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Leading Personalized Learning

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About this Project

This paper is part of a multiyear, multimethod study of 39 schools that participated in the Next Generation Learning Challenges (NGLC) Regional Funds for Breakthrough Schools initiative and the Next Generation Systems Initiative (NGSI), both supported by the Bill & Melinda Gates Foundation. The study looked across a range of schools in 17 sites to learn how early implementation was going in classrooms and the systems that surrounded them. This paper relied on the qualitative field work conducted for the study. The study's overall findings are highlighted in a cross-cutting report, *Personalized Learning at a Crossroads*, that summarizes lessons from the project.

Acknowledgments

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About the Center on Reinventing Public Education

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CRPE Quality Assurance Process

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Introduction

At their most ambitious, personalized learning reforms call on schools to customize learning for each student. This radical idea has far-reaching implications for teachers, students, and schools. It challenges longstanding practices that design learning for large groups of students instead of individuals. It has the potential to upend who learns what, when, and why.

For traditional schools, the scope of change associated with personalization creates serious demands on school leaders. Leaders of personalized learning schools must develop a vision of the future, build a case for change, marshal resources, and develop and communicate a plan of action. In other words, transitioning to personalized learning demands all the challenging tasks associated with change management in organizations.[1]

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But leading personalized learning is not just an organizational change problem. It's also an innovation problem. Personalized learning is not a codified program or set of practices that schools can readily adopt. Elizabeth Steiner of the RAND Corporation explained that her recent studies of personalized learning suggest that "what's happening in the field right now is a lot of innovation and a lot of schools building their [personalized learning] models, building their curriculum, and inventing new systems."[2] Because schools are inventing personalized learning in real time, school leaders who want to see more personalization in their schools must lead innovation in ways that are not typically part of the principal's traditional job description.

To better understand what it might take for school leaders to spearhead innovation in personalized learning schools, this paper draws on lessons from a two-year study of personalized learning in 39 schools. The schools were part of two ambitious initiatives funded by the Bill & Melinda Gates Foundation—the Next Generation Systems Initiative and the Next Generation Learning Challenges Regional Funds for Breakthrough Schools initiative.[3]

What follows illustrates how leaders in the two initiatives supported innovation by using a combination of "opening" behaviors, which encouraged experimentation, and "closing" behaviors, which encouraged consistent implementation of innovative ideas.[4] Using these two interdependent approaches, leaders were better able to support innovation when they:

- *Closed before opening.* Leaders supported innovation by setting baseline expectations about personalization before encouraging experimentation. When leaders asked teachers to experiment on a blank slate, the open-ended results rarely coalesced around shared innovative practice schoolwide.

- *Closed organization-wide, not classroom by classroom.* Leaders supported innovation by using schoolwide routines (e.g., coaching and teacher evaluation) to help codify and support the implementation of promising innovations.

Beyond personalized learning, these leadership approaches have broader implications for how school and district leaders approach innovation and change management (see Implications Summary at the end of the paper).

School Leaders and the Problems of Change and Innovation

Echoing the point made by RAND's Elizabeth Steiner in our introduction, most of the educators in the personalized learning schools we studied said personalized learning was not a program they could implement. Instead, they saw it as something they had to design themselves. As one principal in our study put it, "the district doesn't know what it [personalization] is… We're all learning together." A teacher said the biggest challenge with personalized learning was "actually explaining what it is and learning how to do it."

As they began moving forward, educators were confronted by many questions: What would it mean to increase student "voice and choice," as advocates of personalized learning expected? To provide flexible pathways for student learning? To develop and use learner profiles?

Most of the educators we interviewed were answering these and other questions for themselves as part of their daily practice. They were not necessarily developing entirely novel answers. But they did have to discover ideas, procedures, and processes that were new to their school and then use them. In other words, they had to change and innovate.[5]

Educators had to discover ideas, procedures, and processes that were new to their school and then use them—they had to change and innovate.

Given that schools in the initiatives were changing *and* innovating, leaders faced a complex set of demands. Models of change management from the private sector offer guidance about how to meet some of these demands. For example, among other things, change management models emphasize the importance of establishing urgency, building a guiding coalition, creating and communicating a vision, and other tasks to push organizational change.[6] Although some of these models suggest the importance of "empowering others," they do not suggest how, more specifically, leaders might encourage innovation or spread it throughout an organization. Accounts of improvement science and organizational learning offer some clues to solving this problem, especially when it comes to introducing and testing new ideas.[7] But it is not entirely clear from these improvement-focused accounts how leaders might support the development and spread of innovation.

Other leadership frameworks provide additional clues. For example, psychologist Kathrin Rosing and her colleagues have researched innovation in organizations outside of public education and developed a framework for understanding how leaders support innovation. One of their main conclusions is that leading innovation is not about pursuing a singular leadership style (for example, being a transformational leader). Rather, it is about moving between two related and interdependent leadership behaviors.[8] Rosing and her colleagues call these "opening" behaviors and "closing" behaviors (see Table 1), a distinction that reflects ideas from organizational learning research about the importance of "exploration" and "exploitation" and "divergent" and "convergent" learning in innovative organizations.[9]

TABLE 1. Examples of Opening and Closing Behaviors

Opening leader behaviors	Closing leader behaviors
• Allowing different ways of accomplishing a task	• Monitoring and controlling goal attainment
• Encouraging experimentation with different ideas	• Establishing routines
• Motivating to take risks	• Taking corrective action
• Giving possibilities for independent thinking and acting	• Controlling adherence to rules
• Giving room for own ideas	• Paying attention to uniform task accomplishment
• Allowing errors	• Sanctioning errors
• Encouraging error learning	• Sticking to plans

Source: Kathrin Rosing, Michael Frese, and Andreas Bausch, "Explaining the Heterogeneity of the Leadership-Innovation Relationship: Ambidextrous Leadership," *The Leadership Quarterly 22*, no. 5 (October 2011): 968.

When leaders engage in opening behaviors, they encourage employees to experiment, explore, and generate new ideas. Opening behaviors include things like encouraging risk taking, allowing the freedom to make errors and learn from them, and providing space for people to generate ideas. Above all, opening behaviors allow people to approach their work in many different ways.

But the experimentation encouraged by opening behaviors is only half of the equation. Rosing and her colleagues argue that leaders of innovation must also engage in closing behaviors. Closing behaviors reduce the variation in how teams approach their work and help spread promising new ideas across an organization. Establishing routines, goals, monitoring, standards, and rules are all examples of closing behaviors. Rosing's argument is that leading innovation requires switching between the two interdependent behaviors.

In combination, opening and closing behaviors provide a heuristic for thinking about how leaders might support the creation and use of new ideas over time, as illustrated in Figure 1. The idea is that by both encouraging experimentation (via opening) and supporting the formalization and codification of innovative practice (via closing), leaders can help teachers create and use new ways of teaching.

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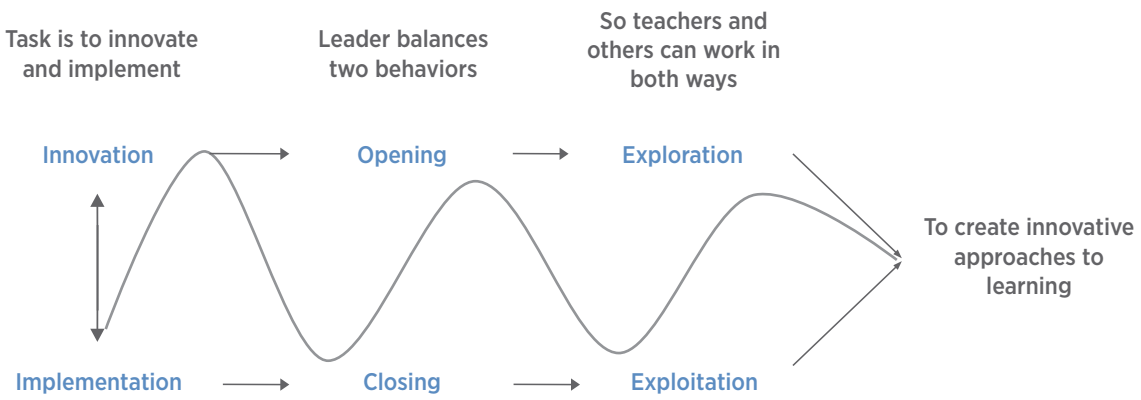
FIGURE 1. Balancing Opening and Closing Behaviors to Support Innovation



Source: Adapted from Rosing et al., "Explaining the Heterogeneity of the Leadership-Innovation Relationship."

We use this framework to look at two leaders in our project who used opening and closing behaviors in their schools to support innovation. We selected these leaders as illustrations based on recommendations from school district leaders and our firsthand observations and interviews in schools. The leaders' schools stood out among the study schools for two reasons: first, the adults and students in these two schools used shared language and showed common understandings about personalized learning in ways not present in most of the sample schools; second, classroom observations during the second field visit suggested that personalized learning practices in these two schools were relatively widespread, affecting multiple classrooms and grade levels. In the other sample schools, personalized learning efforts were confined to a few "pilot" classrooms. By supporting both creativity and formalization, these two leaders helped move personalized learning forward in their schools in ways that went beyond what we saw in the other schools in the study.

We provide a brief portrait of each school and then describe the ways in which their leaders leveraged opening and closing behaviors. We then highlight some of the struggles that leaders in other schools faced when they did not leverage opening and closing behaviors well. Finally, the paper ends with implications for both school leaders and the system-level leaders who support them.

Leading Innovation at Discovery Elementary School

Discovery Elementary serves a little over 300 students in a mid-sized city in a Western state.[10] In recent years, the school's student population has become increasingly racially diverse and more likely to come from low-income households. Around 46 percent of Discovery's students are eligible for free or reduced-price lunch. Asked about what the school was like before launching its personalized learning initiative, the principal said, "We weren't where we needed to be instructionally. Children didn't have a sense of urgency. We were flat."

In 2015 Discovery's principal and her leadership team attended a district meeting about a new district initiative on personalized learning. The initiative would support a handful of schools over the next three years to develop more personalized learning experiences for students. Discovery's leadership was interested in the funding associated with the initiative, but they also thought the initiative's

big ideas—personalization, competency-based progression, and technology—might revitalize the school. Discovery submitted an application and, in the fall of 2015, joined the district's first cohort of personalized learning schools.

The district provided general guideposts for Discovery to follow and outlined a set of "next generation" competencies, which included academic standards but also things like "habits of work" and "student agency." The district also identified new approaches to learning that schools might consider (e.g., blended learning), but it did not require any particular approach. The day-to-day details of what personalization would mean in practice was up to Discovery and the other pilot schools. As one district leader said, "[personalization] is not a program. It's not something [the district] can just say, 'Oh, here's exactly how you do it and implement it.'"

Discovery's leadership team began by spending six months developing a vision and mission for the school's personalized learning work. The result of this vision-setting exercise was a set of "nonnegotiables" that broadly defined personalization for the school. For example, the school said it was committed to adding station-rotation and blended learning models to all of its classrooms. It committed to giving students more choices about their learning activities. And it committed to developing clear learning targets and measurable outcomes associated with its new approaches.

If these nonnegotiables set the guardrails for what Discovery was aiming for and how it would get there, they were still too abstract to guide action. The leadership team had not developed any approaches for teachers to use. And so, even as the principal set the guardrails, she gave teachers explicit freedom to translate them into reality in their classrooms. According to the principal's supervisor, "[The principal said] I'm going to empower my people to do what needs to be done." The principal told her teachers it was their job to decide "how they were going to deliver [the nonnegotiables] and what their teaching and learning model was going to look like."

With freedom to experiment, Discovery's multiage teams of teachers experimented with different approaches to stations, blended learning, student agency, and choice. One team decided to departmentalize and have dedicated reading and math teachers experiment subject by subject. Another team decided to have teachers cover all subjects and to share students throughout the day, allowing them to move from classroom to classroom. Still another team experimented in traditional, self-contained classrooms taught by generalists. "It was terrifying to me," the principal remembered, "but it's been beautiful." Each team ended up doing station rotation, but "everyone does it a little differently," the principal said.

Discovery's teachers experimented with different approaches to stations, blended learning, student agency, and choice. "It was terrifying to me," the principal remembered, "but it's been beautiful."

One teacher described what it was like to have the space to experiment at Discovery. "When I think of something," she said, "I'm like, 'I want to try this. [The principal] looks at me like, 'oh my gosh.'" But she will always let me try, and she will always let me fail. Then she will pull me back and just say, 'okay, tell me what you learned. Tell me what you can do better next time.'"

Experimentation at Discovery wasn't entirely open-ended. As teams learned from what they were doing, the school leadership team started creating schoolwide structures to codify and formalize expectations for personalization.[11] The principal explained that over time, she "had a better direction … of where we wanted to end up, so I could drive the conversation to get us where we needed to be." After having set the direction and letting teachers experiment, she and her team started to drive personalization more directly.

A year and a half into the initiative, the principal started engaging in several "closing" behaviors to help "drive the conversation" and spread innovation across the school. First, Discovery's leadership

team identified a set of teaching behaviors they expected to see in personalized learning classrooms. Formalized in a document, these behaviors described and codified the school's expectations for personalized learning in ways that the school's initial vision for personalized learning did not.

Before, the abstract idea of "blended learning" was the nonnegotiable. Now the school had a formal document that defined different aspects of blended learning and a related set of "look fors." The aspects of blended learning covered in the document included differentiation, personalization, multiple entry points, and responsiveness. For each, the documented included a general description, a list of "look fors," and an example. For instance, the document described "responsiveness" as the "teacher demonstrates knowledge of each student's progress and plans with that in mind, being responsive to data with evidence of reflective feedback for teachers and students." The document went on to identify "look fors" for responsiveness, such as "timely feedback structures that inform learning are in place and are used for peer to peer interactions," and gave examples, such as using an "I like, I wish, I wonder" protocol for reflecting on one's learning experiences.

Instructional coaches reported actively using this document in conjunction with the school's vision statement during their classroom visits. As one coach explained, "When we coach, we always take the look fors and the vision statement with us, so we're talking to teachers and asking questions like, 'How does this [activity] tie to the vision?' 'Tell me, where does whole group instruction fit into the vision?'"

A second way in which the principal started to direct innovation at Discovery was by using the formal tools of personnel management. In particular, she reported leveraging the district-required "professional growth plans" to push teacher leaders to influence their colleagues and reinforce the school's approach to personalization. Each member of the leadership team, according to the principal, "developed a plan of how they were going to influence certain people toward certain [personalized] learning targets…" For the first time, the school's "professional learning plans aligned to our evaluation rubric, [which was] aligned with our mission and vision," the principal said.

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> *—Discovery principal*

By combining opening behaviors ("she will always let me try, and she will always let me fail") and closing behaviors ("look fors" and professional growth plans aligned to personalized learning expectations), Discovery's leadership team supported a coherent schoolwide approach to innovation that both sparked the generation of new ideas and also helped codify and spread them across the school.[12]

Leading Innovation at Enterprise Elementary School

Enterprise Elementary serves about 500 students in a large district in a Southern state. Like Discovery, Enterprise had a history of performance and attendance troubles, although it serves a more disadvantaged student population (82 percent free and reduced-price lunch) than Discovery. In the years leading up to becoming a pilot personalized learning school, Enterprise's culture had started to improve under a new principal. The school seemed poised for improvement.

Similar to Discovery, Enterprise's leadership team started its personalized learning work by defining a broad set of nonnegotiables. The first was that all teachers would experiment with station rotation and data-driven small-group instruction. The leadership team said it chose station rotation, in part, because it allowed them to leverage two online learning programs that were already required by the district (iStation and RM City).[13] These two programs also provided data on students which, along with other assessments, leaders thought teachers could use to drive small-group instruction and individual conferences.

By requiring both tech-supported station rotation and strategic data use, Enterprise's principal created two clear entry points for her teachers to access personalization. Over time, the principal's expectations for personalized learning increased. For example, she initially told teachers that she expected every teacher would use a "three-station" rotation model at least three days a week by December. But by the end of the year, she expected teachers to use the stations five days a week. As with Discovery, however, teachers were free to organize their stations any way they liked.

Over time, Enterprise's principal reported using more and more explicit expectations about personalized instruction with her leadership team and staff. During informal classroom walkthroughs, for example, the principal and district staff began using a district-developed instructional rubric for teaching personalized learning. The rubric explicitly crosswalked personalized learning "look fors" with the district's traditional teacher evaluation framework in areas such as assessment and data, instructional rigor, student agency, and classroom culture.

Enterprise's experience suggests that patterns of opening and closing behaviors are neither linear nor predetermined. Even as the school started to clarify expectations with its teaching rubric, the principal reported using some of her high-capacity classroom teachers as laboratories for new personalized learning approaches. She encouraged her strongest teachers, for example, to experiment with more than three stations and to develop "playlists" that let individual students progress through content at different paces. Referring to these teachers, the principal said, "[These are] my people who've been with me, they're trying things above and beyond. They know they have the autonomy to go to four stations or to do fluid stations every day."

The principal also reported that she leaned on these same handpicked teachers to start experimenting with and identify project-based learning (PBL) practices, which were the next frontier for personalization at the school. Even though every teacher at Enterprise was trained in PBL, the principal at first only asked her second grade team to begin experimenting. The principal said, "I don't want to move too fast over to this [PBL] until we're comfortable with it." She expected her second grade team to try at least two projects during the year as they experimented with the approach. She made it clear that these teachers were free to experiment with how they organized and executed projects. After a year piloting PBL with the second grade team, the principal was comfortable extending her two-projects-a-year expectation to the entire school and formalizing and sharing more widely what the second grade team had learned.

By the middle of the second year of Enterprise's personalization pilot, the principal started mentally categorizing her teachers into three groups to help her think about how innovative practice would spread within the school. She called the groups "the 1.0s, 2.0s, and 3.0s." The principal said she looked for her 1.0 teachers to follow minimal expectations. For example, she expected them to do three station rotations a week and mostly focus on mastering foundational teaching skills. She expected her 2.0s, who had already mastered 1.0 teaching skills, to experiment and innovate. For example, teachers in the 2.0 group were called on to experiment with four or more stations and playlists. "I'm pushing [the 2.0s] so I can see what challenges they encounter," the principal said. Finally, the 3.0s were a group of teachers that the principal expected would become school leaders. Accordingly, she expected them to take on leadership roles and coach colleagues on personalized learning. The principal's differentiated expectations for teachers helped her target supports and feedback, identify areas for experimentation, and codify and scale effective practices—and leadership—throughout her school.

The Enterprise Elementary School principal's differentiated expectations for teachers helped her target supports and feedback, identify areas for experimentation, and codify and scale effective practices—and leadership—throughout her school.

What Practices Did These Innovation Leaders Have in Common?

Although the details differed, leaders at Discovery and Enterprise supported innovation with opening and closing behaviors in similar ways. Both started the innovation process by setting clear expectations about what they were doing and why. Only then did they use opening behaviors that gave teachers opportunities to experiment and innovate. Eventually, they worked to formalize and codify innovations with closing behaviors that included guidelines and rubrics as well as strategic talent management to help others in the school use them.

Principals Set Baseline Expectations Before Encouraging Experimentation and Codifying

Both principals started by establishing baseline expectations before encouraging their teachers to experiment. They gave teachers clear, nonnegotiable assignments for their classroom practice. In some cases, they strategically selected practices that complemented and extended work the school was already doing (for example, leveraging existing online resources at Enterprise). Once they set their initiatives in motion, both leaders gave teachers opportunities to meet their overarching nonnegotiables in different ways. Then, over time, leaders developed and used explicit "look fors" and aligned tools that helped the schools define and reinforce innovative practices schoolwide. As we describe later, most other principals we observed started with few expectations and minimal direction.

Principals Strategically Used Personnel Management to Support Opening and Closing Behaviors

Leadership teams in both schools regularly conducted classroom walkthroughs and used rubrics to check on teaching practices and provide support. Teacher leaders in both schools supported personalization by inviting other teachers to observe their teaching and by giving presentations about personalization in staff meetings and in professional learning communities. Both school leaders leveraged other leaders in their buildings (administrators and teacher leaders) to reinforce expectations and spread innovating personalized learning practices across their staff. At Discovery, the principal went a step further and used formal teacher evaluations (including growth plans) to reinforce and promote innovative practice.

Discovery and Enterprise suggest that leading innovation requires more than one leadership approach. In these schools, leaders moved back and forth between the demands of innovation and design on the one hand (via opening) and the demands of use and implementation on the other (via closing). As we show in the next section, when leaders were not as strategic about using opening and closing behaviors, schools struggled with innovation and implementation.

> **These two leaders moved back and forth between the demands of innovation and design and the demands of use and implementation.**

Common Pitfalls

Although the cases of Discovery and Enterprise suggest the importance of both opening and closing behaviors, leaders in most of the schools we studied emphasized only half of the equation. In particular, many leaders gave teachers leeway to experiment, but failed to close in a way that identified good practice or helped it spread. In particular, we saw leaders encounter two common pitfalls when it came to closing behaviors: opening without closing, and post-hoc closing.

Being Too Open

Most of the principals in the personalized learning schools we visited embraced opening behaviors. But often they failed to do much closing. As a result, teachers experimented with approaches, knowing they could "fail forward" without fear. But they did so with little direction, attention to instructional coherence, or structures to help them learn from their experiments.

One principal who opened the door wide for teachers described a typical mix of experiments and activity at his school. "Right now we've got a couple different things that are happening. We've got some PBL happening. We've got some people that are doing learner profiles. We've got a couple of this and a little bit of that." This approach encouraged experimentation, but without any closing behaviors, personalized learning ended up highly varied from classroom to classroom. And as a result, students tended to experience personalized learning in inconsistent ways, and teachers struggled to learn from each other.

In one high school that took this open-ended approach to personalization, we observed a teacher using a fast-paced, data-driven, teacher-centered approach (for example, a "no excuses" style), another teacher leading a full class activity where students identified information on a handout and filled in a worksheet (despite having 1:1 Chromebooks), a third teacher who had students working on self-directed projects, and a fourth teacher who had students presenting group work to a panel of adults. Varied instructional approaches are common in most schools, personalized or not. But the contrast between this variation and the shared expectations of schools like Discovery and Enterprise was striking.

A few leaders who took an open-ended approach to personalization eventually realized after the fact that they were too open. After two years of open-ended experimentation, for example, one principal recognized that he needed to "do some visioning work with the staff… [and ask] what is the vision going to be?" Another leader in a similar spot said his school needed "to develop this [common] language… and make sure that there's consistency in practice across our school in implementation."[14] But even as these leaders moved to provide more direction, they ran into a second problem: post-hoc closing.

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Post-Hoc Closing

Some schools that started with open-ended experiments ended up with post-hoc closing that reinforced traditional practices rather than supported innovation. At times, these clampdowns were motivated by a desire for more coherence. But at other times they were motivated by external incentives and pressure.

A high school principal, for example, described how he let all his teachers take their own approach to personalization. But after a year, his ninth grade was frustrated with the fragmented approach and decided it need to jointly focus on identifying learning targets. To do so, the team developed a common template that everyone could use while developing their lessons. Likewise, in another open-ended school, teachers advocated from the bottom up for a more well-defined model to promote coherence. In both cases, ideas (and pleas) for closing came from teams of teachers who wanted a more common approach to personalization. But absent intentional learning and closing structures from school leaders, these teachers' efforts did not translate to schoolwide routines or approaches.

Absent intentional learning and closing structures from school leaders, teachers' efforts did not translate to schoolwide routines or approaches.

More commonly, schools engaged in post-hoc closing as a response to external pressure. Sometimes this pressure came from district policy that required schools to follow curriculum pacing guides. In such cases, the system's closing behaviors were misaligned with school-level efforts. An elementary school teacher who experimented with allowing students to move at their own pace said doing so was difficult when "all of [the district's] teachers have to be on the same page, at the same time." She described an assistant superintendent visiting the school who said, "This is where the [curricular blueprint] says that your teachers should be … everyone should be exactly the same." "That," said the teacher, "has been very difficult for a personalized learning school to deal with."

Other examples of misaligned closing pressures include state teacher evaluation policies and grade-based report cards. A principal in a Western state said pressures from her state's test-based accountability system were totally misaligned with innovation. She said, "We were going full blown and really going toward playlists, and the groups were happening and all of that was happening, and then our semester data came in for our reading and our math. And it was not good. So then it was going back to what we knew best."

Conclusion and Implications

Leading innovation is messy and difficult work. It involves giving employees the space to innovate but also providing direction. It involves sparking new ideas but also supporting the use and spread of the best new ideas. When innovation efforts are wide open, they can lead to fragmentation and incoherence. When expectations are applied post-hoc, they can be incomplete or, at worst, squash new ideas.

The examples described in this paper have important implications for principals and school district leaders. For school leaders, simply incorporating the idea of combining "opening" and "closing" behaviors into traditional change management models may be a useful way to frame the challenge of leading innovation. Although leading innovative change requires classic change management strategies, it also requires the careful management of creativity and consistency.

The principals we observed who seemed to have the most success first engaged their leadership teams to clarify or "close" on a set of initial expectations for personalized learning. Next they provided opportunities within those guidelines for teachers and teams of teachers to experiment. Then these principals watched carefully to identify emerging approaches that appeared to be effective. After determining which practices to spread, they articulated new priorities, helped teachers to understand what the practices looked like, and strategically used tools and adult networks to foster buy-in and ongoing support for the work. Although this description suggests a linear process with a beginning and end, in truth, leaders in both buildings moved back and forth between both types of behavior in a way that was iterative, cyclical, and integrating and interdependent.

At the system level, school district leaders must think carefully about the messages and pressures they send to schools. Although many of the school districts we studied rhetorically encouraged innovation, they also sometimes sent mixed signals. Competing initiatives were common. In addition, district leaders should carefully consider the kinds of readiness conditions leaders need (or need to develop) before they take on the hard work of leading innovation. Leading innovation is complex work,

and it demands leadership skills that extend beyond change management—as challenging as that is by itself. Principals who struggle to set a positive and collaborative culture in their buildings, or who have not tended to instructional leadership, will need support on these foundational capacities before school districts provide them with additional support to tackle the challenges of leading school-level innovation.

Leading innovation is complex work, and it demands leadership skills that extend beyond change management—as challenging as that is by itself.

Implications Summary

For Principals:

- Understand opening and closing behaviors as a complement to change management. This can help support innovation leadership: leading innovation isn't about adopting one leadership style but instead moving between styles based on the needs of the movement.
- Start with common vision, mission, and guardrails. Don't let everyone loose in the sandbox.
- Engage leadership teams and use human capital management levers to "close" on what's expected in classrooms and schoolwide.

For School District Leaders:

- Think carefully about mixed signals and competing initiatives from the school district that can make it harder for schools to close in ways that build on, rather than undermine, innovation.
- Recognize that not every school needs to *invent* new approaches. When schools adopt preexisting innovative models, the accompanying leadership tasks, while not easy, are more tractable than when schools are starting from scratch.

Endnotes

1. For example, see John P. Kotter, "Leading Change: Why Transformation Efforts Fail," *Harvard Business Review* 73, no. 2 (March-April 1995): 59-67.

2. Benjamin Herold, "6 Key Insights: RAND Corp. Researchers Talk Personalized Learning," *Education Week*, November 7, 2017; John F. Pane, et al., *Observations and Guidance on Implementing Personalized Learning* (Santa Monica, CA: RAND Corporation, 2017).

3. This paper draws on qualitative data from the larger study. These data include over 450 interviews with over 300 teachers, principals, superintendents, and central office staff in 17 different towns and cities. CRPE researchers observed classrooms in 39 schools and held focus groups with students. For the study, CRPE visited participating schools three separate times over the course of two years. In each school, researchers interviewed the school leader either two or three times. These semi-structured interviews lasted between 25 and 60 minutes.

4. As our elaboration of both types of behavior in the next section suggests, opening and closing behaviors highlight actions that reflect related ideas about *exploration* and *exploitation* and *divergent* and *convergent* learning. For example, see James G. March, "Exploration and Exploitation in Organizational Learning" in *Organizational Learning*, ed. Michael D. Cohen and Lee S. Sproull (Thousand Oaks, CA: Sage Publications, 1995); Andrew H. Van de Ven et al., *The Innovation Journey* (Oxford, UK: Oxford University Press, 1999).

5. This definition of innovation emphasizes the "relative novelty" of ideas to a given workplace, rather than their originality. See Michael A. West and James L. Farr, "Innovation at Work" in *Innovation and Creativity at Work: Psychological and Organizational Strategies*, ed. Michael. A. West and James L. Farr (Chichester, England: John Wiley & Sons, 1990).

6. For example, see John P. Kotter, W. Chen Kim, and Renee Mauborgne, *HBR's 10 Must Reads on Change Management* (Boston, MA: Harvard Business Publishing, 2011).

7. For example, see Anthony S. Bryk et al., *Learning to Improve: How America's Schools Can Get Better at Getting Better* (Cambridge, MA: Harvard Education Press, 2015); Kathryn Parker Boudett, Elizabeth A. City, and Richard J. Murnane, eds., *Data wise: A Step-by-Step Guide to Using Assessment Results to Improve Teaching and Learning* (Cambridge, MA: Harvard Education Press, 2013).

8. For suggestive empirical evidence about the relationship between these leadership behaviors and innovation, see Hannes Zacher and Kathrin Rosing, "Ambidextrous Leadership and Team Innovation," *Leadership & Organization Development Journal* 36, no. 1 (March 2015): 54-68.

9. See March, "Exploration and Exploitation in Organizational Learning;" and Van de Ven, *The Innovation Journey*.

10. All school names are pseudonyms.

11. For the most part, teams of teachers at Discovery took an informal approach to learning from what they were doing, relying on their professional judgment and experience rather than on formal models, such as a Plan-Do-Study-Act cycle. For more on formal improvement processes, see for example Boudett, City, and Murnane, eds., *Data wise*, and Bryk et al., *Learning to Improve*.

12. It is important to recognize that Discovery's principal did not do this work alone. As suggested, she strategically used her internal leadership team to extend her closing behavior's reach. But she also relied on an executive coach that advised her about change management and personalization. The executive coach gave the principal frameworks and tools that she reported using in her day to day work, including a model of change management (the Knoster Model for Managing Complex Change) and practical project management tools (e.g., project plan templates in Excel).

13. In "station rotation," students rotate through different "stations" on a fixed schedule. Examples of stations we observed during the study included online learning, teacher-led instruction, and small group work.

14. The importance of setting expectations on the front end echoes the developmental sequence of replication described by Peurach and colleagues, which progresses from defined practices toward more adaptive use. See Donald J. Peurach and Joshua L. Glazer, "Reconsidering replication: New perspectives on large scale improvement" *Journal of Educational Change* 13, no. 2 (May 2012):155-190.