fruitful to provide training and orientation with external materials first, perhaps with a view towards encouraging teachers to create and disseminate their own materials at a later stage.

Final Step: Application

Up to this point, three key steps in thinking through a design challenge have been presented.

1. Consulting the research and professional knowledge base helps designers formulate a theory of improvement that spells out major factors to be considered for a specific design challenge.
2. Translating the theory of improvement into a matrix of design tasks gives designers broad action orientations. However, design tasks derived in such a way are usually rather all-encompassing.
3. Once specific local constraints—such as pre-existing practices, prevailing experiences, political preferences, limited resources, available expertise—come into the picture, trade-offs are necessary, and certain design tasks may be emphasized while others may be neglected.

Chosen design tasks are made concrete with locally developed activities that, when implemented well, will presumably move the organization forward in the desired direction. Designers make choices with a rationale in mind. In convincing themselves that the locally specific mix of chosen design tasks and activities will be effective, designers formulate a locally specific theory of action.

In this section, this multi-step approach is applied to the initial theories of action developed in three deeper learning projects in the Hewlett design community.* Each pursued a contrasting local mix of design elements and activities. The aim of this final step of application is to illustrate the usefulness of the logic discussed in this paper with concrete examples.

* The three projects are included anonymously, although they describe actual design challenges faced by real research-practice partnerships funded by the William & Flora Hewlett Foundation.

Each project emphasized certain dimensions and sites of development in addressing the design challenge at the outset while either ignoring or touching upon only lightly others when composing the initial theory of action. What follows is not a full story of design and implementation, but a discussion of what designers put in the mix in light of the full spectrum of design tasks that could have been included.

Project A

Background

The goal of Project A was to advance deeper learning instructional formats in all grades and subjects districtwide. This project took place in a medium-sized district serving approximately 20,000 students. The student population is racially and ethnically diverse (about 65% Hispanic, 8 % Black, and 15% Asian). Nearly 70% of students qualify for the free and reduced-price lunch program, and about one-third of the students are classified as English learners. The executive arm of the RPP design team consisted of a university professor with between three and five research and development assistants, the district superintendent, the assistant superintendent of Curriculum and Instruction, and their entire team of administrators.

Initial assumptions about the current state

In formulating a theory of action, the design team conducted a needs assessment in order to establish a baseline in terms of existing practices and available resources. Classroom walkthroughs revealed the prevailing district classroom pedagogy to be caring but low rigor. The district's history of rapid cycles of adoption and implementation of disconnected programs and the pressure to raise test scores had put a premium on shallowness and expediency when it came to professional learning. The design team thus hypothesized that deeper learning instruction required, as a pre-condition, the deepening of professional learning. The designers did not think that "another program" would move district teachers, and limited resources made it impossible to pay for and supply subject matter academies districtwide. On the positive side, the district had a weekly time slot for regular collegial team meetings at school sites, instructional coaches for almost every school, a so-called lab teacher network in which teachers who were willing to demonstrate innovative instruction congregated, instructional leadership teams at almost every site, and regular principal network meetings facilitated by members of the district level Curriculum and Instruction team. These existing organizational features needed to be mobilized for deeper learning.

Initial theory of action

In order to create a tangible focus for the district, the design team selected four deeper learning practices that are essential for effective lessons delivered in deeper learning formats: creating curiosity for content, student-teacher dialogue when introducing new content, student-student dialogue around academically challenging ideas, and teacher feedback based on student misconceptions. These four practices were to be made concrete with an array of video clips, lesson demonstrations, and professional development (PD) modules. Teacher leaders and principals were to be prepared to offer these modules to their faculties during after-school PD sessions. The modules were to be co-designed among district instructional coaches, lab teachers, and university team members. The deeper learning practices were neither curriculum specific nor elaborated in instructional programs. Instead, they were

meant as concrete foci for teacher inquiry that was in the center of the design. The modules and videos were to motivate teachers through testimonials of experimenting colleagues and the appreciation of student voice and academic engagement made visible through the material. All materials were to be in-house productions. Problem awareness—that is, the relatively rare occurrence of deeper learning and the limitations on student voice—was to be generated through classroom walkthroughs using common non-evaluative observation guides across all levels of the system. This work was to begin with district administrators and principals who were to be sensitized to the necessity for change.

Development sites, learning dimensions, and design tasks addressed

By comparing this theory of action to the matrix of design tasks derived from the broader theory of improvement, the project offered potential affordances for bringing about deeper learning. The design addressed multiple developmental sites—teacher professional development and school and district organizational development. The designed learning processes attended to several key dimensions:

- Generating motivation with testimonials and video exemplars from within the district
- Mobilizing leaders on all levels to create momentum for change in the desired direction
- Building understanding of the deeper learning pedagogy through a concrete instructional focus around four deeper learning practices and attendant PD modules
- Enabling inquiry focused on teachers' "tweaks" to day-to-day practices
- Forging focus and coherence with PD modules that serve as a common point of reference for articulation across the teacher and administrator levels
- Facilitating problem awareness and data for iterations through walkthroughs

But it also became apparent what was left out. There were no programs or subject-based curricular materials, and there was little attention paid to deepening understanding of subject matter. The focus of the project was on practical matters. Desirability, for example, was established through exemplars and demonstrations of what students in the district were capable of doing when taught well, and modules connected the pioneers' testimonials with "take-home tools," i.e., techniques for teachers to try out tomorrow. Little attention was given to embedding deeper learning into broader political and social commitments, such as the commitment for racial and ethnic social justice or in a strong identity of professionalism. The designers did not address how to cultivate stakeholder support—presuming that, with the district top leadership being part of the partnership, the deeper learning initiative would withstand political contestation and competing initiatives that might push it to the periphery as happened to many other initiatives before.

Trade-offs and sequencing

In leaving out certain design tasks, Project A accepted certain trade-offs and sequencing decisions in their change activities. Doing so allowed the project to opt for a generic rather than subject-specific approach to building conceptual understanding for deeper learning. At the time, small, subject-specific intensive interventions had existed in the district, but they reached a very small number of teachers in a few schools. The RPP decided that the districtwide impetus would have been lost with this approach, so it was reasoned that a critical look at teachers' own instruction and an incremental striving towards expanding student voice might be more powerful. Later, the theory of action may shift towards an explicit subject matter focus. Secondly, while the existing partnership was committed to values of

social justice and equity, creating a language and message that connected this vision to the academically oriented deeper learning quest would have required a configuration for the partnership that included activists for racial and economic justice. Having strengthened the focus on instruction in the initial design phase, future design tasks might focus more on creating such a configuration that allows for a stronger connection to a social justice ethos.

Predicting implementation challenges

In reference to the spectrum of design tasks derived from the encompassing theory of improvement, the local theory of action was built on a fragile construction, posing potential negative consequences for its success. The initial theory of action depended on multiple levels of the district interacting with each other on a focus for inquiry—a complex undertaking that could overextend existing capacity. It banked upon district leaders being strongly committed to deeper learning—commitments that may be challenged by competing political pressures and urgencies. It relied on teacher-leaders being compelled by practical exemplars and testimonials—which may prove too weak of an impetus for substantial learning to change classroom practice. It assumed a certain degree of professionalism among teachers—namely, appreciation of powerful deeper learning lessons, an established base of inquiry in teams, and a measure of collective efficacy—that may turn out to be less developed than previously thought. Presuming that the design team provided sufficient routines to gather and reflect on evidence about the process and impact of implementation, the matrix of design tasks may give them ideas on how to mitigate weaknesses in the design in next iterations.

Project B

Background

Project B centered around cultivating a school vision and culture to enable schools to develop policies, practices, and structures aligned with deeper learning. The RPP was composed of two organizations: a school district in southern California and a nonprofit research and technical assistance firm located in the Pacific Northwest. The district is composed of about 20 schools, of which the partnership initially worked with 11 but planned to work with all district schools in subsequent years. The nonprofit organization focused on research and evaluation of school innovations and also partnered with schools; the organization's efforts centered on transforming school culture by working on identity, structure, and learning practices to increase student college and career readiness. The district staff involved in the partnership included a designated teacher on special assignment, several assistant superintendents, and district-level coaches. In the nonprofit firm, three research-oriented staff and the executive director of the organization (who provided technical assistance) worked on the partnership.

Initial assumptions about the current state

In the school district, one school had undergone a transformation process that had led to both a new school identity and culture, as well as the promotion of deeper learning practices in 2011, prior to the partnership forming. Three other schools undertook similar transformative activities prior to the partnership forming, which paved the way for the partnership to assist all schools in the district in taking part in the process. Schools were assessed for readiness to participate based on receptivity of leadership to participation, with schools with more eager leaders taking part in earlier cohorts. Schools that had not yet undergone the transformative processes (described later) were assumed to not yet have

developed policies, processes, and structures to support deeper learning (the presumed outcome of the school transformation process). However, the district had made it a priority to focus on 21st-century skills and specific deeper learning competencies—such as critical and creative thinking—that had been articulated as part of that strategy previously.

Initial theory of action

The partnership elected to center its efforts around preparing schools for, shepherding them through, and supporting them after a transformative school process designed to stimulate the creation of a new school vision and culture aligned with promoting specific deeper learning competencies. School leadership teams took part in PD activities to prepare them for transforming their schools and for instilling in them an understanding of specific deeper learning competencies. School leadership teams then enacted the school transformation process and the subsequent development of a vision. The partnership provided additional support for the development of the new school vision and the beginning of the development of the policies, practices, and structures aligned with promoting specific deeper learning competencies.

Development sites, learning dimensions, and design tasks addressed

The design decisions of the partnership focused primarily on the school and district levels of organizational development, with less direct attention paid specifically to teachers' professional development, although teacher-leaders were included in school leadership teams. The school transformation process attended to several key design tasks:

- The preparation for the school transformative process and the enactment of that process generated motivation and commitment from school leaders and school communities.
- Professional development led by the partnership built conceptual understanding of the importance of school transformation as a mechanism for instantiating deeper learning.
- Engaging staff, students, families, and communities—who rarely had seats at the table concerning school culture and identity—helped develop asset-based orientations and practices.
- The entire process of transformation was designed to forge focus and coherence in a school.

There were some design decisions that left out tasks. The school transformation process, for example, did not focus on enabling inquiry on practice; this, along with a lack of leading outcomes or measures of interim actions, inhibited iterative learning in the partnership and the district. Similarly, while the professional development activities helped school and teacher leaders learn more about deeper learning competencies—thus aiming to motivate instructional leaders—the learning activities did not include specific instructional materials or curricular programs to help equip teachers with building their pedagogical practice around deeper learning.

Trade-offs and sequencing

The partnership believed that the transformation of school culture must start from and be continually supported by school leadership, which resulted in it devoting less time and fewer resources to the development of instructional materials or other professional development activities among teachers. The design decisions made by Project B were not made in a vacuum and without considerable thought. The partnership first elected to have a cohort of schools "most ready" (as assessed by the RPP leadership) go through the transformation process: four cohorts were specified, moving from those

hungry for change to those most resistant to change for a wide variety of reasons. The partnership centered its attention on the preparation, execution, and immediate support after the school transformation process leading into the development of a new school vision. In part, this was due to limited human and financial resources in the face of a decision by district leadership that all schools take part in the transformation process. The partnership realized that schools needed greater levels of support for the actual process of building policies, practices, and structures to support deeper learning after the development of a new school identity, but it struggled to assist them due to these constraints. The focus on school leadership was a deliberate decision concerning the expenditure of resources, with important factors such as the likelihood of buy-in from school leadership versus instructional staff, the ability of the RPP leadership to get leaders to be able to participate, and the belief that school leadership could help facilitate further transformation among other staff. This decision led towards the RPP potentially focusing more on instructional staff preparation—through professional development and creation of instructional materials and other supports—moving forward.

Predicting implementation challenges

While the school transformation process might help unite students, teachers, school leaders, and district leaders, the design decisions could result in challenges for school leaders and teachers after the process has gone through its initial steps of bringing people together and articulating a new vision for the school. Instructional staff will likely need additional support in moving from more traditional teaching philosophies and strategies to deeper learning-oriented ones. Additionally, without inquiry cycles and a strategy of iterative improvement, school and district leaders will be left without valuable knowledge of how things worked even if they can point to positive lagging outcomes (such as high school graduation rates). Perhaps most profoundly, the entire conception of school transformation rests upon an assumption that deeper learning will emerge from the new set of policies, practices, and structures that school leadership teams are meant to create based on their new vision of the school and its identity.

Project C

Background

Project C focused on spreading and scaling a standards-aligned social studies curriculum and program referred to as Action Civics. The RPP was a collaboration between a large urban school district in Oklahoma with about 45,000 students, a national non-profit firm focused on developing citizenship skills among students, and a research center housed at a university in the Northeast. These organizations came together to change teaching practice in the partnering district and learn about the impact of the nonprofit's action civics'-inspired reform efforts. This nonprofit firm had a key project manager and additional staff in Oklahoma City who partnered with district leaders in the office of curriculum and instruction and several researchers at the university-based research center. The district is diverse, with about three-quarters of students of color and one-third designated as English language learners.

Initial assumptions about the current state

Project C noted two key issues inherent in their context. First, Oklahoma pays its teachers poorly compared to neighboring states and has experienced a teacher shortage. Because of this, many teachers have emergency credentials,* little experience in classrooms, and particularly little experience with tackling deeper learning as an instructional goal. Second, the partnering district had gone through a significant restructuring at the outset of the project that resulted in the closing of 15 schools and/or changing their grade bands. The district faced the double-edged challenge of opening new schools with inexperienced teachers at the same time as they worked to enact deeper learning practices at scale.

Initial theory of action

The nonprofit organization had developed a standards-aligned Action Civics curriculum and program centered on supporting students with developing the skills needed to be active, empowered citizens, which was being implemented in school districts in multiple states. While initially intended as a partnership focused on implementing Action Civics in 12th grade social studies classes, it became clear quickly that students were entering 12th grade underprepared to engage in the curriculum. The partnership thus expanded its aims to include: (a) support for the successful implementation of action civics in 12th grade classrooms across the district; (b) development of and support for the implementation of collaborative project-based learning (CPBL) in grades 7 and 10; and (c) studying the effects of these efforts.

Development sites, learning dimensions, and design tasks addressed

The design decisions of the partnership focused primarily on teachers' professional development, with less emphasis placed on the school organizational development levels, and little focus on district organizational development. In order to promote CPBL and action civics, the partnership pursued several key activities:

- Developing instructional materials for CPBL
- Offering professional development in CPBL and in Action Civics to build conceptual understanding of deeper learning practices
- Creating a leadership cadre of teachers to generate motivation and commitment and mobilize instructional leadership
- Providing targeted CPBL coaching and support for schools to forge focus and coherence in practices (at least within schools)
- Develop a sustain asset-based orientations and practices through the very content and spirit of Action Civics

* Oklahoma law, at 70 O.S. § 6-187(F) provides that the State Board of Education may issue an emergency certificate, as needed. Provided, however, prior to the issuance of an emergency certificate, the district shall document substantial efforts to employ a teacher who holds a current non-emergency certificate. In the event a district is unable to hire an individual meeting this criteria, the district shall document efforts to employ an individual with a non-emergency certificate in another curricular area with academic preparation in the field of need. Only after these alternatives have been exhausted shall the district be allowed to employ an individual meeting minimum standards as established by the State Board of Education for the issuance of emergency certificates. (Source: Oklahoma State Department of Education. https://sde.ok.gov/emergency-certification-guidance.)

While the design of the partnership's interventions attended to some tasks, others were not enacted. In particular, while the research center provided the partnership with knowledge of teacher and student beliefs around CPBL and Action Civics, it was not designed to enable inquiry on practice among the participating schools and teachers. In not including mechanisms for inquiry, it was hard for the partnership to center iterative improvement since they lacked the structures and the data for doing so.

Trade-offs and sequencing

The context of the partnering district forced the RPP's hand in the design decisions it made. Because of the restructuring of schools, the high turnover of teaching staff, and the comparative inexperience among teachers who remained, the partnership placed considerable emphasis on teacher development and providing teachers with resources. The partnership believed that arming emergency credentialed teachers with better skills, tools, and knowledge related to deeper learning (as enacted through CPBL and Action Civics) would be more likely to produce changes in students' learning experiences compared to focusing on school- or distinct-level interventions. The RPP, therefore, focused its work first where it could gain the most traction; moving forward, the RPP might opt to engage with school leadership to create different conditions within schools for the instructional staff to better be able to implement deeper learning.

Predicting implementation challenges

Project C likely will face several large challenges even as they work to improve how underprepared teachers engage with students to promote deeper learning competencies. First, because the focus is on teacher professional development, but not at the district (and state) levels, teachers and coaches may run into difficulties to integrate action civics and CPBL with other instructional standards dictated by the district and the state. Another difficulty the partnership could encounter is that the type of teaching the professional development and training asks teachers to take on is far from the norm among teachers in the district. Finally, the instructional approach the partnership advocated for is hard to implement well; many teachers may struggle with the task of taking what they learn (and the materials provided) and executing this in the classroom.

Conclusion

The purpose of this paper is twofold: (1) it demonstrates a logic of designing that may be useful for designers of educational change projects in schools and school districts, and (2) it does this around a substantive focus on deeper learning. The steps in the logic bring together the research and professional knowledge base into a more concrete matrix of possible multilevel design tasks elucidated by a variety of literatures on professional learning and organizational development. This design task matrix gives designers orientation as to what design tasks they may want to address and which ones they may forgo or neglect initially.*

The design task matrix has a number of affordances for designers. First, it facilitates a view of the system in which design tasks in relevant system developmental sites (professional development, school development, and district development) are enumerated. Second, the matrix clarifies design decision points around trade-offs and sequencing of change activities. In the real life of designing projects or interventions, designers often do not conduct lengthy literature reviews and then draw from this review an encompassing view of the challenge. Rather, in order to compose a solution, they begin with intuitions of how the field works; imaginations of the desirable, articulated expertise around the table; and available resources. This happens often before designers have really understood the problem to be addressed in a deep way.[89]

* Authors' note: The research and professional knowledge base is selective; therefore, the matrix of design tasks cannot be all-encompassing. But if the reader follows the interpretation presented here of the extant research base, the design tasks derived from it should be read as relatively well-founded

In short, designers emphasize what is in the picture, not what is outside of it. The matrix of design tasks helps designers see what is outside of the initial or spontaneous scope of their projects. It highlights what features are privileged in their local theory of action and which ones are left out, what issues down the line they may encounter given the systemic complexity of their undertaking, or how they might space their activities over time to meet this complexity. Examples from deeper learning projects funded by the William & Flora Hewlett Foundation illustrated this point.

Designers emphasize what is in the picture, not what is outside of it.

Existing design teams in the midst of a deeper learning project may also find the matrix of design tasks presented here as a useful tool for iterative improvement. This framework could serve as a touchstone for reflecting on implementation progress and challenges, offering insights into initially neglected sites of development, learning dimensions, or specific design tasks that might be useful to attend to in future iterations.

Not all members of a given design team may have the inclination to read through a lengthy summary of the research and professional knowledge base. Expertise and interest necessarily vary, and should do so to address the many theoretical and practical issues involved. In RPPs, the research and professional knowledge base is a foundation of the work. Nevertheless, documents written in a more academic register can fruitfully be transformed into a more practitioner-oriented tone that is sensitive to the fast pace of decision making and the never-ending surprises that working in an educational organization often entails. In other words, the essential insights from the research and professional knowledge base, the matrix of design tasks, and the necessity of trade-offs and sequencing over time could be presented in a form that is appreciative of the time constraints that busy practitioners encounter.

There is a practical application for grant-making imbued in this thinking. Foundations' program officers are oftentimes a bridge between academic research and practical application or, expressed in the reverse, between the sensibilities of the field of practice and the remote academic sphere. Implementation research has time and again demonstrated the poor fate of implementation for grant-funded projects. These projects were connected with each other in an ambitious Foundation-funded cross-project design community. Rendering a research-based matrix of design tasks around the substantive focus of a foundation's grantmaking might orient applicants and members of a grant-centered learning community to the systemic complexity of bringing ambitious instructional change to scale in distressed environments by inequity, and it might help foundations make wiser funding decisions in light of these challenges.

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