How is evidence use enacted in schools? A mixed methods multiple case study of "deep-use" schools

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About the Center

The Center for Research Use in Education is and Institute for Education Sciences-funded knowledge utilization center focused on rethinking research for schools (R4S). Our mission is to expand the study of research use and produce a more holistic picture of what drives it, from the production of knowledge by researchers to the application of research in schools. We also seek to identify strategies that can make research more meaningful to classroom practice.

At our Center, we believe that education research is an important part of the educational process. We further believe that rigorous evidence, whether qualitative or quantitative, can foster better opportunities and outcomes for children by empowering educators, families, and communities with additional knowledge to inform better decision-making. For this reason, we seek to support strong ties between research and practice.

To learn more about our Center, visit https://crue.cehd.udel.edu/or follow us on Twitter at @UDCRUE.

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Executive Summary

In the context of heightened policy expectations for research use, there is a need to better understand how schools enact these expectations. However, normative models for research use do not fit with longstanding empirical evidence about research use. This a) means that schools are likely to implement evidence use expectations in diverse ways that do not necessarily fit with policy expectations, b) creates challenges for developing meaningful guidance on improving research use in schools, and c) makes it difficult to assess the outcomes of, and ultimately improve, evidence use policy.

This work is part of a unique, national study of schools' use of research conducted by an IES-funded knowledge utilization center, the Center for Research Use in Education. Through the purposeful selection of cases that engage in what we call "deep use" of research (see Farley-Ripple, et al, 2018), the present study links the Center's large scale, national survey data with interview data to explore how research use expectations are enacted in schools. The guiding research questions for this work are:

1. What does deep use of research look like in schools?
2. What conditions support deep use of research and how do those conditions come to exist?

Methods

Cases

Our four case study schools were elementary schools with average student performance compared with other schools in their states. Fairfield Elementary is a small, suburban school in the Midwest that serves a predominantly low income population. Fairfield has a strong, collaborative approach to education, and works closely with district leaders and external consultants to support its literacy work. Clark Elementary was founded as a STEM magnet school with a strong tradition of teacher autonomy and improvement-focused district leadership. It serves a predominantly white population in the Northwest, with a growing Latinx population. Ivy Institute is a K-12 charter in a Midwestern city, and its elementary school staff feel that research and data use is at the core of the school. It serves a predominantly black student population with high levels of poverty and has a strong college preparatory mission. Last, Willow Grove is a Title 1 elementary school in the rural South that serves a diverse community and is described as "beating the odds". Educators focus on using data to improve implementation of evidence-based programs and work with district staff frequently.

Findings: *What does deep use of research look like in schools?*

Evidence

Educators in deep use schools value more than external research in decision-making, and in particular, value local data and the experiences of others. Often different forms of evidence - both empirical and experiential and both external and local - are integrated into decision-making. Such an approach differs from normative models of research use and is not explicitly described or supported in policy guidance. Findings about evidence from deep use schools, therefore, may provide more realistic or useful models for schools' use of research.

Use

Findings confirm the complexity of "use" and suggest that more research use may be happening in schools than we might suspect in a narrow focus on instrumental use. Further, the integration of different purposes of use challenges typologies that suggest use is *either* one form *or* another. Deep use schools provide helpful examples of how research can be woven throughout different aspects of improvement - from decision-making to buy in to broader professional learning.

Search

Search is a complex activity that relates to educators' relationships and networks, knowledge of research, and demands on time. Deep use schools decrease the burden of search by designating specific staff (whether in schools or districts) to take on these roles and developing formal and informal routines for gathering and evaluating information. Still search is rarely direct to original sources of research, reinforcing the need to develop and leverage different systems for making research available.

Interpretation

Deep use schools model collective sensemaking through multiple strategies for critically considering evidence in their improvement work. Opportunities for staff to dig into evidence were organized by leaders and promoted shared understanding, assessments of relevance, and opportunities for action. The capacity to interpret evidence in deep use schools is therefore less about individual knowledge and skills than organizational routines.

Participation

Deep use schools featured highly participatory approaches to research use, at least among school staff, enabled by the presence of organizational structures that both engage staff school-wide and which take up responsibility for important aspects of school improvement. Moreover, the distribution of responsibility for research use appears to be an intentional way to build capacity and buy in for research use across the school.

Frequency

Evidence use in deep use schools often occurred in the context of typical school routines that occurred with regularity, allowing for sustained and continuous engagement. This made use simply part of *the* work of the school, not *more* work - a theme that persists throughout this report.

Findings: *What conditions support deep use?*

Problems of practice

Even among deep use schools, there appear to be opportunities to improve the reputation of research as a resource for improving practice. Diverse notions of what constitutes research, challenges with availability (both lacking and overwhelming), and concerns about feasibility of implementing recommendations point to a persistent gap between research and practice communities.

Capacity

Formal preparation for using research was limited to graduate study in deep use schools, yet that experience proved valuable, particularly among school and district leaders. Informal capacity building was then cultivated by leaders and enabled by school cultures that value collaborative learning. Therefore, formal learning about research use among educational leaders may be a key lever for building school-wide capacity.

Qualities of research

Educators in deep use schools articulate evaluative criteria for research that differs from those stated in evidence use policy and that push us past the traditional debates about internal and external validity. These criteria are critically important for helping the research and broker communities to conduct and communicate research that is more likely to be taken up in practice and for explaining choices educators make about the research they *do* use.

Products

Deep use educators value products that make the work of evidence use easier - whether products designed to support action, programs that help them achieve their goals, or tools that facilitate their engagement with research. Notably, different products appear to serve different aspects of improvement work, which provides insight into how to package research to facilitate its use.

Organizational processes

Having said it earlier, we find it worth repeating again. Integrating evidence into school processes and routines makes using it *the* work, not *more* work. Deep use schools provide actionable models for how school processes can introduce and collaboratively engage with research, reinforce norms, and model research-informed practice.

Organizational structures

While school processes become a means for engaging in and sustaining research use, organizational structures are critically important sites and supports for use and for expanding participation school-wide. Typical structures are leveraged for research use purposes, again, integrating research use into the regular work of schools. Research-specific structures and supports, which when available are often enabled through the district, often work through these more typical structures to enhance engagement with research. The importance of school structures, like processes, highlights the importance of framing capacity for research use as an organizational, rather than an individual, issue.

Organizational culture

Ultimately, the cultures of these elementary schools held teacher professionalism in high regard. This is expressed among teachers, through collective responsibility and improvement mindsets, but also from administrators at the school and district who not only created opportunities for teacher feedback and leadership, but valued them as well. In such cultures, structures and processes that involved teachers in a meaningful way could thrive.

Leadership

School and district leaders – especially principals – exerted strong influence over school culture, processes, and structures which, as described above, leveraged research and other evidence in improvement efforts. Further, in distributing leadership, they cultivated individual and collective capacity to support research use across multiple dimensions of the schools' work. These findings - and the practices described here - exemplify strategic knowledge leadership, a key component in schools' absorptive capacity.

Relationship between communities

Similar to our bottom line for search, even deep use schools experience weak ties to the research communities. However, all cases had relationships to local IHEs, and regarded them as valuable resources to draw upon for instructional improvement. These findings suggest the *potential* that collaboration between schools or districts and universities holds for supporting research-informed improvement and the critical importance of relationships in establishing those connections.

Brokerage

Deep use schools rely on brokers to bring external information into the school and to move research-based ideas within the school, but they also are trusted to vet information and reduce the burden of finding and evaluating evidence. Importantly, trusted brokers have certain characteristics which relate to their knowledge and experience, which may help them be successful in supporting school-wide engagement with research.

Key takeaways

In addition to findings for each dimension of our framework, we highlight three key lessons about research use in deep-use schools.

First, we learned that, even in "deep use" schools, there is not one model of research use. Rather, across the four cases we saw very different approaches to using evidence that all resulted in deep use. In one case, we saw educators defer research use to district "experts", who were responsible for selection of programs and curricula, while viewing their own role as implementing those decisions. Rather than viewed as deprofessionalizing, this model was viewed as efficient and was based on a high level of trust. A second case was largely teacher-driven, with staff heavily involved in all aspects of decision-making and evidence use, enabled by trust and autonomy that were supported by school and district leadership. In between were two cases that engaged educators extensively in research use and decision-making. In one school, educator engagement supported an agenda largely driven by the school leader, while in the other, educator teams often engaged with evidence, largely with the support of district resources. Multiple approaches to deep use confirm that research use is a local, contexualized practice that often reflects the different capacities and norms within schools and between schools and districts. Further, these findings show that deep research use is possible in a range of different contexts and illustrate some of the strategies that leaders use to strengthen the role of evidence in improvement efforts.

Second, we learned that the "deep use" schools, in many ways, are not drastically different from the rest of the participating SEE-S schools in *what* they have, use, or do but rather do differ in *how* they work. Specifically, we've identified four key factors that interact to create ideal conditions for deep research use in a cyclical relationship we describe as a "virtuous diamond." Those factors are culture, leadership, organizational structures, and processes. Each of these factors are inextricably connected and equally important. Interpretation of information occurs in the context of processes that are embedded or occur within structures. These are facilitated by leadership and reflected in culture. School leaders often determine participation in organizational structures and processes (e.g., deciding who to place on a leadership team). These decisions can reinforce an inclusive culture, committed to using research for improvement. School or teacher leaders can infuse evidence into existing school processes and structures. Thus synergy between the four points of the "virtuous diamond" in case study schools appears foundational to deep use schools, and may be an important way of understanding and building schools' capacity to use research to drive improvement efforts.

Third, individual capacities and perspectives of brokers may be particularly important in shaping school practices, particularly as they pertain to the types of research and research products that are considered. This finding means that building knowledge and skills among school and district brokers may be a productive lever for strengthening the role of externally produced research, and

that efforts to improve dissemination of research products could benefit from collaboration with these influential staff.

Implications for research use in education

This project accomplishes three things. First, it illustrates that implementation of evidence-use policy takes many forms – even among schools with strong records of using research, and highlights the need to develop greater guidance and supports that are appropriate for schools' local contexts. Second, these findings highlight conditions that support deep use of research, including potential levers for improvement. On the practice side, we argue the most important would be to prepare school and district leadership for roles as evidence-use leaders. On the research side, we note that even among deep use schools, preferences for products, qualities of research, and search reflect priorities very different from what we find in traditional research, highlighting the critical importance of rethinking what gets researched and where and how it is communicated. Last, this project demonstrates the value of mixed methods research in the study of research use. The field needs a better understanding of practice at scale but simultaneously requires attention to nuance and context. Our findings demonstrate the ways in which quantitative were useful in differentiating among schools, and where it was not, as well as where qualitative data helped contextualize and deepen our understanding of the larger survey findings. Still, these findings represent four cases of deep users and therefore should be a starting point for additional inquiry and experimentation to further the knowledge base.

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Introduction and Background

Expectations for the use of research evidence in school improvement are codified in federal accountability policy through both No Child Left Behind (NCLB) and its more recent iteration, the Every Student Succeeds Act (ESSA). Underlying these policies is the belief that using research will improve the quality of instructional programs and practices in schools, ultimately yielding better outcomes for students. Further, these policies reflect assumptions about how schools use research to achieve those policy goals; notably, to adopt programs and practices, that research is readily incorporated into decision-making processes, and that both individuals and organizations have the capacity to engage in research use (Farley-Ripple, 2012; Honig & Coburn, 2008; Spillane et al., 2007). Accordingly, a range of initiatives focused on improving the relevance and accessibility of educational research emerged—from the What Works Clearinghouse to state-created tools that facilitate the selection of interventions based on ESSA's tiers of evidence (Wei & Johnson, 2020).

However, the normative model of research use suggested by policy does not fit with longstanding empirical evidence, which finds research use to be a social, highly contextualized, and dynamic process (e.g., Coburn et al., 2009, 2020; Farley-Ripple, 2012; Honig et al., 2017; Kennedy, 1982). The misalignment of normative and observed approaches to research use change a) means that schools are likely to implement evidence use expectations in diverse ways that do not necessarily fit with policy expectations, b) creates challenges for developing meaningful guidance on improving research use in schools, and c) makes it difficult to assess the outcomes of, and ultimately improve, evidence use policy.

These challenges motivate the present study, which seeks to inform both the policy and research dialogue around research use by exploring the ways in which research use is understood and enacted in schools identified by our study as *deep users* of research. This work is part of a unique national study of schools' use of research conducted by an Institute of Education Sciences (IES)-funded knowledge utilization center, the Center for Research Use in Education. The Center's work is organized around a conceptual framework (Farley-Ripple et al., 2018) in which schools' use of research is considered a complex, multidimensional process. This framework, described later in this report, identifies different dimensions of use and variation in their implementation, a framework we describe as *depth* of use (in the same way that Coburn [2003] referred to depth of reform implementation). The notion of depth of use originates in prior studies that sought to distinguish among decisions that were all considered evidence based but that differed across a set of observable practices, such as the types of evidence used and who engaged with that evidence (Farley-Ripple, 2012; Farley-Ripple & Cho, 2014). The research goals of the Center include exploring

the distribution of different research use practices within and across schools, which entails understanding multiple facets of both decision-making and the larger context in which decisions unfold.

Through the purposeful selection of cases that engage in deep use of research, the present study links the Center's large-scale, national survey data to interview data to explore how research use expectations are enacted in schools. In the following sections preceding our findings, we provide a brief overview of the literature on research use in schools, a description of the work of the Center for Research Use in Education, and the conceptual framework that guides this work.

Overview of Research Use in Schools

The study of research use is extensive, spanning decades, disciplines, and fields of study. Education has been a notable subject in this literature, and a full review is beyond the scope of this report. We therefore foreground our research by briefly summarizing four areas: *how* research is used, *what* research is used, *who* uses research, and what *factors* shape research use.

How is research used?

Although the term suggests a straightforward practice, "use" itself happens in a range of ways. Weiss's typology is often referenced in explicating these differences (Weiss, 1979; Weiss & Bucuvalas, 1980); however, the types of uses have evolved over time, as has the language that is used to describe them. Normative expectations in education policy often focus on *instrumental use*—direct uptake of research in decision-making. For example, Penuel et al. (2017) described instrumental uses as including cases in which research is used in purchasing an intervention, adopting a curriculum, or designing professional development. *Conceptual use* refers to the role of research in shaping how individuals think about or understand an issue—a form of professional growth and learning. Farrell and Coburn (2016) have offered examples of how research can be useful in introducing new concepts; seeing an issue in a new light; broadening the set of potential solutions to a problem; or providing a framework to guide action. *Tactical (or political) use* of research is often part of efforts to generate buy-in or discredit a potential policy or practice. Asen and colleagues (2013) illustrated this type of use in their description of school board deliberations. Often lumped into this category is *symbolic use*. Symbolic (originally termed "tactical"; Weiss, 1979) use captures attempts to meet normative expectations for engaging in evidence-based decisions, but often in inauthentic or rhetorical ways, for example with phrases such as "the research says" (Farley-Ripple, 2012). *Imposed or sanctioned* use refers to external requirements for use of research or research-based programs, including requirements to choose programs or curricula from a pre-selected set of evidence-based options (Kochanek et al., 2015; Penuel et al. 2017; Yoshizawa, 2020).

Latent or embedded use captures the integration of research into the development of routines, tools, and other resources used by practitioners or policymakers (Cain & Allen, 2017; Coburn et al., 2020).

These uses are valued differentially under accountability policy and may vary in their practice across the educational system. For example, both instrumental and imposed or sanctioned use appear to meet the expectations of accountability policy. In a recent report, the National Center for Research, Policy and Practice found that instrumental use may be the most commonly reported type of research use, primarily involving designing professional development and directing resources to programs (Penuel et al., 2016). Yoshizawa (2020) showed how these decisions can also be made under imposed or sanctioned use, exploring how programs were selected when the state provided a set of evidence-based options. However, because conceptual use "can be difficult to 'see' in action" (Farrell & Coburn, 2016, para. 5), it may be underrated as a means by which research shapes education policy and practice. For example, Farley-Ripple (2012) noted that conceptual use of research played a significant role in three decisions made in response to growing accountability pressures, including the need to improve professional development, the strategic planning process, and textbook adoption. Finally, increased expectations to use research may heighten symbolic use, and pressure to engage in evidence use is not always coupled with capacity or supports to do so.

What research is used?

In addition to *how* research is used, we must understand *what* research is used. The extant research has consistently indicated that educators draw upon a wide range of evidence sources, including professional periodicals, practical guides, and intermediary organizations, and—rarely—from academic or peer-reviewed publications (Cordingley, 2008; Farley-Ripple, 2012; Penuel et al., 2018). The diversity of resources taken up in educational decision-making highlights differences in how researchers evidence use policy, and educators think about evidence.

Federal accountability policy privileges a specific definition of scientifically based research, which it has promoted through significant investments, described earlier. However, whether there is shared understanding about what constitutes research evidence remains unclear (Bransford et al., 2009), and studies have consistently recognized a gap between what is privileged and what is actually used. Educators have much broader conceptions of evidence than policy has suggested (Coburn & Talbert, 2006; Honig & Coburn, 2008), ranging from school/district-level data (e.g., standardized assessment scores) to empirical studies and theoretical pieces (Farley-Ripple, 2012; Jabbar et al., 2014; Malin et al., 2019; Penuel et al., 2018). While such evidence often aligns with federal educational policies (Mills et al., 2020), educators and policymakers also rely on expert guidance,

feedback from parents or communities, and other local or practice knowledge, including anecdotal evidence and personal experiences (Corcoran et al., 2001; Honig & Coburn, 2008; Honig & Venkateswaran, 2012; Jabbar et al., 2014; Neal et al., 2018; Supovitz & Klein, 2003).

This broad perspective on evidence reflects criteria such as rigor, reputation, and compatibility (Cooper et al., 2017; Eryaman, 2017; Neal et al., 2018; Penuel et al., 2018). A recent study found that educators were less concerned with the research process than with credibility, which includes expert and peer-review, but also professional judgment (Mills et al., 2020). Not surprisingly, research also suggests that evidence is most often found useful when it is compatible with the school or district context in which an educator is working (Corcoran et al., 2001; Jabbar et al., 2014; Neal et al., 2018; Penuel et al., 2018).

Who uses research?

In the United States, districts and schools reside at the nexus of debates surrounding education research use. Both NCLB and ESSA legislate expectations for district use of evidence, collection, and reporting of demographic and achievement data and use of research on program effectiveness to inform the adoption of programs and practices. Furthermore, studies indicate that one of the most important district practices for improving student outcomes is using evidence – including research and data - for planning, learning, and accountability (Anderson & Young, 2018; Leithwood et al., 2019). For example, central offices may restructure instructional programs, professional development, school leadership structures, or relationships with the community (Corcoran et al., 2001; Hightower, 2002; Massell & Goertz, 2002). Further, district central offices are critical actors in the use of research in education decision-making, both as users of research in decisions about curricular and instructional reform (Corcoran et al., 2003; Farley-Ripple, 2008, 2012; Honig & Coburn, 2008; Penuel et al., 2016) and in supporting the role of research in school-based decisions (Finnegan et al., 2012; Honig & Venkatswaran, 2012). Accordingly, much of what we know about research use in the United States is focused on district central offices.

Although other nations have explored this issue more systematically, relatively little is known about school-based use of research in the United States (Biddle & Saha, 2006; Brown & Zhang, 2017; Dagenais et al., 2012; Hemsley-Brown & Sharp, 2003; Prendergast & Rickinson, 2019). Schools and school-based administrators are not specifically targeted in current accountability policy, but may, in fact, be important to consider as users of research evidence, as many decisions impacting teaching and learning are made and implemented at the school level. Several studies have explored how *teachers* engage with or talk about research (e.g., Drill et al., 2012; Mirezky, 2007; Nicholson-Goodman & Garman, 2007), but do not contextualize use within schools or their improvement work. The present study focuses primarily on the school level and surfaces what

research use looks like in practice in real schools. We consider district offices and personnel primarily in light of how they influence that ecosystem of use.

What factors shape research use?

Across districts and schools, use of research depends on a variety of factors, including individual, organizational, and decision characteristics. The literature consistently finds that skills to understand and make use of evidence in decisions are variable across schools and districts, with several studies reporting limited confidence in their evidence use abilities (Hill & Briggs, 2020; May et al., 2020; Supovitz & Klein, 2003) and difficulty applying research to their context (Finnigan et al., 2013). Additionally, because the process of using research evidence requires educators to make sense of evidence in their own context and practice, use entails more than technical skills. Research suggests that practitioners' individual experiences and beliefs impact the way they process evidence (Corcoran et al., 2001; Jabbar et al., 2014; Neal et al., 2018; Penuel et al., 2018). Both experiential factors and technical skills shape where educators look for and whether they choose to use information (Birkeland et al., 2005; Corcoran et al., 2001; Honig & Coburn, 2006).

Organizational factors that shape use can be described as absorptive capacity (Cohen & Levinthal, 1990; Farrell & Coburn, 2017), or the organization's capacity to incorporate external information. An extensive set of studies has shown that key factors include human and financial resources to support evidence use; allocation of time for evidence use; a culture that features trust, collaboration, and norms for evidence use; leadership; and structures and processes that facilitate communication of and about evidence (Asen et al., 2013; Brown & Zhang, 2016; Coburn & Talbert, 2006; Coburn et al., 2009; Coburn et al., 2020; Farley-Ripple, 2012; Penuel et al., 2017; Supovitz & Klein, 2003). Research also suggests that the individual capacities described above are shaped by the organization, including the level of investment in skill development and professional learning, structures that enable collective sensemaking, and the nature of work in different parts of the organization (Coburn, 2001; Coburn & Talbert, 2006; Honig & Coburn, 2008; Kennedy, 1982; Supovitz & Klein, 2003; WestEd, 2002).

Additionally, the decision context matters. The complex nature and technical, political, and educational challenges of decision-making are well documented (Fuhrman & Elmore, 2004; Honig et al., 2014). Decision-maker goals vary, and pressure from a variety of key stakeholders can devalue research evidence and increase emphasis on other forms of evidence or opinion (Asen & Gurke, 2014). Furthermore, there may be decisions for which the use of research is not necessary, for which evidence is overwhelming and conflicting, or for which many different research bases are relevant (Farley-Ripple et al., 2020), in addition to the availability, compatibility with the local context, and relevance of research evidence to the issue at hand (Jabbar et al., 2014; Neal et al.,

2018; Penuel et al., 2018; Robinson, 1992). Decisions are not discrete events but rather are non-linear, have multiple stages, and accrete over time (Weiss, 1980). Decision contexts may also vary in terms of who participates and how, social and cultural norms surrounding the issue, and anticipated controversy (Huguet et al., 2021). Further, how problems are understood can influence which solutions are proposed and the arguments used to support them (Coburn et al., 2009; Farley-Ripple et al., 2020).

A review of what we know about research use in schools reveals that the assumptions reflected in policy are not well-matched to research use in reality. We find that the types of research policy privileges are not necessarily prioritized by decision-makers, and that a focus on the instrumental role of research in educational decision-making substantially underestimates the extent to which research can and does inform practice. Further, the literature suggests that educators at all levels of the system—from teachers through central office administrators—are actors in decision-making and engage with research as part of their practice. All of these dimensions of practice—the how, who, and what—are embedded in the complex social and political context that constitutes our education system. Thus, use is likely to be a local and contextualized practice resulting in diverse approaches to the implementation of evidence use policy (and in ways that may not fit policy expectations). This variation in research use practices—and lack of understanding of what those practices look like—poses a significant challenge to developing guidance and providing assistance for research use in schools.

The Work of the Center for Research Use in Education

The goal of the Center for Research Use in Education (CRUE) is to expand the study of knowledge utilization and produce a more holistic picture of what drives research use, from the production of knowledge by researchers, to the sharing or brokering of knowledge between the two communities of research and practice, to the application of research knowledge in local decision-making processes. First, through our measurement study, we designed, produced, piloted, and validated two parallel surveys for researchers and practitioners: the Survey of Evidence in Education - Schools (SEE-S) and the Survey of Evidence in Education - Research (SEE-R). Both surveys contain parallel items and sets of items designed to assess three dimensions: (a) the different aspects of production, dissemination, and use of education research; (b) the gaps and assumptions between the practitioner and research communities that support or hinder connections; and (c) the direct and indirect connections between research and practice communities. Additionally, the practitioner version of the survey includes a fourth dimension, which focuses on measuring the capacity of individual educators to critically interpret research. Second, we conducted descriptive studies, using our parallel surveys to examine researcher and school practices and to test the hypotheses implied

in our conceptual framework for both the research and practice communities. Last, we conducted case studies to supplement the descriptive studies so that we can deepen our understanding of the factors that support connections between research and practice, as well as the use of research evidence in school decision-making.

This report presents findings from this third set of studies and features deeper examinations of schools' use of research. Using data collected through a national administration of the SEE-S, we purposively selected schools that data suggest are *deep* users of research for further study. Through interviews with school leaders and teachers, we explored the ways in which the different aspects of research use, captured in our conceptual framework, were enacted in schools.

Conceptual framework

The work of the Center is guided by a conceptual framework that links the practices and perspectives of both researcher and practitioner communities; its application here is focused on the latter, as we seek to deepen our understanding of how elements of this framework transpire in schools. Below, we elaborate upon the assumptions underlying our framework as well as the framework dimensions and the literature that informs them.

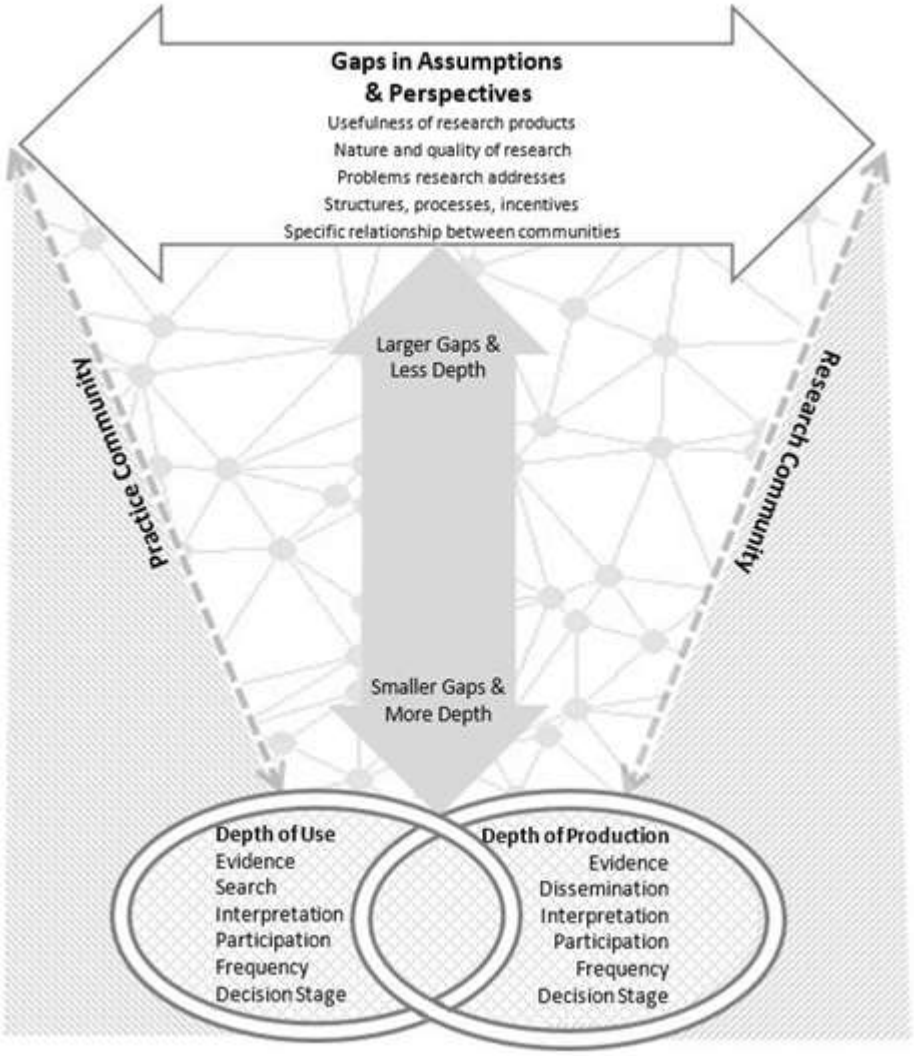
First, our understanding of the problem is guided by early work on knowledge utilization, and we draw on the "two-communities" metaphor to explore gaps between the research and practice communities. This metaphor reflects differences among the cultures, contexts, and systems in which researchers and practitioners operate, which Bogenscheider and Corbett (2010) have described as community dissonance. The two-communities metaphor emphasizes the bidirectional nature of the problem of knowledge utilization; that is, understanding the disconnects between communities offers insight into the mechanisms that can support change in both research and practice domains.

Second, we define communities in specific ways. We define the research community as primarily those responsible for generating scholarship that examines educational processes and contexts. We include among producers those in traditional academic institutions as well as think-tanks, but also acknowledge that this work takes place in a range of organizations, including some school districts, with varying contexts that shape research production. We define the practice communities as the administrative and implementation levels of the system (Newman et al., 2015) responsible for making decisions that ultimately influence teaching and learning, and thus potential users of research. Therefore, in our work, the "practice community" includes all school and district practitioners.

A final key idea informing our framework is the idea of evidence-based practice in schools. In the literature, evidence-based practice (EBP) is typically defined as either a) the extent to which schools implement programs based on scientific research (e.g., implementing a "proven" curriculum), or b) the practice of incorporating evidence, broadly construed, into decision-making processes (Hood, 2003). The Center's work primarily focuses on the latter, which most closely resembles what Weiss (1980) described as instrumental uses of research, in which research evidence informs decision processes, and what is imagined by evidence use policy. Our emphasis also reflects a pragmatic goal to identify and elucidate observable dimensions of practice, as we are sensitive to the challenges of measuring conceptual use. Nonetheless we understand the substantial value that other forms of research use (e.g., conceptual, tactical, etc.) have for educational improvement. In our case studies, we attempt to examine research use and EBP more broadly.

Figure 1 presents a detailed visualization of our conceptual framework. At the bottom of the figure are interrelated processes associated with use of research in decision-making and research production. Each process features a parallel set of dimensions, and we describe variability in those processes in terms of depth, a concept we explore in our work. At the top of the image are five key assumptions and perspectives of the research and practice communities represented by the horizontal arrow. This arrow denotes the size and scope of potential gaps in those assumptions and perspectives between the research and practice communities, larger at the top, becoming smaller toward the bottom. We hypothesize that where gaps between those communities are largest, we will see the least research use, or research use that lacks "depth," as indicated by the widening of the arrows as we move up. We believe characteristics of individuals and their organizations drive these gaps.

Figure 1. Conceptual Framework



Depth of use

Our construct of "depth of use" describes the complex ways in which evidence use is meaningful, systematic, and likely to generate improvements in policy and practice. Our conception of depth of use acknowledges the complexity and multidimensionality of evidence use as an organizational practice. Attending to this complexity, we focus on evidence, search, interpretation, participation, frequency, and the stage of decision-making at which evidence is relied upon. As a larger construct, depth of use describes the degree to which research meaningfully and systematically informs decisions about education practice.

Evidence

Decision-makers utilize a variety of evidence sources during the decision-making process (Coburn et al., 2009; Corcoran et al., 2003; Farley-Ripple, 2012; Penuel et al., 2016; Supovitz & Klein, 2003). Accountability policy specifically privileges external research and evaluation as well as local data in improvement decisions. We are specifically interested in the use of evidence generated from research not conducted by the school or district (i.e., external research) compared with other forms of research (e.g., local data analysis) and knowledge that influences decision-making. We do not consider one form of research to be better or more important than other forms of evidence. Rather, we are interested in the relative influence of external research compared to other forms (i.e., locally generated) of evidence.

Search

This dimension of depth of use focuses on the nature and extent of practitioners' search for evidence. Search incorporates time, effort, and sources of evidence. Prior studies have suggested that searches are often limited to sources that are local or familiar to the decision-maker (David, 1981; Finnigan et al., 2012; Honig & Coburn, 2008; Williams & Cole, 2007), whereas several recent initiatives target improved access to research, from clearinghouses to open-access publications.

Interpretation

To impact decision-making, evidence must be interpreted and transformed into usable knowledge (Bertrand & Marsh, 2015; Coburn et al., 2009; Davies & Nutley, 2008). This sensemaking process includes critical evaluation of information to determine its quality or rigor, applicability to one's context, and relevance to the problem (Davies, 1999; Williams & Cole, 2007).

Participation

Understanding who participates in research use during decision-making is important because individuals' positionality within the staffing hierarchy as well as their predispositions, knowledge, and goals influence what and how group members interpret evidence (Coburn, 2001a; Coburn et al., 2009; Finnigan & Daly, 2014; Kennedy, 1982; Weick, 1995; Weiss 1995). Participation relates to who participates in decision-making, as well as to the ways in which they are involved (i.e., collecting information, evaluating information, making the decision).

Frequency

Frequency is an indicator of the extent to which research informs decisions and to which evidence use practices are institutionalized and sustained in practice. Although no research exists in this specific domain, the regularity with which research evidence is brought to bear on decisions may be an indicator of greater or lesser systematic use.

Stage of decision-making

Theories on research use suggest that different types of evidence may be preferred at different points in decision processes (Bass, 1983; Farley-Ripple, 2008b), such as problem framing or identification of a potential solution (Coburn et al., 2009).

Gaps in assumptions & perspectives about research

The horizontal arrow in Figure 1 represents our approach to understanding and describing the factors that influence the use of research in school-based decisions. Dunn's (1980) five categories of culture grounds our work. Here, we look to describe the differences in assumptions and perspectives between the research and practice community across the following dimensions.

Usefulness of research products

Prior research suggests that the characteristics and type of research products influence their use in schools (Corcoran et al., 2001; West & Rhoton, 1994). The usefulness dimension of the gap represents the degree to which the characteristics valued by practitioners are incorporated into research products.

Nature and quality of research

Findings from prior work suggest that practitioners may value characteristics of research that differ from researchers' primary concerns. For example, while the research community often places greater emphasis on internal validity for causal inference, practitioners often prefer evidence based on work from organizations similar to their own; suggesting greater weight on external validity (i.e., other schools and districts; Corcoran et al., 2001; Finnigan et al., 2013; Supovitz & Klein, 2003).

Problems that research addresses

Historically, barriers to the use of research include perceptions about the relevance and timeliness for addressing problems of practice. This dimension relates to the degree to which research is able to address current problems of practice (Maynard, 2006) as well as the characteristics of problems of practice. Both the issue (e.g., instructional, organizational) and the nature of the problem (e.g., identifying the range of potential solutions vs. choosing to adopt a specific solution) can influence the role of research in solving those problems (Hemsley et al., 2009; Supovitz & Klein, 2003; West & Rhoton, 1994).

Structures, processes, and incentives

Community dissonance reflects differences in structures, processes, and incentives between communities (Bogenschneider & Corbett, 2010). These differences are reflected in organizational

conditions and shape research use in schools (e.g., Coburn & Talbert, 2006; Coburn et al., 2020; Corcoran et al., 2001; Finnigan et al., 2013; Honig, 2003; Massel et al., 2012; Supovitz & Klein, 2003; West & Rhoton, 1994).

Capacity to Critically Evaluate Research Evidence

Extant research suggests that practitioners may lack both confidence in their research-use abilities (Hill & Briggs, 2020; Williams & Coles, 2007) and the capacity to critically interpret research (Coburn & Talbert, 2006; Supovitz & Klein, 2003). Educators' training and experiences related to research and data analysis may also influence whether and how they engage with research (Biddle & Saha, 2002; Supovitz & Klein, 2003).

Relationships and Connections Between Communities

Depicted as network ties in our framework (see Figure 1), research use may also be considered a function of the relationship between researchers and practitioners (Coburn & Stein, 2010; Honig & Venkateswaran, 2012; Huberman, 1990; Landry et al., 2001). Additionally, both researchers and practitioners may be indirectly connected through individuals in the other community and organizations and media outlets (Malin et al., 2018; Neal et al., 2015; Neal et al., 2019; Spencer & Louis, 1980). The nature and extent of that relationship can facilitate or constrain beliefs about access and capacity to use research.

Research Brokerage

Research brokers are seen as "linking mechanisms," and include a variety of actors such as funding organizations, advocacy groups, professional associations, and individuals in schools and districts who operate in brokerage roles (Cooper, et al., 2018; MacGregor & Phipps, 2020; Malin et al., 2018; Neal et al., 2015; Scott et al., 2014;). Brokers take on roles related to building and maintaining relationships, staying well informed and up to date in their area of expertise, providing "coaching" related to technical and administrative components of research use, translating research jargon into ordinary language, creating products with greater value to practitioners, and creating a more collaborative space between researchers and practitioners (Cooper, 2014; Cooper & Levin, 2010; Cousins & Simon, 1996; Hood, 1982; Kochanek et al., 2015; Louis & Kell, 1981; Malin & Paralkar, 2017; Massellet al., 2012).

The present study

This conceptual framework serves as the basis for the Center's Measurement Study and Descriptive Studies. Data from the Survey of Evidence in Education-Schools (SEE-S) provide insights into each component of this framework as it applies to schools, generating a unique, large-scale portrait of

research use across the U.S. education system. We deepen our understanding of these practices through the case study research presented here, in which the dimensions of this framework are examined qualitatively to provide a rich, illustrative narrative that brings research use and the conditions that put it into sharper focus.

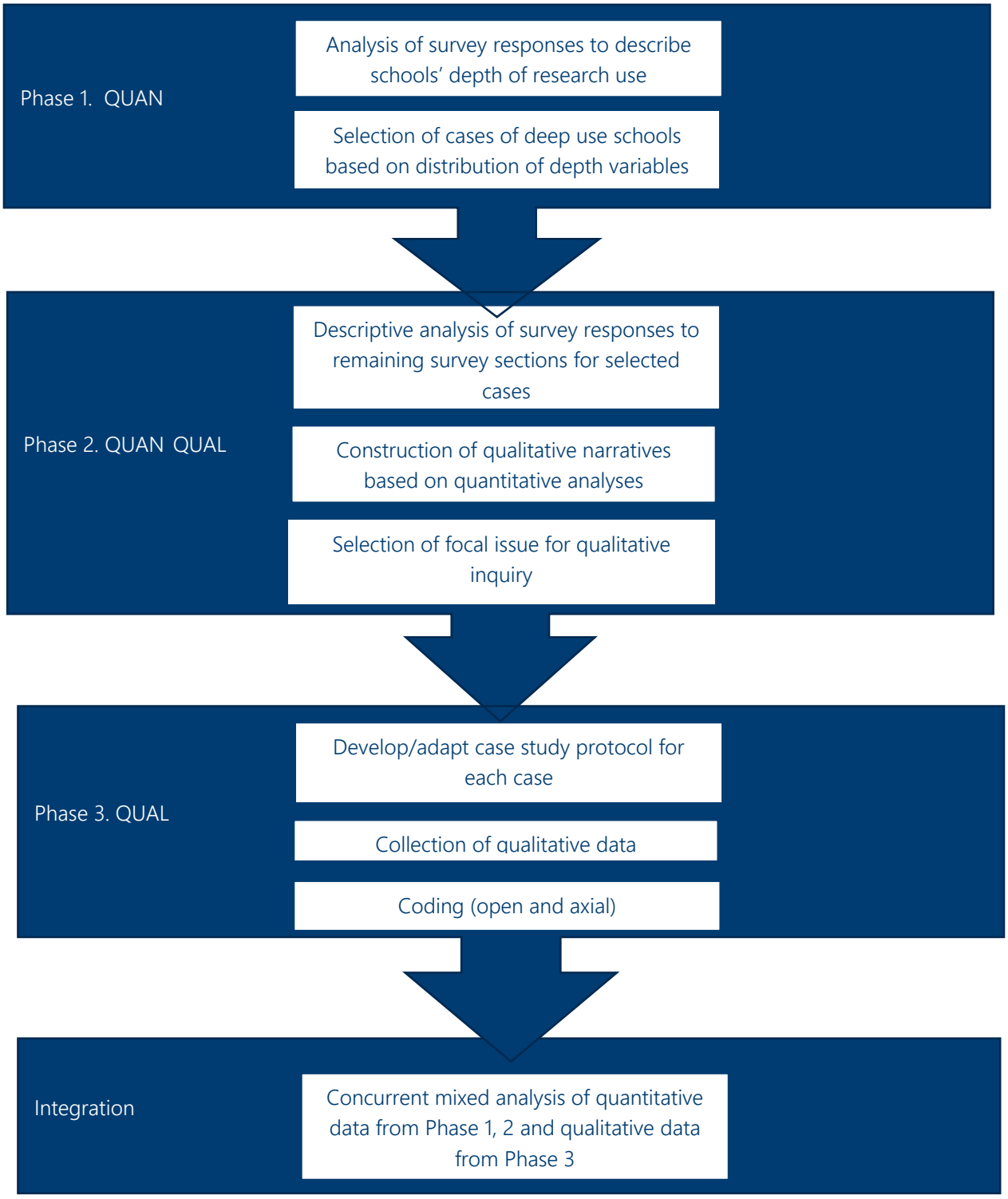
The guiding research questions for this work are:

1. What does deep use of research look like in schools?
2. What conditions support deep use of research, and how do those conditions come to exist?

Methods

Case studies are conducted using a mixed -method, multiphase design. The various phases of design and analysis, featured in Figure 1 and described below, are an extended form of a sequential explanatory design. We use our analysis of our quantitative survey data to select a purposive sample of cases (Gerring, 2007), ensuring that our qualitative work will generate new empirical knowledge about deep research use.

Figure 2. Mixed Methods Design



Phase 1 methods

The initial QUAN component centers on the sampling procedure. Schools were selected based on quantitative analysis of survey responses to the SEE-S instrument. Specific items selected to operationalize our key construct–*depth of use*–were analyzed to establish the distribution of schools along the six key dimensions of our framework (Table 1). These schools will represent a larger set of typical cases (Gerring, 2006) consisting of deep users in contexts that previous analyses will have identified as consistent predictors of deep use. The sample thus permits literal replication and analysis focused on refining explanations for schools' deep use of research.

Schools were selected based on quantitative analysis of survey responses to the SEE-S instrument (May et al., 2018), administered to all staff in a national, stratified sample of schools between 2018 and 2020 (see Appendix A). Respondents include 4,415 educators in 134 schools in 18 states. For each school with more than one individual reporting on organizational decisions (n = 133), we calculated school-level scores for the eight dimensions of depth of use (DOU) as well as an overall score for DOU (see Appendix B for original measures; see May, et al., 2022 for technical details regarding calculations). Because survey data were collected from multiple respondents in each school, multilevel models were used to produce aggregate school-level scores on each metric. Resulting estimates for each component of depth are empirical-Bayes estimates of school-level means, with precision-weighting given to within-school sample sizes and between-within school variances.

School-level estimates, or scores, were used to identify schools as "deep users" of research if they had (a) an *influence of external research* score at least one standard deviation above the mean school, and (b) at least one additional score among the DOU dimensions that was one standard deviation above the mean for the national sample. Schools were then sorted by the overall depth of use metric and the team prioritized higher scores in case study recruitment.

Table 1. Dimensions of Depth of Use

Dimension of depth		Description of metric
Evidence	Influence of external research	Reported influence of external research on decision-making, validated by open-ended responses. Score can be interpreted as the probability of decisions in our case study schools being influenced by external research.
	Influence of local research	Reported influence of central office, principal, or teacher-led or youth-led research on decision making, validated by closed-ended survey items about familiarity with products or process. Score can be interpreted as the probability of decisions in our case study schools being influenced by local research.
	Influence of formal analyses of local data	Reported influence of data analysis on decision-making, validated by closed-ended survey items about familiarity with products or process. Score can be interpreted as the probability of decisions in our case study schools being influenced by data.
Search		Binary indicator of whether respondents went directly to sources of research, as opposed to intermediary sources. Direct sources included "library or research database search (e.g., ERIC, Google Scholar)," "by collecting references from one or more bibliographies," or via "an external researcher or research organization," "a Regional Education Lab or Comprehensive Center," "the What Works Clearinghouse," "a peer-reviewed academic journal," or "a faculty person or a course from your undergrad/grad program." Scores can be interpreted as estimates of the proportion of decisions that involve direct search for research.
Interpretation		Calculated as a sum of the items checked "Yes" to whether they engaged in determining whether the information was of high quality, whether the information was relevant to their school/district as well as if they worked to make sure the information was understandable, made connections between information and current practice, and developed a shared understanding of the information. Scores can be interpreted as the school mean number of ways evidence was interpreted.
Participation		Calculated the number of groups (of 18 listed) involved in gathering or evaluating decisions or in making the decision. Scores can be interpreted as the school mean participation in decision-making.
Decision-stage		Count of decision stages in which evidence was reported to be used, including (a) identifying a problem, (b) determining reasons behind a problem, (c) identifying potential strategies for addressing a problem, (d) selecting which strategies to implement, (e) informing how to implement the strategy, and (f) adjusting the solution to improve implementation or outcomes. Scores can be interpreted as the school mean number of stages in which evidence was reported to be used (0-6).
Frequency		Calculated as the expected proportion of decisions, within a school, for which external research, or local research, or local data analyses influenced the decision. Scores can be interpreted as estimates of the proportion of school organizational decisions that are influenced by external or local research or local data analyses.
Overall depth of use (DOU)		After plotting eight dimensions on a radar plot, scores for each school are calculated as the percentage of the total possible area in the radar chart that is covered by the eight triangles for that school (0-100).

This process yielded 17 schools in nine districts and two charter organizations, representing diverse contexts in terms of geography, urbanicity, grade level, and demographics of community served. Two districts and one charter declined participation (eliminating four schools). Seven districts approved further communication with schools, and ultimately four schools in three districts and one charter organization agreed to participate. Table 1 reports school scores on the DOU metrics, broken down by case study sites (n = 4), other schools that met our criteria for deep use (n = 14), and the rest of the SEE-S sample (n = 113). We note no statistically significant differences among case study and other deep-use schools, and that deep-use schools were statistically significantly different than the rest of the sample on all measures except formal data analysis (both reported influence and frequency of use). We note that case study school scores were not always statistically significantly different than those in the rest of the sample, and that the sample size (n = 4) may have been inadequate to achieve statistical significance. However, with the exception of participation, where the case study mean was lower than for other deep-use schools and the rest of the sample, differences were in the anticipated direction.

Table 2. Comparison of Case Study Schools, Other Deep Use Schools, and the Rest of the Sample

	Case study schools (n = 4)			**Other deep-use schools (n = 14)**			**Rest of sample (n=113)**	
	Mean	*SD*	*p value of difference from rest of sample*	*Mean*	*SD*	*p value of difference from rest of sample*	*Mean*	*SD*
DOU total score	20.75	6.45	0.0465	23.36	6.31	<.0001	14.42	4.99
External research	0.26	0.08	<.0001	0.27	0.06	<.0001	0.08	0.07
Local research	0.48	0.23	0.2484	0.46	0.12	0.0506	0.36	0.15
Formal data analysis	0.53	0.05	0.7345	0.54	0.15	0.2249	0.46	0.16
Total research use	1.44	0.28	0.015	1.42	0.27	<.0001	0.97	0.32
Search	0.18	0.09	0.0513	0.16	0.11	0.0009	0.08	0.08
Interpretation	4.02	0.87	0.1519	3.93	0.68	0.013	3.36	0.7
Participation	5.9	1.89	0.841	7.76	0.99	0.0165	6.39	1.78
Decision stage	2.72	0.66	0.7727	3	1.02	0.0503	2.43	0.84
Frequency of external research use	0.42	0.11	0.0005	0.48	0.11	<.0001	0.21	0.1
Frequency of internal research use	0.54	0.08	0.4478	0.54	0.09	0.0748	0.49	0.08
Frequency of data analysis	0.54	0.03	0.8519	0.55	0.05	0.3014	0.53	0.05
Frequency of total research use	0.7	0.04	0.3646	0.73	0.09	0.0019	0.62	0.11

Phase 2 methods

Phase 2 was enacted concurrently with the recruitment of schools for the QUAL phase of the project. Once a school agreed to participate, survey data for the case study school was examined to develop qualitative narratives about each school's use of research, which the research team used to identify focal issues for the QUAL data collection phase. The research team completed a protocol designed for this phase of work, which constituted:

1. An initial selection of key items and constructs from the demographic, perspectives, network, capacity, and brokerage sections of the survey;
2. The creation of quantitative summaries of descriptive statistics that compare responses from each deep-use case study school with the overall survey responses; and
3. A discussion of quantitative data to identify practically and theoretically meaningful practices that might be explored (focal issues) in interviews.

The results of Phase 2 were "stories" about research use and the conditions that support research use practices in each of the schools. These stories enabled the research team to identify school-specific issues to explore in the QUAL phase.

Phase 3 methods

The QUAL phase of the project was conducted in the 2020–2021 school year as a multiple case study of deep -use of research, with each school constituting a case. Interviews were conducted first with the principal and two members of the research team. Interviews were semi-structured, beginning with a "grand tour" question about research use in the school and seeking illustrative stories. The interview then shifted to focal issues identified in Phase 2. For example, a school that demonstrated greater use of school structures to support engagement research than other schools in the larger SEE-S sample would be asked about those structures. Probes for elaboration, clarification, and examples were used throughout. After meeting with the respective principals, we requested interviews with key informants identified based on either the survey responses or information gathered during the interview with the principal. Although we solicited recommendations from the principals, they were not informed about who ultimately participated in an interview, in order to protect confidentiality. Interviews with key informants included teachers, other school

leaders, and—when appropriate, external partners or district staff. Not all requests were accepted, which means these data may not capture all perspectives on research use. We note that this study was conducted during the COVID-19 pandemic, during which demands on educators reached exceptional levels. We were grateful for the time and consideration of those willing and able to participate. Therefore, we feel that, although not comprehensive, the set of interviews for each school provides substantial insight into school practices. Table 3 shows the final sample for Phase 3.

Table 3 Case Study School Interview Participants by Role

Case Study School	Interviews
Clark Elementary	district administrator, principal, teachers (2) (total: 4)
Fairfield Elementary	district administrator, principal, assistant principal, teachers (2) (total: 5)
Ivy Institute	principal, teachers (2) (total: 4)
Willow Grove Elementary	principal, evaluation & assessment coordinator, teacher (1) (total: 3)

Analysis of interview data included several steps. The research team approached coding in Dedoose using an a priori framework—the Center's conceptual framework. Codes were applied in an iterative manner: the research team worked through one interview, discussed and refined the codebook to clarify concepts, condense similar codes (e.g., stages of decision-making and purposes of use), and add new codes (e.g., leadership), and then worked through another and repeated the process. After the third iteration, the research team achieved satisfactory reliability and consensus about the coding framework to be applied (Appendix C). Interviews were coded by one of two researchers. Once structural codes were applied, the research team began a process of analytical memoing for each code.

This process employed a protocol developed by the team to facilitate synthesis and interpretation of codes both within and across cases. The protocol elicited researcher

perspectives on patterns and the meaning of those patterns as well as illustrative quotes (a) for each code over all, (b) for each school within each code, and (c) for emerging relationships between codes. Two members of the research team contributed to each analytical memo, and each memo was reviewed and discussed by the full team. After this initial memoing process, the research team engaged in synthesis across memos to describe major themes within and across schools that respond to the research questions.

Case Descriptions

Fairfield Elementary

Fairfield Elementary School was identified as a deep-use school based on its scores for using external research (.24) and for interpretation (.47). The school serves grades kindergarten through five in a large suburb in the Midwest. The school is small, serving just over 300 students and under 20 teachers in the 2020–2021 school year (National Center for Educational Statistics [NCES], 2020-21). The principal and assistant principal had been working together for 7 years at the time of our interviews; before entering administration, the assistant principal was a special education teacher. There are multiple collaborative structures in place, such as the building leadership team, teacher-based teams (also known as professional learning communities [PLCs]), and the positive behavioral interventions and supports (PBIS) Team. The staff includes a mix of new and veteran teachers, several of whom have attended (or are attending) graduate programs at local universities, together. Fairfield's district also provides strong instructional leadership, including hands-on support from a Director of Teaching and Learning. It also coordinates districtwide professional learning, including several ongoing, multi-year partnerships with external consultants. Literacy and mindset are strong focuses for professional learning here.

Fairfield students are demographically diverse, with about half identifying as Black and the other half as White, Hispanic, multiracial, or Asian. Almost 80% of Fairfield students qualify for free or reduced-price lunch. According to state performance records, Fairfield struggles with low performance, but has an above-average record for growth and for closing gaps among demographic groups. The school is located in an area with high mobility, and improving attendance rates and student culture and climate has been a major focus at Fairfield in recent years.

Clark Elementary

Clark Elementary scored highly for its use of external research (.31) and engagement in search (.29). Clark is a K–6 school in the Pacific Northwest. Although much of the state is rural, the school is located in a small suburban area, in a district that had two schools identified as "deep users" of research, according to quantitative data. Clark agreed to participate as a case study, and the other school did not. In this case study, we were able to conduct an interview with the district superintendent. This individual had been promoted from within and had many years of experience in other district-level leadership positions. In response to an expanding district population, Clark was founded about 10 years ago as an inquiry-based STEM magnet school, with teachers given substantial autonomy for curriculum and instructional decisions. Several interviewees described the history of the school as important in understanding its current story. At the same time, staff turnover was described as relatively high, and the school only employs a small number of its founding educators today. Although perhaps new to Clark, the staff is generally seasoned, with 63% having 6+ years of experience (source: State Department of Education, 2022). The school has only one administrator, a principal.

Clark is located near major engineering and military employers, so draws from a fairly well-educated, professional community. Clark served about almost 450 students in 2020–2-21 and has a predominately White student body (80%). Around 15% of the students are Hispanic or Latino, and other race/ethnic groups are represented in small numbers (Source: NCES, 2020-21). About a quarter of the student body are considered low income. According to state records, student achievement is comparable to the state average, with about half of students proficient in reading and mathematics. As such, Clark is neither recognized for its performance nor identified for additional supports.

Ivy Institute

Ivy institute was determined to be a deep-use school by its use of external research (.31), internal research (.66), as well as its engagement in search (.22) and interpretation (.47). The school is a college preparatory public charter school serving approximately pre-kindergarten through 12th-grade students in a Midwestern city. In their elementary school, which serves about 600 students, research and data use in planning and improvement

efforts is considered "the core of the school," and engagement is expected of all school staff. The charter organization's central office is located within the school building, but central office staff take a mostly "hands off" approach and are there to support the school staff, should they request assistance. The school also places high value on collaboration, and decision-making is an inclusive, concerted process.

The school opened in the early 2000s with a strong focus on college preparation. This mission is embraced even in the early grades, which was the focus of our case study data collection. The school serves a student body that is predominately low income (>60%) and African American (>95%) (Source: NCES, 2020-21). Most have experienced or been exposed to trauma, according to the school staff. Student achievement data reveal that students are "on track" for achievement across subject areas and subgroups, although some declines in performance have been seen over prior years.

Willow Grove Elementary

Willow Grove Elementary was noteable among schools for its use of external research (.33) and internal research (.63). The school is a Title I public elementary school serving students in prekindergarten through fifth grade in the rural South. The school is uniquely located between two major universities, resulting in a high number of staff attending graduate school. District-level staff, including the superintendent, assistant superintendent, and various coordinators, interact with the school on a regular basis. From doing walkthroughs and providing resources and technical assistance, district-level staff are instrumental in supporting educators in evidence-based improvement efforts. Like Clark Elementary, Willow Grove was one of two deep-use schools in their district identified by our sampling procedures (described above), although the other opted not to participate as a case study.

Willow Grove serves more than 400 elementary students, about 60% of which are White, a fifth African American, and about 10% Hispanic (Source: NCES, 2020-21). Half of students are considered low-income and the school experiences a high level of mobility. According to state records, Willow Grove students slightly outperform other schools in the state but are in the top 10% for growth. Additionally, the school is described as "beating the odds"—

performing better than schools with similar characteristics and student populations.

Findings

Decision-making contexts for research use

In order to contextualize deep use of research, we must understand the nature of decisions in which research might play a role. Overall responses to the SEE-S indicate that schools are making a range of decisions across a broad set of issues. When compared to the rest of the sample, we found that case study schools are engaged in similar decisions around similar challenges and issues (see Figures 3 and 4, for more information see May et al, 2022 for technical details about coding). Qualitatively, we also found this to be true: these schools seem to be facing similar types of issues, common to elementary schools, and common to the current climate (in 2021, schools in the United States were coping with the stresses of the COVID-19 pandemic and increased social and political attention to issues of racial and social justice). However, our interviews offered a few additional insights and nuances, which we describe below.

Figure 3. Types of Decisions Identified in SEE-S

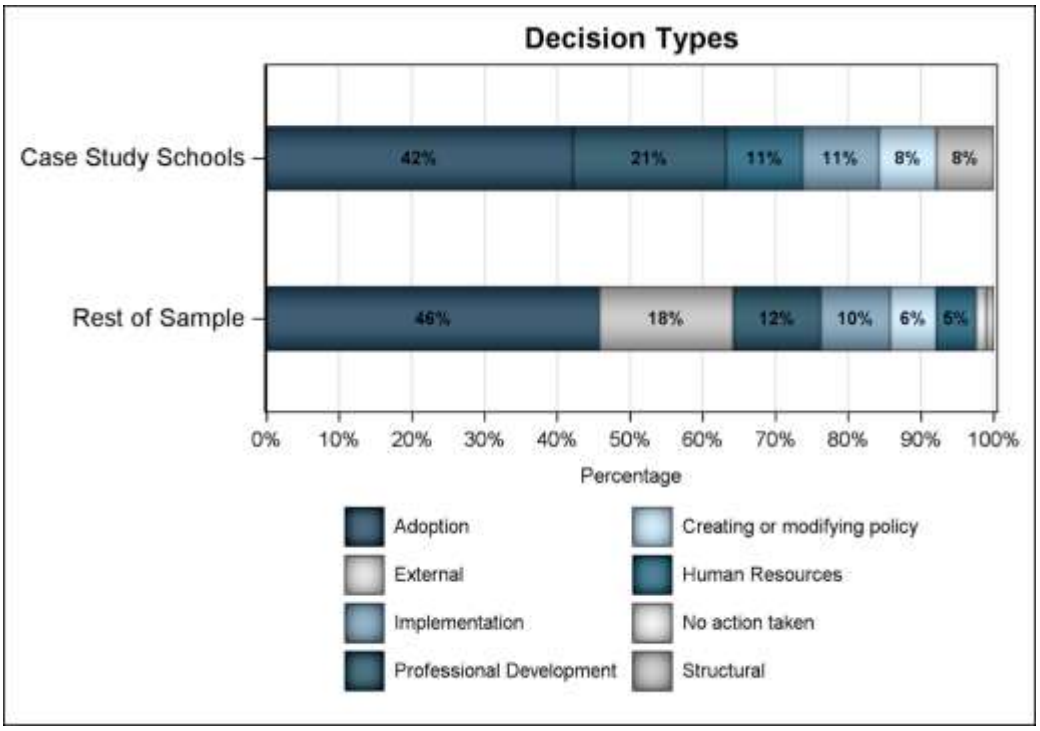
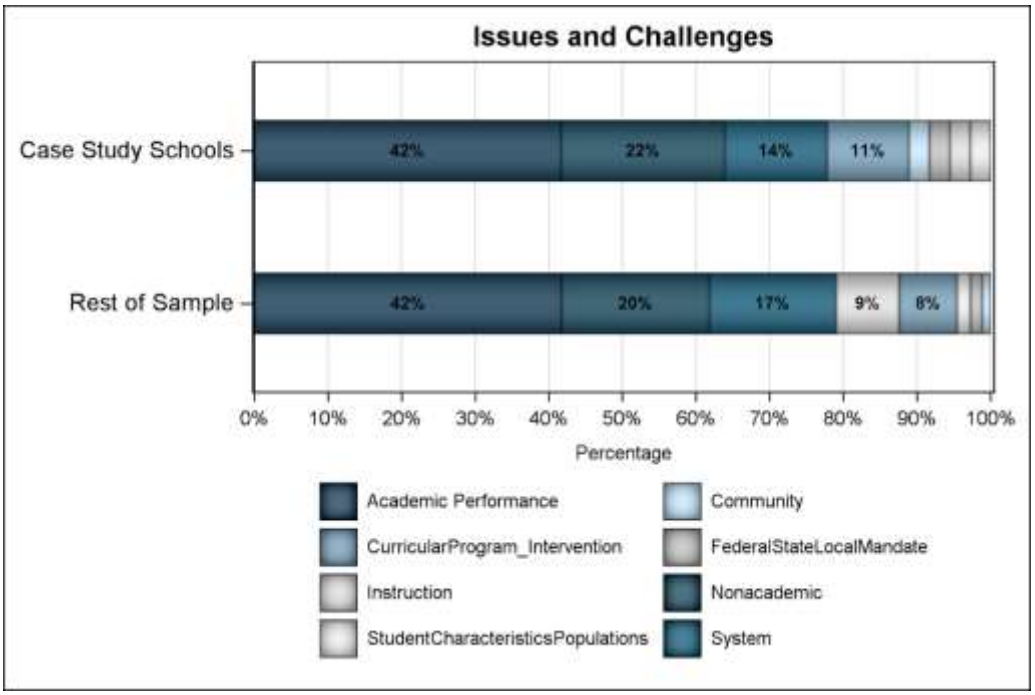


Figure 4. Types of Challenges & Issues Identified in SEE-S



Literacy initiatives were frequently opportunity for research use.

Many decision-making processes used evidence to improve academic performance. Whether through adopting a new curriculum, intervention, or other resource—or by providing further training/support to educators, consistent with the SEE-S data—most problem-solving or decision-making efforts aimed at increasing student academic performance. Specifically, the most prevalent problems related to literacy. For example, we heard statements such as, "My kids are having issues with, like I noticed that their writing is lacking a lot of structure or elaboration," and "My students were having a really hard time with multi-paragraph writing." In fact, literacy often connected to research use. For example, one teacher described the support she received from a coach in addressing a literacy problem in her classroom:

> I had a student who was really struggling with comprehension, and [the coach] gave me the book Seven Ways . . . I forget exactly what it's called. Like *Seven Keys to Comprehension* and so she actually gave me a book that she has with research-based articles to help with my teaching.

In a different school, a coach offered a similar example:

> And so if the first grade teachers are talking about "Man, I can't figure out how to teach inferencing or whatever, do you have any ideas?" And then I say, "Okay, I'm gonna go check it out, I have some books on it, and then I'll get back to you." And so you know, I have a lot of teacher books, you know, that are going to give ideas, do some research on it, and then try and get back to them as quickly as possible so that they can try those two.

Schools' focus on literacy is perhaps unsurprising considering the elementary school context and the robust research based on the topic. Other academic subjects were mentioned less often, and not as clearly in the context of evidence use. Mathematics-related problems, for example, were mentioned far less frequently and seemed less connected to explicit research use. While sparse, comments from teachers like "they don't know the numbers, so you know you have to go back and fill in all these gaps that they didn't come with," and "[Our district superintendent] said at the time that our math was somewhere that was lacking in our district testing. Like he could see it as our stats were coming in, there was a disconnect in math," were still offered. Unlike with literacy problems, though, discussions of explicit research use in those problem-solving/decision-making processes were absent. There did seem to be some desire for more support in increasing math performance, particularly in the form of coaches. Two schools mentioned this need.

Schools were looking for new ideas and resources to help them respond to emerging challenges.
Many of the problems discussed in the four deep-use cases related to the current climate and recent events, most predominant among them were problems related to the global pandemic and the need to adapt to virtual learning. From issues using technology, ("A lot of our veteran teachers were struggling because they haven't used a lot of technology with teaching"), trouble with staffing ("We have a small staff, and we had one virtual teacher on every single grade level"), and the student experience ("They want to be here. They don't like learning through the screen"), COVID-19 created a whole new set of problems for schools. Decisions made in response to these problems include reading relevant books and articles, making digital learning a focus of PLCs, and providing additional training/support to educators in using digital platforms. One teacher recalled a book study called *The Distance Learning Playbook* (Fisher et al., 2020): "It was a book that came out because teachers are scrambling and researchers are scrambling, to give us ideas that would apply to this school year." In a different school, similar reading was occurring:

> We've been reading about how to run a school during a pandemic. Or, you know, virtual online teaching and learning has been a big one. And so one of the articles we read was really all about how to engage virtual learners."

In light of tragedies like the murder of George Floyd and the civil uprising that followed in summer 2020, issues related to social justice were also particularly salient for schools in this case study. There seemed to be new recognition of the importance of culturally relevant pedagogies and heightened attention to disparities among student groups. One teacher reflected on the introduction of a book study of *Other People's Children: Cultural Conflict in the Classroom* (Delpit, 2006), stating:

> We do pick journals or books that are based on research. This particular one, I think, was in response to everything that happened after George Floyd . . . and so, when a teacher brought it up the leadership committee was pretty excited about it.

A teacher in another school shared:

> When we look at literature to bring into the building, that when I was a kid, you know, it was all middle class, white, whatever, kids. Well, these kids here, they're looking at a book, and it's like, you know, nobody's like me. They want to read about kids who are like them, not about what the publisher thinks the kid should look like. So I think that's made a big difference.

What does deep use of research look like in schools?

One of our guiding questions seeks to unpack what we describe as *deep* use of research. These four case study schools demonstrated high scores on our indicators for depth of research use (see Table 2), but scores are not particularly instructive for providing policy or practice guidance for strengthening research use. This section elaborates on qualitative findings to provide richer descriptions that illustrate deep-use practices. They are organized by dimensions of use featured in the Center's conceptual framework.

Evidence

The first dimension of depth of use refers to the types of evidence that inform school decisions and the role of research in those processes. Survey data for both the full sample and our case study schools highlight that educators use a wide range of information to support their work, and that local data and research are utilized more often than, but often in conjunction with, external research (May et al., 2022). Case study schools, however, stand out in their use of external research. The was more than three times greater than in the rest of the sample (.26 versus .08, respectively), though it was similar for the use of local data and local research (Table 2). Through our qualitative data, we explore case study schools' use of evidence, with particular attention to the role of external research and its relationship to data use.

Educators in deep use schools rely on both external and local research.

Educators referred to "research" as inclusive of many kinds of information, some of which are consistent with the types of scientifically based research prioritized by evidence use policy, for example, under NCLB or ESSA. Educators described research articles and books as resources shared and discussed in order to inform improvement efforts. One administrator at Willow Grove Elementary described evidence as "current articles and research on what's being done, like what's good. That's why, you know, things like publications, like *Education Leadership* helped me to know . . . to get it. I like an overview, a scattering of what's really going on." A teacher at Fairfield Elementary School mentioned a research-based book used in book study, and others referred to case studies and papers they read in college. This understanding of research was demonstrated in comments about using "science," wanting to see the "numbers" or "proof"—invoking external research as evidence to inform decisions. Similarly, educators referred to research as inclusive of frameworks that shaped action. For example, Fairfield's district office used a "guided reading framework based on Fountas & Pinnell" to help principals build instructional leadership skills.

Yet "research" also referred to local research. Educators described analyses of data, whether

conducted by the school or generated through reports from a data system. Data were invoked as research often referred to information gathered and compiled for use. In this way, research was not only a form of information, but also a process for generating knowledge from multiple kinds of information. For example, a teacher from Clark Elementary explained, "I think, like our biggest place we use research is really the student data, though, more than anything. We do our own research studies so much in here." Another teacher at Fairfield described the analysis of pre-post test data as research: "So we can get a lot of research we use for math, math class, and sometimes reading." These uses of data constitute a form of local research, rather than the normative external research often described in the discourse on evidence-based decision-making.

Deep use schools also value other forms of evidence in their improvement work.
When educators described improvement efforts, local data were the most frequently cited kind of evidence, including assessment (formative, interim, and summative) as well as more expansive findings such as survey data, social-emotional learning (SEL) data, attendance, running records, observations, student work, teacher-level data on students, and cost. Data also captured comparisons to other schools locally or even nationally. One school also described the importance of longitudinal data (past report cards, attendance data, relevant family history, etc.).

Another commonly referenced kind of evidence might be described as "what others are doing," which was demonstrated in a few ways. First, educators referred to evidence as demonstrated expertise or experience; for example, some sources of evidence included teachers who were having some success, often based on observations or student scores, or, alternatively, learning that another school was using a strategy effectively. Another version of this form of evidence is implied or assumed expertise, generally based on position. For example, some educators relied on advice from people in specialized positions, such as district office curriculum directors, consultants, or expert speakers. In some cases, evidence was more about seeing or hearing the work in action, even if not connected to outcomes. For example, when talking about the adoption of a program they had already looked into, a teacher at Ivy Institute described first going to a conference: "But we wanted to, you know, experience it firsthand . . . But then watching it in action at another school was I think the thing that made us decide, yes, sure. This is what we want."

Notably, research and data were often linked in school improvement work. First, external research shaped the use of local data. For instance, a Clark administrator described the impact of reading research about opportunity gaps:

> *Other People's Children* and *Teaching Tolerance* and those things, have had us look at data in a different way. We are still looking at the data to see, you know, how students are achieving. But we want to make sure that there's not a gap there that we're not aware of. And it turned out there was a gap that we weren't aware of. So, you know, it helped us with our Latino minority. We don't have a very large one . . . but our Latino Americans were falling behind and we didn't know, we weren't aware.

Another intersection showcases data as driving research use. For example, at Willow Grove, early data on student reading demonstrated the potential of a research-based program (*Bookworms*). An interviewee described this intersection:

> We were seeing some really cool results, you know, and then everyone else was like, "What are you doing? You know, what is it that you're doing?" And I'm like, "Well, actually, we've been trying this because I, you know, I've done some of my own research, not research research, but I've looked into it and I went to a conference" . . . And then so that buy-in was something that started very small, and then was kind of like, "What are you doing?" . . . We were recognized for high growth when . . . our district started saying "What are you doing?" You know, like, so that little bit of buy-in does work.

Lastly, evidence integration was observed through educators using research-based tools to collect or analyze data. For instance, a district administrator at Fairfield recounted:

> First of all Panorama is an educational organization that has a lot of research behind it. Their core values align with our core values as an organization. Their reliability and validity on their surveys are strong. We looked into that . . . So we specifically chose certain variables that we knew based on research and based on what science has told us are very big levers for kids. And so that's where we're trying to focus.

The bottom line. Educators in deep-use schools value other forms of evidence besides external research in decision-making; they also value local data and the experiences of others. Often different forms of evidence—both empirical and experiential, both external and local—are integrated into decision-making. Such an approach differs from normative models of research use and is not explicitly described or supported in policy guidance. Findings about evidence from deep-use schools, therefore, may provide more realistic or useful models for schools' use of research.

Search

Search constitutes the strategies and activities associated with *finding* research evidence to inform school improvement efforts. Across case study schools and the larger sample, scores for *search* were skewed right (May, et al, 2022), indicating that few indicating strategies that led directly to research (e.g., journals). The probability of educators in case study schools reporting efforts to access research directly was nonetheless more than double the probability in the larger sample (.18 versus .08, Table 2). Interviews helped us unpack educators' search strategies for accessing research in greater detail. Below, we elaborate on what we learned about search in these schools.

Online search resources are prominent.

When educators do turn to external sources of information, they often start with information accessible on the web. Search engines such as Google were frequent starting points, but as noted above, had recognized downsides. Other online search strategies were mentioned, but we were unable to assess the frequency or importance of each across the cases. These included:

- ERIC database
- What Works Clearinghouse (WWC)
- Education Week as a source of quick information/recent research hits; people can go deeper if they want to
- National resources, e.g., Reading League, Center on Positive Behavioral Interventions and Supports (PBIS)
- State assessment portals or private assessment portals (e.g., NWEA)
- State Department of Education (DOE) websites/resources
- Curriculum websites (e.g., Bookworms)
- Professional learning networks, such as Facebook groups
- Twitter

Site-based activities were also noted, most often conferences but also school visits. Search strategies were often used in combination with each other, combining knowledge and human resources. For example, an Ivy Institute teacher described the process of researching possible reading programs:

> Some of them came from just like you said, from searching on the internet, some of it came from speaking to teachers and other districts and what those districts used. And then once we found out those, we went back to the internet and looked at their materials, looked at

> the books they use and made sure it would fit with our population.

The selection of external sources for search reflects other aspects of research use. For example, different purposes for use may lead to different search processes. In the examples presented here, we see that adoption of new programs or implementation of curricula (i.e., instrumental purposes) are more likely to involve searching curriculum websites. On the other hand, educators mentioned Twitter or Facebook in the context of staying abreast of current educational issues (i.e., conceptual purposes). A search also reflects educators' beliefs about the qualities of research as well about whether research is useful in addressing problems of practice, which we explore more deeply in other sections of this report.

Search often happens in the context of relationships.
Strategies for seeking out education research primarily entails leveraging existing relationships. Educators seek research-based resources from other educators, primarily colleagues and school or district administrators; but, in some cases, wider networks as well. For example, a Fairfield teacher described why she turned to a district leader for research:

> She has the experience of a teacher. She works in the district office . . . and so she's the one that I like to go to because I feel like she has a lot of resources and is able to get the research-based questions that I'm asking.

Search strategies also reflect the value placed on the knowledge and experience of other educators. One Clark teacher commented, "Teacher knowledge base really does drive everything . . . you need your colleagues." Educators recognize others as having expertise or access to information, making them credible sources of information. Here, an Ivy teacher discussed mobilizing a professional friendship with another teacher who read more: "My strategy was to go to a colleague . . . you know, I, in my personal time, I don't do a lot of reading, but she does, you know, and whenever I go to her, she always has an answer." Leaders in deep-use schools often encouraged leveraging school resources as a starting point. As one Clark administrator explained: "Another thing that I want to make sure that [teachers have] checked before they start doing some of that other stuff is to check with their colleagues."

Relationships that support search are largely based on trust and knowledge about local context. Implied in relationship-driven search processes are beliefs about the qualities of research, professional background and experience, and school cultures that foster curiosity and openness.

Furthermore, search strategies that are relationship-driven ultimately configure certain individuals as key brokers in linking research and practice in deep-use schools. We describe these factors and conditions later in this report.

Search is part seeking, part vetting.
Although the literature most often described search in terms of where educators go to find information, we found that, in deep-use schools, search is a joint process of finding and vetting information. In fact, in almost all instances in which search was described, both processes were identified. Here, a teacher-leader described the search process at Clark Elementary: "Typically, we start with the national organizations . . . it's usually based off of their recommendations. And then we try to say, 'what's going to fit [our school context]?'"

Finding information starts with making decisions about where useful information is likely to be available. Vetting that information requires critical thinking and reflection on its application. Vetting sometimes included evaluating the quality or source of the information, but more often reflected whether the information was relevant to the school context, which we explore in more depth in the *research quality* section of this report. This local evaluation can be general (e.g., making sure that readings in a curriculum reflect diverse perspectives) or more specific (e.g., making sure that a program's evidence of effectiveness derives from demographically similar students).

While these processes could be considered steps in the search process, they sometimes occurred simultaneously. Decisions about where to look for information were vetted as much as the information itself. For example, reliance on other, often local, educators as sources of information as a starting point filters the information that ultimately gets accessed. As described by one Clark teacher, this process also cuts down on the volume of information—a type of vetting that saves time and effort and yields more relevant information:

> Usually talking to colleagues inside or outside of the building . . . that is usually my first step. I don't like Googling things. . . . There's too much stuff, too much crap, and then having to wade through that. It's just low impact, right? So I am a person whose relationships are massively important inside and outside of school.

Search is an explicit expectation, but responsibility for search varies.
Two of our cases (Fairfield and Willow Grove) explicitly identified district staff members as go-to search resources, which appeared to be designed to lessen the burden of search on school-based

educators. In a different case (Clark), the district leader credited school administrators for playing this role for teachers:

> *A lot of our principals are engaged in that and doing that with their faculties themselves. Always looking for a good researcher that's out there, looking at publications or books that are meaningful to them and how they can share that with our staffs.*

Two cases (Fairfield Elementary and Ivy Institute) engaged teachers in search and had explicit processes for doing so, as articulated across multiple interviews. By way of example, an Ivy Institute administrator described delegating search responsibilities to teachers in the process of deciding on new ELA curriculum materials:

> Okay, you guys need to go out. And here are the things that you need to research and it was very, very spelled out, we need to know, kind of, like I said before, "What district is using this? Does this district compare to ours?" You know, so and so forth? Right? So making sure that the programming or any kind of resources that they brought back for us to talk about as a group, like they became the expert of, right?

This individual also set explicit standards for search, clarifying that teachers "don't go to somebody's website and just print off something that they say. That doesn't work. That's like a D minus in our house. So you got to do something better." In Fairfield, teacher engagement in search was described more as an interpersonal and collaborative effort than as a technical task. As an example, volunteer teacher teams collaboratively took on the task of searching for and recommending new research-based programs or strategies, a model consistent with the larger culture of sharing practices and collaborating in PLCs.

The bottom line. Search is a complex activity that relates to educators' relationships and networks, knowledge of research, and demands on time. Deep-use schools decrease the burden of search by designating specific staff (in schools or districts) to take on these roles and developing formal and informal routines for gathering and evaluating information. Still, search is rarely direct to original sources of research, reinforcing the need to develop and leverage different systems for making research available.

Interpretation

Sensemaking is a critically important component of meaningful engagement with research. A school's score for interpretation was a count of ways educators interpreted research, in terms of (a) whether the information was of high quality, (b) whether the information was relevant to their school/district, (c) if they worked to make sure the information was understandable, (d) if they made connections between information and current practice, and (e) if they developed a shared understanding of the information. Educators in case study schools reported greater investment in interpretation than the larger sample, with a mean score of 4.02, compared to 3.36, though this difference was not statistically significant.

Our qualitative findings unequivocally demonstrate the importance of engaging critically with evidence. As an administrator from the Ivy Institute illustrated:

> I like to coach and create our team to be thinkers . . . Because I hate to say this, I don't know how to say it properly. But, you can BS through anything. But if you literally have the chops and like the knowledge and the prowess to really be intentionally thinking about comparisons to what our kids need, and what is already there success wise. Like, that speaks volumes within itself.

Below, we share additional insight into how deep-use schools engage in sensemaking.

Interpretation is described as a process of questioning, comparing, and planning.

Many interviewees described the questions they would ask themselves while looking at evidence. Whether examining internal student data or external research, they frequently made sense of information through questioning. When interpreting internal data, educators tended to ask questions about current status, potential causes of issues, and potential solutions. One teacher at Fairfield offered an example, "Where are we? Are we heading in the right direction? Are we not heading in the right direction? What do we need to change? What do we need to continue?" An administrator at Willow Grove mentioned a similar questioning process:

> Why are we still struggling? And then, of course, all that led to, well what do we do about it? . . . We can't just pick something randomly on a hunch. We really have to figure that out, you know.

When engaging external research, educators again asked questions to elucidate the information. Some interviewees described critically questioning the actions or solutions proposed by the research. A teacher from Fairfield explained:

> I'll question when I'm reading. So I'm like, "Well, how do I know that would work?" I want to know how you did it. Then I can be like, "Okay, that makes sense," or question it and be like, "Okay, I don't agree with that, personally, so I don't want to use that data," because that might not apply to how I want to use it.

Even when a piece of external research evidence is determined to be high quality, questions remain regarding the feasibility of implementation. An administrator at Clark revealed, "You might have a fantastic idea but it's so cumbersome or difficult to implement [so] it's never going to take hold. And is it something that I guess just rings true to us?" These comments, in addition to affording some insight into educators' interpretation processes, touch on themes related to research quality discussed in a later section of this report.

Another part of the interpretive process involves making comparisons. Interviewees described looking at how internal evidence compared to district, state, and national data. An administrator in Fairfield put it thusly:

> When I look at Panorama . . . we look at it like, "Are we beating the national average on this"' or "Are we doing better than the school district in this?" So, like an example would be when we were doing our attendance initiative and we're looking at our attendance, "Are we better than the rest of the district with our attendance?" or things like that.

When making sense of external research, interviewees made comparisons between the context in which the research took place and their own local context. For example, one Clark teacher who described her context as "semi-rural" explained, "We always have to keep our population in mind because it is different. They're not going to understand an urban setting and you don't have the same challenges, they have different challenges." An Ivy Institute educator made similar comparisons:

> *Just because something works in one district doesn't mean it's going to work for you. So you have to take that into account too. So when you do talk to the other districts, it's important to talk to some that have the same population that you have.*

We can see overlap these comparison processes and themes related to vetting discussed in the earlier section titled "Search."

A theme that emerged in our conversations is that part of critical interpretation of evidence is deciding what to do about it. Such input was offered on the classroom level (i.e., planning instruction or interventions, grouping, choosing or designing materials to supplement curriculum) and the school or district level (i.e., adopting curriculum or programs, designating coaching resources). Interviewees described the need to implement, or "apply," lessons from evidence. When asked to describe their process for interpreting evidence, one Fairfield teacher used the word "apply" six times in one response. When asked to define "apply research," they replied: "Apply it means like actually use it in my classroom. Be able to take data on it and see the progress that it's having in my classroom." In order for this classroom application to occur, educators must make plans for how they will implement the findings, strategy, program, and so forth. Often, planning was discussed as part of ongoing evaluation of programs and practices. For example, one Fairfield administrator explained:

> Ok, we know what the research says. We know what we're using. We've got this program that helps us. We've got these interventions in place. We're working on monitoring them. Now what's the full circle step of reevaluating and pushing forward? It's kind of like okay we've got our data . . . It's going to be that reevaluation to plan for the future.

Interpretation relates to collaboration.

Interpretation of evidence frequently happens through collaborative, rather than individual, processes. Many interviewees described interpretation occurring in the context of PLC; for example, a teacher from Clark explained when asked about how PLCs function in their school:

> We meet together, we plan together, we look at grades, or you know overall scores together and we talk about why or where, what we need to do to change it, what kind of interventions are or are not happening.

This quotation illustrates the interpretive processes of questioning, comparing, and planning highlighted above. During the 2020–2021 school year, Fairfield Elementary took advantage of asynchronous Wednesdays to have staff meetings in which Panorama survey data were interpreted collectively. In one example offered by an administrator, this collaboration was crucial to the accurate interpretation of results. Specifically, the administrator mentioned being surprised by the Panorama data related to their own performance in the area of communication and relied on input from teachers to make sense of the information:

> I feel like the one area that I'm probably super strong on is communicating with staff . . . And my rating was not good, and I said, "Okay staff, what can I do?" and they're like , "oh it wasn't against you, it was this department or it was all trying to communicate with our specialists," and so that was very interesting how people interpret these questions very differently. We've been able to take some of these Wednesdays, and really break down some of those questions and talk about what the teachers are feeling when they read them. And then also they realize, "Oh well, our students probably are doing the same thing when they're reading their questions and that's why some of our Panorama scores aren't where we think they should be." And so they've been able to really talk to the kids about the questions.

This scenario shows two levels of interpretation: the difference in interpretation of the survey item in Panorama and the administrator's interpretation of the results in order to identify opportunities for improvement. This example demonstrates an instance in which collective interpretation by the staff was not only essential, but also led to the realization that similar considerations (regarding the understanding of survey items by survey respondents) may be necessary when interpreting student-level Panorama data as well.

The bottom line. Deep-use schools model collective sensemaking through multiple strategies for critically considering evidence in their improvement work. Opportunities for staff to dig into evidence were organized by leaders and promoted shared understanding, assessments of relevance, and opportunities for action. The capacity to interpret evidence in deep-use schools is therefore less about individual knowledge and skills than about organizational routines.

Participation

Who engages in evidence use and decision-making shapes *what* information is accessed, *how* it is understood, and *what is used* to inform the work of schools. Therefore, understanding the ways in which schools involve or do not involve stakeholders—from teachers to community members—in these processes is instructive for building school capacity for research use. The SEE-S asks respondents to indicate the involvement of 18 different stakeholder groups, ranging from school staff to external researchers to families. The mean stakeholder groups involved in decisions for case study schools was 5.9, compared to 6.4 among the other sample schools, suggesting that fewer groups were involved in decision-making. In fact, our qualitative data offer no examples of parent, student, school board, or community member roles in school improvement work. However, the

qualitative data provide a rich portrait of inclusive decision-making and engagement *among school staff*, a narrower but critically important set of stakeholders.

Educators participate in research use through multiple roles.
Schools included in the case study did not necessarily involve a large number of different stakeholder groups in their use of research, but they did have many ways (and structures) in which educators engaged with the research. School members participated in research use in a variety of ways and through several different roles including activities described as search (finding, vetting, evaluating), sensemaking, decision-making, and implementing, thus distributing responsibility for research use. Because many of these activities have been described elsewhere in this report, we focus here on who participates in research use and how.

Teachers are often engaged in the processes of search, interpretation, and implementation (as described in more detail in their respective sections of this report). In deep-use schools, we often see teachers tasked with actively gathering evidence to inform problem-solving and/or decision-making processes as well as vetting that information in terms of relevance, trustworthiness, and quality before sharing it with decision-makers. We also see teachers participating in interpretation processes, which are often collective in nature. Perhaps the most salient role for classroom teachers is implementation. By implementing new research-based programs, practices, or curricula in their classrooms, teachers participated in applied research use.

Administrators most frequently participate in decision-making. When considering decision-making, two different roles were identified: recommending a decision and, ultimately, making it. In Ivy Institute, Fairfield, and Clark, committees make a recommendation based on evidence they have collected, vetted, and interpreted, but the final authority to take action fell on school administrators. In Willow Grove, on the other hand, recommendations and decisions typically came from building and district-level administrators.

While coaches may be involved in various aspects of the decision-making process (e.g., serving on committees engaged in search, participating in collective interpretive processes, making recommendations), they are instrumental in implementation. Coaches were often reported as facilitating implementation of decisions by supporting teachers in the classroom.

Widespread participation made possible by organizational structures.
Organizational structures will be discussed in greater detail in below, but briefly it is worth noting

that participation in research use was often facilitated by structures such as teams (e.g., teacher-based teams, building leadership teams) and dedicated time/space for collaboration and professional development (e.g., PLCs, staff meetings, data team meetings, professional development workshops). Even when participation was not available to everyone, schools ensured access to ideas and information. Case study schools had a common practice of selecting an educator or a small group of educators to attend events and then bringing back and sharing what they learned with the rest of the school. This approach ensured that valuable information from professional workshops or conferences was still able to enter the school regardless of constraints to all staff from attending. One teacher described going to an out-of-state literacy conference: "It was two teachers from each school [who] got selected to go . . . Our school did an upper and lower grade teacher, so we could bring back and present to our common grades."

Schools made efforts to ensure representativeness.
each of the deep-use schools demonstrated common efforts to ensure representativeness in participation with research use. Teams such as BLTs are often intentionally composed of representatives from each grade level as well as special educators, related arts teachers, building administrators, coaches, and counselors. This approach ensures that each grade level has someone to represent their interests in meetings and that information is shared with all educators efficiently. We see a similar approach used in some professional development and conference opportunities, but with the goal being less about representativeness and more about universal access.

The bottom line. Deep-use schools feature highly participatory approaches to research use, at least among school staff, enabled by the presence of organizational structures that both engage staff school-wide and take up responsibility for important aspects of school improvement. Moreover, the distribution of responsibility for research use appears to be an intentional way to build capacity and buy-in for research use across the school.

Frequency of use

In selecting deep-use schools for further study, we sought cases in which research use was frequent; in other words, research use is an institutionalized practice. Quantitative analyses show that these schools used local data and research as frequently as others in the sample but were more than twice as likely to frequently engage with external research (Table 2). Qualitative data help us understand what institutionalized practice means and looks like in schools.

Evidence use is routinized—"It's how we do things."

Across the four schools, evidence use occurred in a routine, institutionalized set of activities and processes. While some regularly scheduled activities were identified as primarily about evidence (e.g., Panorama data collection and results review at Fairfield; annual "data days" at Willow Grove), more often, the evidence was integrated into other structures and processes (described later), which were then identified with a frequency. For example, Clark Elementary held regular staff meetings bi-monthly, including at least one book study per year, and PLCs met for a full day biweekly. Similarly, Fairfield held regular monthly staff meetings and BLT meetings, districtwide professional development occurred monthly, PLC meeting took place three times per month, and a pair of external consultants who served as research brokers visited monthly. More important than the frequency (weekly, monthly, etc.) was the that these events occurred on a known schedule and that there was dedicated, protected time for them to occur.

Additionally, frequency and purpose of use seemed to bear some connection. For example, uses for classroom purposes often occurred weekly in the form of data routines, while uses for teacher learning were more likely to occur on a monthly basis in the form of professional development or engagement with consultants, and uses for school improvement planning often happened annually through events like the year-end data retreat held at Willow Grove. Conceptual uses of research, such as book studies, seemed to be ongoing and engaged in with long-term use in mind.

Routines can be flexible and adaptable.

While the four schools employed routines and processes for research use, there was also evidence of flexibility and adaptability that further facilitated use. At Fairfield, for example, administration of the Panorama survey was scheduled three times each year, but when educators decided that more frequent data would be beneficial, an adjustment was made. A teacher shared:

> Yes we're still continuing Panorama three times a year but let's create our own based off of data from Panorama and let's do that monthly check in with kids and see now where are we? Are we heading in the right direction?

Conversely, sometimes a decision was made to reduce the frequency of an activity. Due to the large number of staff (more than a quarter) in graduate school, and thus already engaged in intense reading, Willow Grove scaled back its school book studies. One teacher commented, "So when we first started, we did, like, I mean, we had probably about at least two to three within a year going at one time. But we haven't done that in a while." At Clark Elementary, for over a

decade, collaboration time for teachers was provided on Wednesday afternoons until, as an administrator explained:

> But what I heard from them is, you know, teachers can never quite get over the hump of all the work that we really needed them to do in PLCs. So we picked one Friday a trimester as a full collaboration day for teachers. And teachers were just really supportive and excited about that, and it really went well and then COVID this year pushes them to a different model where our elementary teachers have a full day on every other Monday and our secondary teachers have basically intervention time in the morning and then collaboration time in the afternoon every Monday. So we've really expanded collaboration time for teachers.

This input provides examples of adaptations to both educator feedback and needs and to current societal conditions. Processes around evidence use may also occur as needed due to emergent needs, such as program adoption. For example, an administrator described how, at the Ivy Institute, "We literally nerd out and . . . we do article searches once a month." But the frequency and intensity of that routine increased in response to needs: "When we're going through a program change, for example right now we're changing our ELA resource." Therefore, the process of finding and sharing evidence was occurring more often.

Sustained, reliable, and ongoing engagement is valued.

Frequency of evidence use highlighted the importance of sustained, reliable, ongoing engagement with research evidence. We saw this pattern within the use of organizational structures (e.g., PLCs, BLTs), but also in engagement with research brokers. For example, Fairfield Elementary had regularly scheduled engagement, with external consultants acting as research brokers. Across all interviews from this school were constant mentions of the external consultants who provide monthly professional development. Here two educators describe the value of this arrangement:

> I think it's just I think that's been a really big game changer too, because I think a lot of times teachers have this view of PD as very boring and very just, like, "I'm not going to get a lot of use out of it." . . . Where these ladies bring in their experience, I mean it's personable. They meet with us every month, so it's continuous. It's not just one PD and never see you again, and they even go a step farther to coming into our school. So I think that's just been like a game changer for us.

> I think one thing that I really benefit from, which I know not all schools can do it, but having those consultants . . . I think that's been a really nice thing, being able to do it monthly. I think one research-based PD isn't enough because you have so much information thrown at you, and then, when you want to apply it you kind of get overwhelmed or you kind of forget all of the details. So those monthly PDs, or even like three times a year, you're able to really be able to apply it, analyze it, ask more questions and then keep going.

At Willow Grove, this preference for reliable, ongoing engagement was echoed in descriptions of interactions with the district ELA Coordinator, a key broker for the school. A school-level administrator expressed appreciation for the consistent and trusted research-based information they received from this coordinator when needed:

> She's actually pretty been pretty instrumental obviously in the implementation and rollout of Bookworms. So if I ever have any questions . . . I can just reach out and say, "I don't understand, why why are they? Why is this happening?" . . . so she has recently given us well, "If you get this question, here's a research-based answer to it," you know, which really helps us on this end.

These statements demonstrate that these educators found the consistent, ongoing nature of these brokering interactions especially useful. While the importance of routines with a regular schedule has already been established, the descriptions of these particular activities make a strong case for ongoing, job-embedded, sustained professional development and support.

The bottom line. Evidence use in deep-use schools often occurred in the context of typical school routines scheduled with regularity, allowing for sustained and continuous engagement. This model made use simply part of *the* work of the school, not *more* work—a theme that persists throughout this report.

When and for what purposes do educators use evidence?

Prior studies about research use point to multiple ways in which evidence can inform educational improvement efforts. Policy discourse promoting evidence use focuses on instrumental use, whereby research is used to inform a specific decision. With instrumental use, however, educators might use research to understand a problem, identify, and select among solutions, or inform implementation. Still, educators can use research *conceptually, tactically, symbolically*, or use can be embedded or imposed. In our survey data, educators in our case study schools report greater use

of research across all of these purposes than schools in the rest of the sample. Below we share more about their practices.

Uses of research were diverse and integrated.
Interviews revealed just how complex research use is in practice. As we explain below, we found evidence of all types of research use (instrumental, conceptual, tactical, imposed, symbolic, and embedded). However, these uses were often woven together as part of improvement work, highlighting the challenges of identifying, understanding, and supporting research use practice in schools.

In case study schools, research was often described instrumentally, informing decision making and problem-solving, particularly in the context of adoption of programs, practices, and interventions. For example, at the Ivy Institute, teachers used research to inform a decision to adopt a new English language arts curriculum: "And so some of the classroom teachers did some research into those and narrowed it down to two different [programs] they thought would be best for us." Descriptions of instrumental research use were the most common and were represented across the cases.

Tactical or political use of research was connected to instrumental use in all four schools, and most often described as a means to build buy-in for a particular strategy or initiative. At Clark Elementary, for instance, one teacher explained how a book the staff read as part of a standards-based grading initiative helped resolve conflicts about the new policy:

> *We just had to keep referring back to the book, "this is what the research says, this is what he says is the reason why we do it." . . . we kind of use it as, this is the North Star.*

Sometimes this tactical use reflected the need to get leadership approval for new practices a teacher might want to implement—a scenario most clearly demonstrated at Willow Grove. An administrator explained, "If you cannot back up, like what you want to do, or what programs you want to change, or you want to change your literature, within the scope and sequence for ELA, then you're not going to do it."

However, participants also frequently mentioned conceptual uses of research to develop new understandings to guide practice. Conceptual use was noted on its own as a means for personal or staff professional growth, as exemplified by the Willow Grove principal's purposes for reading

articles shared by a district-level coordinator; as he explained it: "So that we can be current, read as much as possible. And then, you know, help, hopefully helps us make decisions at the local level." However, conceptual use also supported instrumental use. Book studies, which we describe later in this report, were common ways that educators used research conceptually for school-wide professional learning around particular initiatives, noted in the earlier quote about standards-based grading in Clark Elementary.

Both conceptual and instrumental uses were sometimes connected to imposed or sanctioned use, which did not emerge as a mandate or list of evidence-based programs from which to pick, as suggested in the literature. Educators in three schools (Willow Grove, Ivy Institute, and Fairfield) used language like "pushing down," "filtering down from the top," or "we use [it] districtwide," suggesting that research use is being required by another level of the system. This finding reflects what Yoshizawa (2020) referred to as *deferred use*, which she described as one of the ways imposed use plays out in local decision making. Fairfield illustrates this model through an administrator describing when districts find information and programs that meet the school's needs: "But we're not necessarily going out and finding these resources because someone else does that for us at the [district] they find those resources for us and we just use those resources and gain the information from those resources." Similarly, a Willow Grove administrator noted:

> I will say that I think that most of the research is probably done more at the district level than it is here at the school level. And that's because we really do have those experts who are content specific . . . we read research articles and things like that here at the school level, but it's usually from the recommendation of one of those coordinators.

Another way research-informed practice in deep-use schools was through embedded or latent use. In these instances, we heard educators talk about how research becomes part of organizational routines and practices. An administrator in Fairfield explained:

> The [building leadership team] will see something that's going on and will bring some research to [the team] or bring some research to us. And then we all talk about it as a collaborative and then they decide how to push it down into the team.

Similarly, they explained how literacy consultants worked research into their support for teachers:

> It was like, "let me help you use this in your classroom," and they gave us that training. And the teachers walked out going, "Oh, I can use this today, this today and this today." And it's all research based but I don't know if they really realized that at the time.

Another version of embedded use was the implementation of routines that reflect research-based practices or ideas. Though our data do not capture the use of research in designing these practices, educators described these processes in the context of discussing research use. For example, in Fairfield, district administrators engaged in monthly walkthroughs with school administrators to build their understanding of the research on early literacy instruction as well as their capacity to support research-informed practices in their schools. At Clark, a district administrator described a push for instructional coherence (e.g., Newmann et al., 2001) across the district, activities for which included refocusing teachers on their core math curriculum and convening teacher representatives in the summer to prioritize standards. These examples highlight ways in which research is the foundation for a wide range of initiatives and activities across deep-use schools.

Expressing a perspective found across our case study schools, one Fairfield teacher reflected:

> But I think the next step's just continuing to grow and take the new research and apply it, because I think a lot of times, we just read it, and we understand it, but we don't actually apply it. So being able to, so like we listen. And we're like okay that sounds great, and then we don't actually do it.

This teacher is engaged in conceptual use of research ("read it…understand it") and wants to increase instrumental use ("the next step's…to actually apply it"). In all four deep use schools, there seemed to be an awareness that to use research is to meaningfully engage with it, even to take action on it. Not surprisingly, symbolic use was less prevalent. Indeed, we did not find any clear symbolic examples in our case study interviews.

Local data and external research are used at different stages of decision-making.
While the primary interest of this study relates to the use of external research evidence, as noted earlier, schools rely heavily on local data as evidence in improvement efforts. Due to the importance of local data, conversations about research use inevitably provoke discussions about the use of both types of evidence. Local data and external research are both used primarily for instrumental purposes, but at different stages of the decision-making process. Analyses of local

data are often used to track and monitor student performance, evaluate instructional effectiveness, forecast future needs, and make local and national comparisons. These purposes correspond primarily to the decision stages of problem identification and evaluation. An administrator from Ivy Institute provided an example of using student data to identify opportunities for improvement, explaining:

> We have seen, especially COVID, that we already started to see a decline in specific skills and power standards within ELA. So based on that, my team is already committed to researching and looking at like, "Hey, we got to find a different resource, because right now, it's not meeting the needs of our kids." . . . So we just decided on Expeditionary Learning as a team, which also has a virtual component, you have to offer virtual. And, and that's kind of where we are now. So now, with that research piece like that was the step that we took.

This example also demonstrates the interaction of local data and external research in a decision-making process, whereby analysis of local data identifies a need (e.g., student ELA data) and a program is adopted based on recommendations of external research. In this same example, we see external research being used at the decision-making stages of search and choice (i.e., finding potential solutions and choosing which to adopt). Local data are also used to monitor and evaluate the implementation and effectiveness of research-based programs, curricula, and interventions, which corresponds to the decision-stage of improvement (i.e., improving a current process/solution that addresses a problem). A Fairfield administrator discussed the importance of implementing programs with fidelity even though, at times:

> Teachers are hesitant about it and it's like, listen just try it. We'll see where we are. We'll look at the data with our kids. Compare Lexia to MAP and see if it is working, and if it is how we can move forward.

This example illustrates the planned instrumental use of local data to evaluate the impact of recently adopted programs as well as potential strategic use of that data to encourage resistant teachers to continue implementing programs based on their demonstrated success.

The bottom line. Findings confirm the complexity of "use" and suggest that more research use may be happening in schools than we might suspect in a narrow focus on instrumental use. Further, the integration of different purposes of use challenges typologies that suggest use is *either* one form

or another. Deep-use schools provide helpful examples of how research can be woven throughout different aspects of improvement—from decision-making to buy-in to broader professional learning.

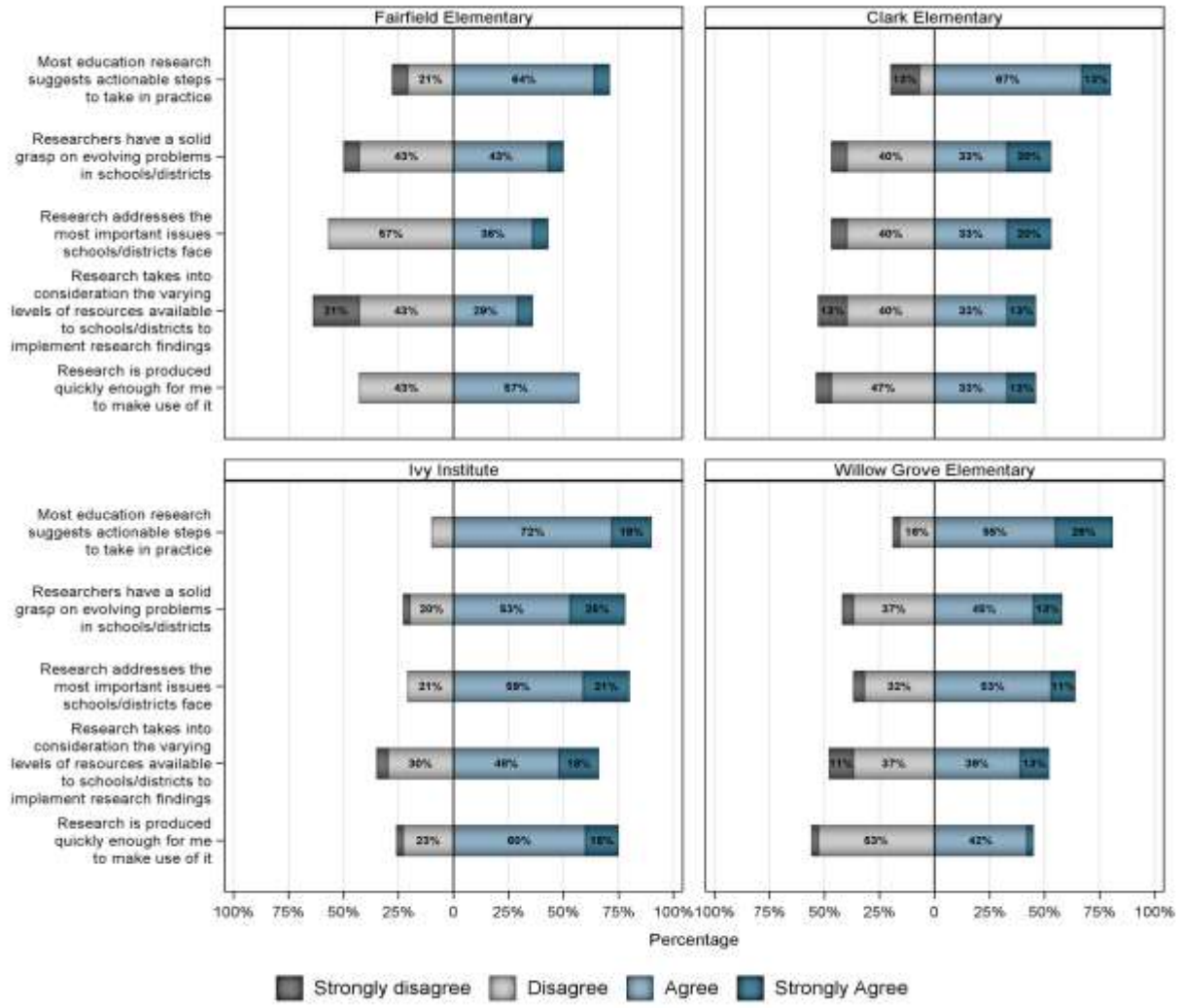
What conditions support deep use of research and how do those conditions come to exist?

Unpacking deep research use paints a rich, instructive picture of school practices and offers useful guidance for those seeking to be stronger users of research evidence. However, these practices are not isolated from the larger school and district context; they are a product of many different individual characteristics and organizational conditions that support meaningful engagement with research. In this section, we address our second research question by presenting qualitative findings related to key factors shaping deep use in case study schools. We focus first on describing what we learned about the various dimensions of our conceptual framework and their relationship to deep use. We then describe how the collective set of conditions work together.

Perspectives on problems of practice

An historical barrier to the use of research in policy and practice has been the perceived utility and relevance of research, which we asked about in the SEE-S. Educators in case study schools, on average, reported favorable perceptions of the potential for research to address problems of practice in the SEE-S (Figure 5). This outcome is particularly true at Ivy Institute. However, sizable numbers of educators in the other three schools disagreed with statements about the value of research. Further, schools varied in their beliefs about timeliness and were less likely to agree that researchers take into consideration the resources needed to implement research-based practices (Figure 5). Interviews offered greater nuance about these perspectives, helping us to better understand how even deep users feel about research.

Figure 5. Survey Responses on Perspectives on Problems of Practice



As described earlier in our findings, educators in deep-use schools reported using research in multiple ways and for multiple purposes related to school improvement, which in and of itself suggests positive perceptions of the utility of educational research for practice. That said, the notion of research was met with mixed responses. It was common for interviewees to hedge or express uncertainty about what we may have been "looking for" as research. Others contrasted the different connotations of "research" and "data," with the latter seeming more accessible. For example, here is an excerpt from a Fairfield administrator:"

> I'm only going to speak for myself, so when I first read the email and I thought "Research? What research have I been doing?" You know what I mean?
>
> *Interviewer:* Does it feel wrong?
>
> Yeah yes. Do we read articles, things like that? Absolutely. Book studies. But I don't know that we would classify it as research. I'm thinking [of] research as someone who's going out and researching something like you guys are doing right now. And then probably going to write some article or write some sort of document on it, whereas we're diving into the data, and so I just think it's just the way . . . that is the term that we use.

Entangled with perceptions of the value of research for addressing problems of practice are perceptions of the availability of relevant research, which interviews revealed to be mixed. For example, here are comments from two different speakers:

> Because really, within the United States, there's nothing published within educational magazines, or professional, whatever, there's really not a lot on [retention] that shows actual raw data to say, this particular school district or whatever. And these are the positive or negative impacts on things.
>
> We were working with the national [organization], it's [focused] on increasing attendance. There's so much research on that.

These examples highlight conflicted views. These perceptions may be in part driven by the area of work. For example, there were mentions of certain issues having a lot of available information (e.g., literacy, attendance) while others perceived a lack of relevant research for their work (e.g., gifted learners, retention).[1] The extent to which educators perceive that relevant research is available may be a function of the body of evidence in the area but may also reflect educators' beliefs and preferences related to research quality (see later discussion of local compatibility), products, and accessibility.

Educators' preferences regarding product formats and characteristics (as discussed in more detail in the next section) played a role in their perceptions of the availability of relevant research. There

[1] We focus here on the perceptions in interviews and have not verified claims about the availability of research in these areas.

may be hundreds of peer-reviewed journal articles or books written on a topic, but if the research is not available in a format that educators find useful and accessible then they are likely to conclude that there is a lack of relevant research on that topic. A Clark teacher showed how perceptions of limited research can be impacted by product characteristics:

> And sometimes there's not a lot of choice. There's only a certain amount on gifted [education] that is going to be meant for direct instruction in the classroom. And I guess that's the other thing that we look for. Is it going to be easily applicable? We don't do things that are a waste of time.

The emphasis here on resources that are "meant for direct instruction" demonstrates the desire for research that is actionable, and the impact on perceptions of availability if it is not.

Another significant factor in educators' perceptions of the availability of relevant research is accessibility. Multiple educators mentioned barriers to locating and obtaining research products. Even if a wealth of relevant and usable research on a topic does exist, if educators cannot locate and access it, they will likely perceive that there is a lack of available information. At times, educators expressed feeling overwhelmed when searching for information on a topic, or a desire for reliable sources:

> But the thing that I feel like is lacking that I wish somehow could be like, more focused, [is] being able to have some sort of literature or publication or whatever that's already been vetted through an organization that has good community standing, for lack of a better word, national standing . . . to me that's a go-to.

An administrator from Ivy Institute pointed out, "There's a lot of publications, like from special specialty areas, like the Orton Gillingham stuff, or just basic research that doesn't get published in easily accessible ways."

Finally, cost and implementation feasibility relate to beliefs about how research can address problems of practice. It is not sufficient for relevant, usable research to erdXxist and be accessible to educators if the proposed solutions, programs, or interventions are prohibitively expensive or unrealistically complicated to implement. A school-level administrator at Willow Grove who had experience using the What Works Clearinghouse described the challenges of locating relevant research or research-based programs on virtual learning during the pandemic. Whatever she could find was out of reach financially:

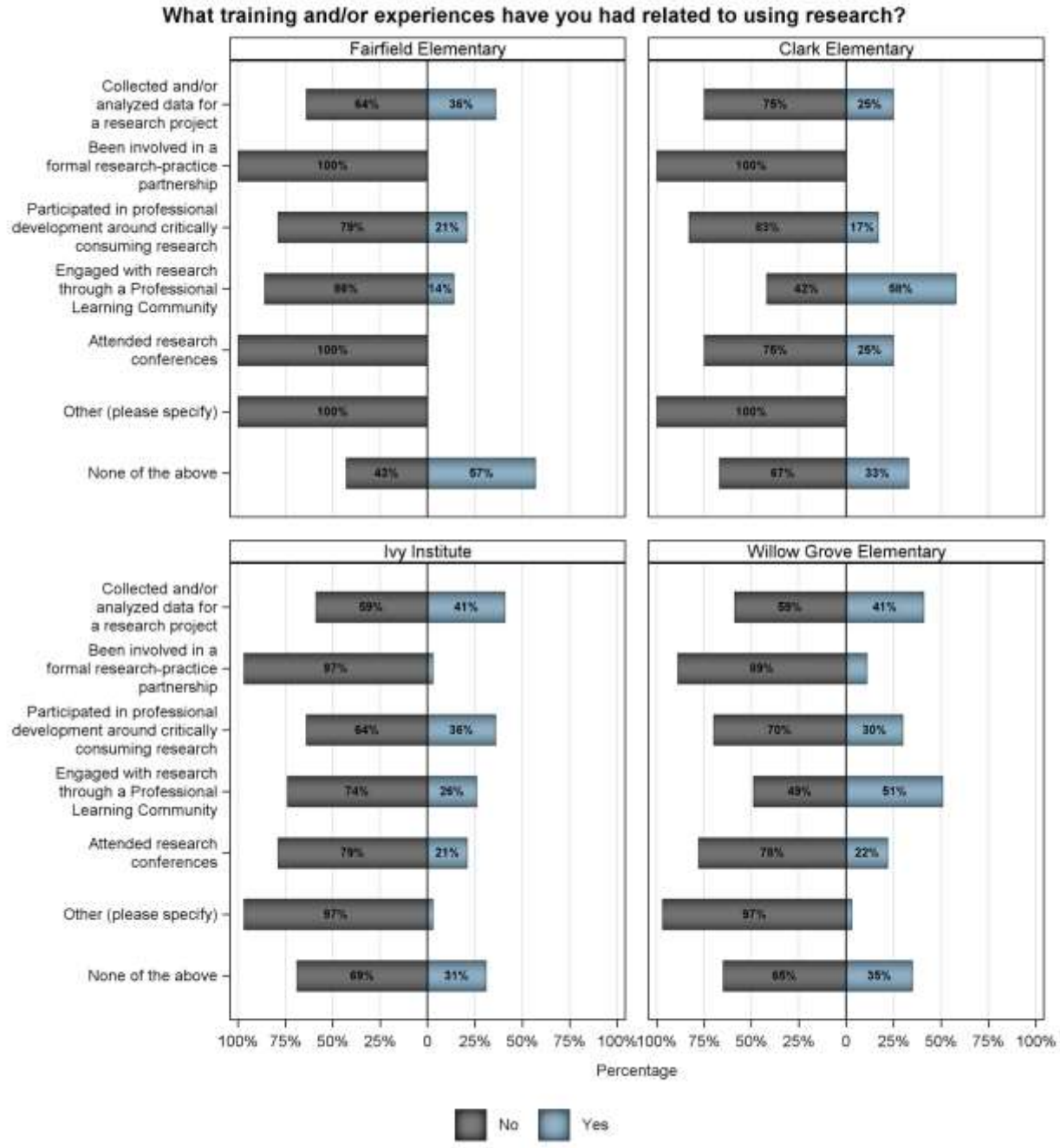
> I felt like there was a huge gap . . . you know, if we were looking for something to help with reading comprehension, of course, we're going to find something on that website. [But] if you narrowed it down to really very, very specific problems, I think you might have a problem . . . .I was looking for web based things. And I remember saying, 'there's really nothing we can touch. Like there's nothing we can even get close to' . . . We had enough funding, very limited, . . . like teeny, tiny. . . . There's this website that has all this amazing research, like they've proven that their product . . . the resource works. But however, we may not be able to touch it. We only have so much funding. We're like, okay, well, we have a problem. And we don't have the funding to actually to get a program or, you know, a product that is research-based. So there's that. And that's a problem as well.

The bottom line. Even among deep-use schools, there appear to be opportunities to improve the perceptions of the value, accessibility, and relevance of research as a resource for improving practice. Diverse notions of what constitutes research, challenges with availability (both lacking and overwhelming), and concerns about the feasibility of implementing recommendations point to a persistent gap between research and practice communities.

Educator capacity

Educators' knowledge of and skills related to research represent individual factors that may contribute to schools' use of research. A research literacy perspective suggests that educators' ability to understand and apply research is an important, but insufficient, condition for research use. Responses to SEE-S items show that educators in our case study schools, on average, reported similar levels of self-confidence using research (mean = 2.06 on a scale of 1–4) to the larger sample (mean = 2.18) as well as similar prior experiences with research. Figure 6 presents educators' prior experiences across our deep-use case study schools. We see many similarities across schools but note some key differences. For example, Fairfield educators were much more likely to report having had none of the listed experiences, whereas Clark and Willow Grove were much more likely to engage with research in PLCs. We explored some of these differences in educator capacity through interviews to better understand whether and how this capacity supports research use in deep-use schools.

Figure 6. Respondents Prior Training & Experience Related to Research Use



Graduate study builds educator capacity for research use.

Graduate programs appear to be the primary means for formal professional learning about research use. Professional learning opportunities specific to research use were not evident in our interviews; rather, educators explained that professional learning can entail the use of research or research-based information.[2] Educators mentioned prior, current, and future plans for graduate study that directly impacted their ability to use research evidence in meaningful ways. In one case, many district principals had graduate degrees that required engagement with or conducting research, which built their capacity to understand and discuss research at high levels. As one administrator reflected:

> One benefit of going through graduate programs, and especially the doctoral program, is that it forced me to learn a higher level of research than I had before. And we do have the benefit of, you know, probably four or five people with doctoral degrees in the district that have a pretty good working knowledge of how to implement research.

Three interviewees, all at the administrative level, described their dissertation/capstone projects as directly related to their uses of research in the field. For example, one explained, "My big project was on data collection for attendance and how to use that to change our practices." A key research use leader, a district administrator who supported Fairfield, described how her doctoral work influenced her role:

> I know my own dissertation was done on [instructional leadership] and what I did was a structural equation analysis on that. And I know that setting goals, setting visions, setting expectations, holding people to accountability is extremely important, but you have to be a warm demander. We know that you can't just go in there and demand it. So really focusing on the growth mindset, the empathy. You know, all of those things. It isn't going to happen overnight, unfortunately. So, continuing to work through that and get people to feel comfortable and build their efficacy in their belief that they are instructional leaders, first and foremost.

In addition to having administrators with advanced degrees, deep-use schools take a collaborative, job-embedded approach to graduate study for teachers. Two had a critical mass of teachers

[2] This may also be how the corresponding item in the SEE-S was interpreted, given the relatively frequent reports of availability of professional learning on research use.

pursuing master's degrees together. The cohort model was seen as powerful, and teachers were encouraged to "bring back" the research they learned in their graduate programs to share with the rest of the school. A teacher from Willow Grove shared:

> One of our fifth grade teachers who is in grad school right now [is] doing an action research project. So she involved us in that yesterday. We have another fifth grade teacher who is also in grad school, and she has been offering some professional development based on research. And I think we have probably about 10 people right now who are in grad school, including myself, so that's 11.

Deep-use schools are open to what new teachers bring to the table.
Not all research use capacity comes from advanced degrees. Related to the idea of educators in deep-use schools having a growth mindset, there appears to be a common openness to new ideas, training, research, and technology that facilitates capacity building in these schools. A second-year teacher explained:

> I also think just being open to other teachers' ideas [is part of the school's success]. I think many times there's this view that veteran teachers know it all. But as I graduated from [university pre-service program], I had a lot of research that I had to go through that's new.

This idea was echoed by an administrator in a different school and demonstrated in descriptions of newer teachers offering training and technical assistance surrounding new technologies and platforms. The fact that veteran teachers in these schools were receptive to training/technical assistance provided by newer teachers reflects this idea of openness. Three other interviewees, representing three different case study schools, also described student teachers as a source of new research/ideas and a link between the research and practice communities. "I mean just that they have such a growth mindset. I think our staff is like a community of learners themselves . . . then we also turn it around to, we have 10 student teachers right now, so they also bring research-based practices to us," an interviewee explained. Being open to learning from student teachers, who are there in the school to train and learn themselves, highlights the openness of staff in these schools.

Leaders see building capacity for research use as part of their role.
Leaders at all levels of the organization recognized their role in both building capacity to use research and identifying where capacity already exists internally and showcasing it. At times, this capacity building is direct, with district leaders coaching principals, and principals and assistant

principals coaching teachers, for example. Other times the capacity building happened more indirectly, with leaders designing professional development or bringing in external consultants to work with educators on research use or research-based instructional practices. Several administrators identified staff members within their building who had exceptional capacity to access, interpret, or act based on research. Sometimes these individuals gained external recognition for their capacity (e.g., "the state seeks her out"). Other times, they were highlighted or given a platform internally. For example, a Fairfield administrator described "tapping" a teacher to share her use of data for assessment and intervention with colleagues:

> I just was really impressed with what she was doing immediately in the classroom as far as assessing students, how she was documenting it, and then she had a child that she wanted to talk to me about. And what she had done with her data, making graphs . . . being able to say, "Okay, at this time I did this intervention, at this time I did this intervention . . . and these are the results." . . . I said, "You know what, I'd really like for you to speak to the staff . . . .the staff needs to see this." I said, "This is great." And she did a nice presentation last Wednesday, and you know teachers who have been teaching 30 years, teachers who have been teaching 15 years, you know, they were very receptive.

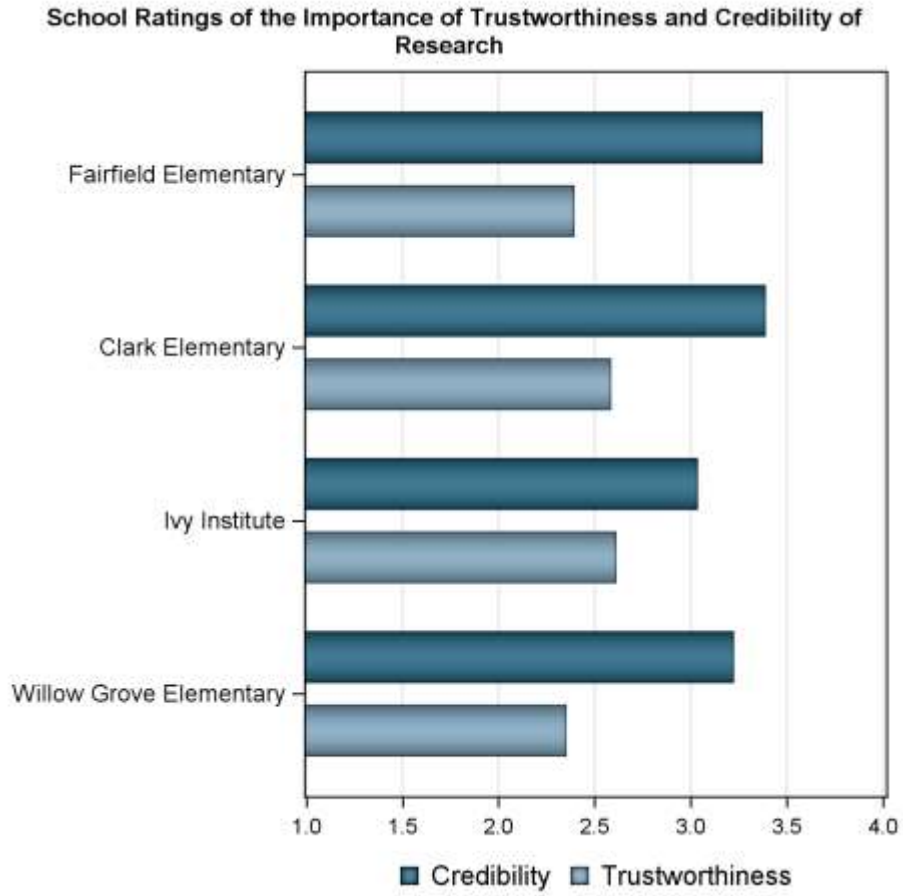
The bottom line. Formal preparation for using research was limited to graduate study in deep-use schools, but that experience proved valuable, particularly among school and district leaders. Informal capacity building was then cultivated by leaders and enabled by school cultures that value collaborative learning. Therefore, formal learning about research use among educational leaders may be a key lever for building school-wide capacity.

Qualities of research

Educators evaluate information during the process of search and interpretation, ultimately making decisions about whether research meets their needs, which we have described elsewhere in this report. We asked about the qualities of research that they valued in the SEE-S, focusing on factors that might make research more trustworthy and credible. Educators in our case study schools as well as in the broader sample did not feel that the criteria for trustworthiness—including publishing in a peer-review journal, research highlighted in a major media outlet, the number of times a study was cited, or whether research was conducted by a person or institution they knew—were particularly important (means in our case study schools ranged from 2.35 to 2.61 on a scale of 1 [lowest] to 4 [highest]). Criteria for credibility—including producing statistically significant results, a

large sample size, random assignment, reporting on *all* outcomes, and detailed methods—were rated higher (means in case study schools ranged from 3.03 to 3.39). As reported elsewhere (May et al., 2022), these data may indicate that, although the rigor of the research enhances credibility from educator perspectives, the most important criteria for evaluating the trustworthiness of research were not captured in our survey.

Figure 7. School Ratings of the Importance of Trustworthiness & Credibility of Research



Interviews with case study schools are instructive for unpacking some additional criteria according to which educators evaluate research. Educators appeared to apply four criteria when evaluating research: compatibility, credibility, alignment, and timeliness. In elaborating on these criteria below, we note that often, educators' notions of research quality most often reflect whether curricula or instructional resources are based on research, rather than the research itself. This finding is consistent with our prior discussion of what educators count as "research" and the complicated, integrated nature of instrumental use. In the context of unpacking qualities of research, this means,

for example, that compatibility is more often measured by "where has this (program/intervention) worked?" rather than, "Where does the research behind this program come from?"

Quality research fits the context: school, teachers, and most importantly students.
Educators in deep-use schools first and foremost are concerned with local compatibility. When seeking new programs or curricula, they aim to understand if these courses have demonstrated effectiveness with similar students and in similar settings to their own. Dimensions of "fit" include student demographics (race, socioeconomic status, disability, age/grade level) as well as school setting (urban/rural). As one educator noted, "We always have to keep our population in mind." This dimension of quality tends to be assessed in one of two ways—either in terms of the methods provided in research, or by coming recommended by a trusted broker who understands the local context deeply. A teacher at Fairfield explained her preference for needing to understand research methods:

> I feel like I'm kind of like an analytical and research-based person so a lot of times I'll question when I'm reading. So I'm like well, "How do I know that that would work?" I want to know how you did it. Then I can be like, "Okay that makes sense" or question it and be like, "Okay I don't agree with that, personally, so like I don't want to use that data.''

On the other hand, describing professional learning with external consultants, the same teacher explained:

> I like them, because they were teachers. They have a lot of experience in the classroom. One was a principal so she has also the experience of an admin position . . . And they do a lot of work in different schools so sometimes they'll just present to us, but then they'll also come in our classroom and just observe, model and so it's more of a hands on . . . they adapt their presentation to our individual school.

Another dimension of compatibility pertained to cost. As discussed in a prior section ("Problems of Practice"), a program in the WWC may be too expensive while one that is more recent but not yet "proven" may be a good option.

Compatibility was expressed somewhat differently in each case study school. For example, at Ivy Institute, compatibility appeared especially important when educators and administrators described their search processes. In contrast, some participants from Clark Elementary described the limits of compatibility as criteria. Educators in this school cautioned against ruling out information or practices that don't on the surface seem to "fit," citing the benefit of learning from an international researcher or reading Lisa Delpit's work in a predominantly White community.

Credible research reflects reputation and background.

Much of the research educators referenced was valued because of its source. For some, research was valued because of the reputation of the scholar, expressing the notion of the "credible expert." For example, an international expert on standards-based grading was invited to speak in a professional learning session, while others referred to work by the name of the scholar or author (e.g., Jim Knight on coaching, Sharon Walpole, and Michael McKenna for Bookworms). In this way, educators in deep-use schools signaled that credibility is associated with expert sources based on reputation—though no specific criteria for reputation were articulated. Credibility also comes from the source being a member of the practice community. Educators valued resources shared by those with past experience in schools, as reflected in the remark cited above regarding the Fairfield consultants. An administrator at Clark echoed this idea, describing a visiting scholar as

> someone who's spent time in that particular area is helpful. Like the guy that came to us, he was a principal and he was a superintendent and he was a teacher. He had seen it on all kinds of different levels."

Quality research is aligned to student learning goals.

All four schools demonstrated a strong commitment to instructional improvement, which means that research is valuable when it connects directly to improvement efforts. Leaders in Clark and Fairfield particularly noted this criterion, framing research use in terms of alignment or coherence. As noted by a Fairfield administrator: "We're really trying to know what are those big levers that will make the biggest difference." This concern is more than a pragmatic one about time and effort associated with translation; educators were attentive to the feasibility of research-based practices as well. A Clark district administrator explained:

> So for me it really comes down to this. Is it something—this sounds simplistic to start—that can impact instruction in the classroom, right? And there's multiple levels. . . . One is you might have a fantastic idea but it's so cumbersome or difficult to implement it's never going to take hold. And is it something that I guess just that rings true to us? That's one of my filters.

Although not necessarily a criterion applied in the search or vetting process, educators reflected that student performance or other data often confirm the value of the research. A school administrator in Willow Grove remarked;

> You know, the things that we're using in the building, the large resources that we're using, and then practices we're using are really very effective. And I guess I know it, because they're very reputable. And they do have research behind them. But also, because from a practical standpoint, for myself, and for other teachers, they're being proven to work based on real life, consistent data that we're seeing in the building. So . . . I think you do need to start from that research standpoint, but whether it really is working for you and your building, you need to actually be consistently reviewing and looking at that formative and summative data to make sure that, you know, research or not, it's working for what your problem is.

This interpretation reflects a sort of post-hoc criteria that, when applied, may reinforce research use practices in the school. That is, use of research or research-based practices, coupled with success in improvement efforts (and reflected in local data), reinforces the school's research use practices, confirming they are using "good" research.

Quality research is timely and up-to-date.
Educators also looked for "the latest and greatest" research to inform instruction. An administrator at Willow Grove explained:

> We're trying to look for things that are more that are more current . . . A lot of the books you can find . . . were published 10 years ago, whatever. Well, things have changed and you need to keep up with that . . . you always have to be willing to change and move on with what the kids need.

This criterion, while not widely mentioned, recognizes that knowledge about teaching and learning continues to evolve, and that improvement requires revisiting that knowledge base regularly. In this sense, these remarks suggests the importance of timeliness for both instrumental and conceptual use of research.

The bottom line. Educators in deep-use schools articulate evaluative criteria for research that differs from those stated in evidence use policy and that push us past the traditional debates about internal and external validity. These criteria are critically important for helping the research and broker communities to conduct and communicate research that is more likely to be taken up in practice and for explaining the choices educators make about the research they *do* use.

Research products

Educators engage with many different types of products as part of their professional practice. When asked about the frequency of use of particular types, educators in our deep-use schools, like educators in the larger sample, were more likely to use professional resources, such as professional development materials, materials from conferences/presentations, and books, than other types of information (Figure 8). Traditional research products, such as peer-reviewed academic journals, research summaries/briefs, research/program evaluation reports, reviews of multiple research studies, were less often used. Not surprisingly, educators in all four schools felt that characteristics that support ease of access, such as presenting actionable information, being concise and easy to understand, and being free or online to be important or very important (mean responses ranged from 3.2 to 3.8 for each school on a scale of 1 [lowest] to 4 [highest]). Interview data provide helpful qualitative information about the preferences that guide the resources educators select to inform their practice.

Figure 8. Average Number of Products Consumed (by Category) in Last Year

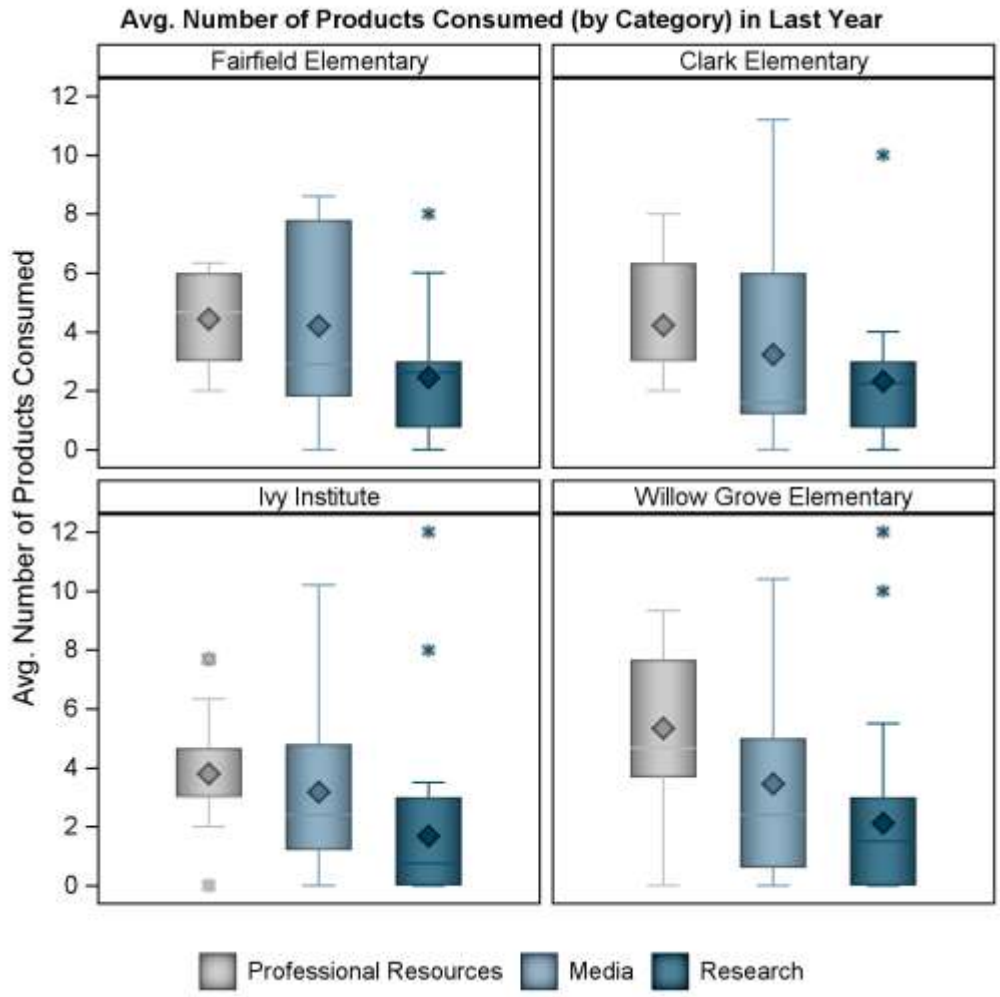
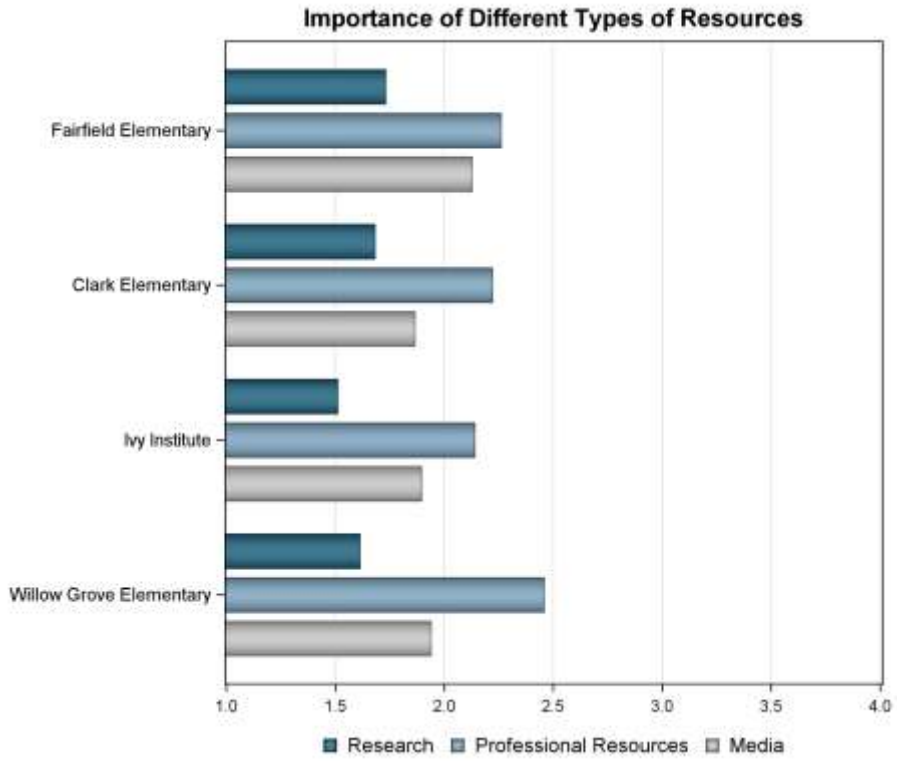


Figure 9. Importance of Different Types of Resources



Schools use a variety of products, but books feature heavily as resources across the cases. Participants cited a few distinct products fairly consistently including books, data reports, professional development, articles, evidence-based programs, credible experts, frameworks, and conferences. While articles were referenced through the interviews, they were generally discussed in more vague terms: "I mean, we read research articles and things like that," and "And so one of the articles we read was really all about how to engage virtual learners, and how to keep them engaged. And so that one was really good." While there were discussions of articles, it was uncommon for the title, author, or journal to be mentioned by name. In the few instances when more detail was provided, we learned that *Education Leadership, Education Week*, and the American Pediatric Association have served as sources for articles in these schools. In contrast, books, one of the most prevalent types of products being used in the four deep-use schools, were frequently referenced by name; specifically, participants mentioned: *Brain Rules, Visible Learning and Mindset, Hacking School Discipline, Conscious Discipline, The Distance Learning Playbook, Other People's Children, Playbook for Grading, Grading from the Inside Out*, and *Neurons to Neighborhoods*. At times, rather than mentioning an actual product, interviewees identified credible

experts, frameworks, and/or models describing evidence as "Hattie's research," "the Fountas and Pinnell framework," or "Jim Knight's model," for example.

Data reports and displays, though not external research, were also important products for enabling evidence use. Similar to professional development, "data days" or similarly titled meetings often served as opportunities for educators to collaboratively examine and interpret local data. A Fairfield administrator shared how the small staff at her school enabled her to continue these types of meetings despite the pandemic,

> So I can use the cafeteria and spread everyone out for those six feet. And we project, the questions or the data or the graphs or whatever you know we're looking at that day and that way every staff member can see exactly what we're talking about.

Extending beyond these internal school events, conferences—and presumably but implicitly—their presentations and associated materials were discussed as products in which evidence was packaged. An administrator at Clark explained that, after looking at the local data and identifying a problem/need, "when we go to get that help, you know, what does the research say? And that's why we sent people to different conferences. It's pretty important that we see those things."

Educators have clear preferences regarding product characteristics.
Interviews revealed specific preferences about research products. The most salient and prevalent product across all four cases was practitioner-oriented materials. Educators consistently expressed a desire for products that have been written and/or created with a practitioner audience in mind. "It has to be well written, honestly. It has to be written for a teacher, I would say," one teacher remarked. This preference was reflected in both the survey responses to the SEE-S and interview data through the frequent use of products in certain formats including books, professional development materials, and conference presentations.

Aside from the writing itself, products are viewed as practitioner-oriented if they are actionable. Relatedly, educators often valued research that they could put into practice more than research that needed additional translation. A teacher in Fairfield explained, "We like research that is very practical and very linear . . . we want ideas that we can implement right now in our classroom." Across interviews, educators' desire for resources that provide clear, explicit steps to take in the classroom is clear. As one teacher asked:

> Does it have classroom examples? Does it have, this is what you can try? Think about this. Ask this question. We really want this to start the motivation, I guess. If you have to make up too much, . . . it's too much interpretation.

Lastly, research that provides just enough information—which we might describe as efficiency—facilitates educators' use of that information. For example, educators in Fairfield valued resources shared by a consultant supporting literacy instruction, describing her "Cliff Notes [version] of Fountas and Pinnell." In fact, educators often mentioned research that has been "broken down" as valuable. "Just enough" efficient information also helps educators manage the sheer volume of information available to them when looking for research. Some expressed that shorter products helped them decide when to dig deeper, though not all educators reported taking that next step. For instance, an educator at Willow Grove explained the value of practitioner journals:

> *Education Leadership helped me to know, kind of get it. I like an overview, a scattering of what's really going on out there. And then if I want to dig in, I can . . . . I can do a little bit more research on it.*

Implementation of evidence-based programs equates to research use.
Given educator preferences for actionable, practitioner-friendly products, not surprisingly we found that use of evidence-based programs were widely considered a form of research use.[3] Across cases, when asked about what research use looks like, or to provide an example of what research was used, educators often mentioned programs or curricula themselves. For example, when asked about specific examples of research use, some educators made statements like, "We do use Boys Town. I don't know if you're familiar with Boys Town," and:

> With reading, you know, we've been doing Bookworms for many, many years, four or five years. But then this year, we added another piece. So now this year, we added in the labs, the System 44, and Read 180 Labs.

These types of responses, when considered in the context of the question, suggest that educators in these schools may have viewed research use and the use of research-based programs as one and the same. Some programs and curricula mentioned include Eureka Math, Hope Squad, Orton

[3] We do not verify claims about the evidence-basis of educational programs in this paper but rather focus on educators' perceptions and reports of their evidence use practices.

Gillingham, Positive Behavioral Interventions and Supports (PBIS), Phonics First, Managed Classroom, Open Court, and National Geographic.

Products seem to be linked to purposes of use.

Data suggest a connection between products and purposes of use. Book studies and article sharing seemed closely tied to conceptual uses of research, sometimes also supporting instrumental use or implementation of adopted programs. Educators often engaged with these products in order to expand or shape their knowledge about teaching and learning or about a particular initiative. Data reports appeared to be associated with some aspects of instrumental use, such as identifying problems and monitoring implementation. Conferences, program evaluations, and websites also supported instrumental use and were cited as supporting adoption decisions. For example, a Willow Grove educator remembered:

> I happened to have gone to [a conference] with Walpole and McKenna and I came back and nobody in our district was doing Bookworms at the time. And so I came back and I thought, everything they told us was aligned with what I learned in my reading endorsement class. And then I asked . . . our leadership, 'Can I have some funding to purchase the materials?'

Once a program or practice is adopted, frameworks and professional development materials serve as guides for implementation. Credible experts seem to support both conceptual and political use. At times these experts and their work were mentioned as shaping the way educators thought about their practice or providing a common language and set of ideas for a school; for example:

> *Other books, we go through when we're looking for them, you know, like some of the Schmoker books and stuff like that. Those ones are super research driven and we've done some of those on purpose learning, how to better use data.*

In other instances, the names of credible experts seemed to be invoked in order to gain support for a perspective or decision. For instance, a Fairfield educator describing a professional developer by saying, "I'm pretty sure John Hattie rises and sets the sun to her. So like she would always cite [his] research, she would bring stuff in for us to read, she would talk about it."

Schools use products to enable evidence use.

Products are often conceptualized as packages or formats used to disseminate research evidence, such as books, articles, reports, conferences, workshops, and so on. In examining the products referenced by educators, we uncovered that some products were actually used to enable evidence use.

Panorama, Edulastic, Class Dojo, and similar programs were frequently mentioned in discussions around products and evidence use. A teacher from Fairfield detailed her school's use of Panorama to gauge both academic and social/emotional needs:

> So, academically the outlet allows me to see their past data on testing so therefore that can help if I have a flag on a kid that I think might need to go to an RTI process for interventions, or if need be, evaluation. So being able to see their past trends and look at you know, "Are you making the growth? Are you flatlining?" You know that in itself has been useful . . . .
> So we can look at data three times a year as far as social emotional. And then that allows us to break that down and look at chunks of different pieces of social-emotional, so that we know how to guide our mindset meetings here at school.

Also at Fairfield, Edulastic was described similarly as a data generation and storage tool. When asked why she used Edulastic, one teacher explained:

> So I like it, because it stores all of my information in one spot. It already—because I like to, with my guided reading levels, I like to really map out who's proficient and who's not, and this does it for me. And so I can see exactly where my students are scoring, what questions they need help with, without having to do the labor on my own. It's all in one place, I can see it. And just I love it. It's a great platform.

These tools represent products in two ways: they reflect designs that are perceived to be evidence-informed, and they assist in the generation of evidence through data reports and displays. Programs like Schoology and Class Dojo, used primarily as communication interfaces for teachers, students, and families, were also mentioned as useful products.

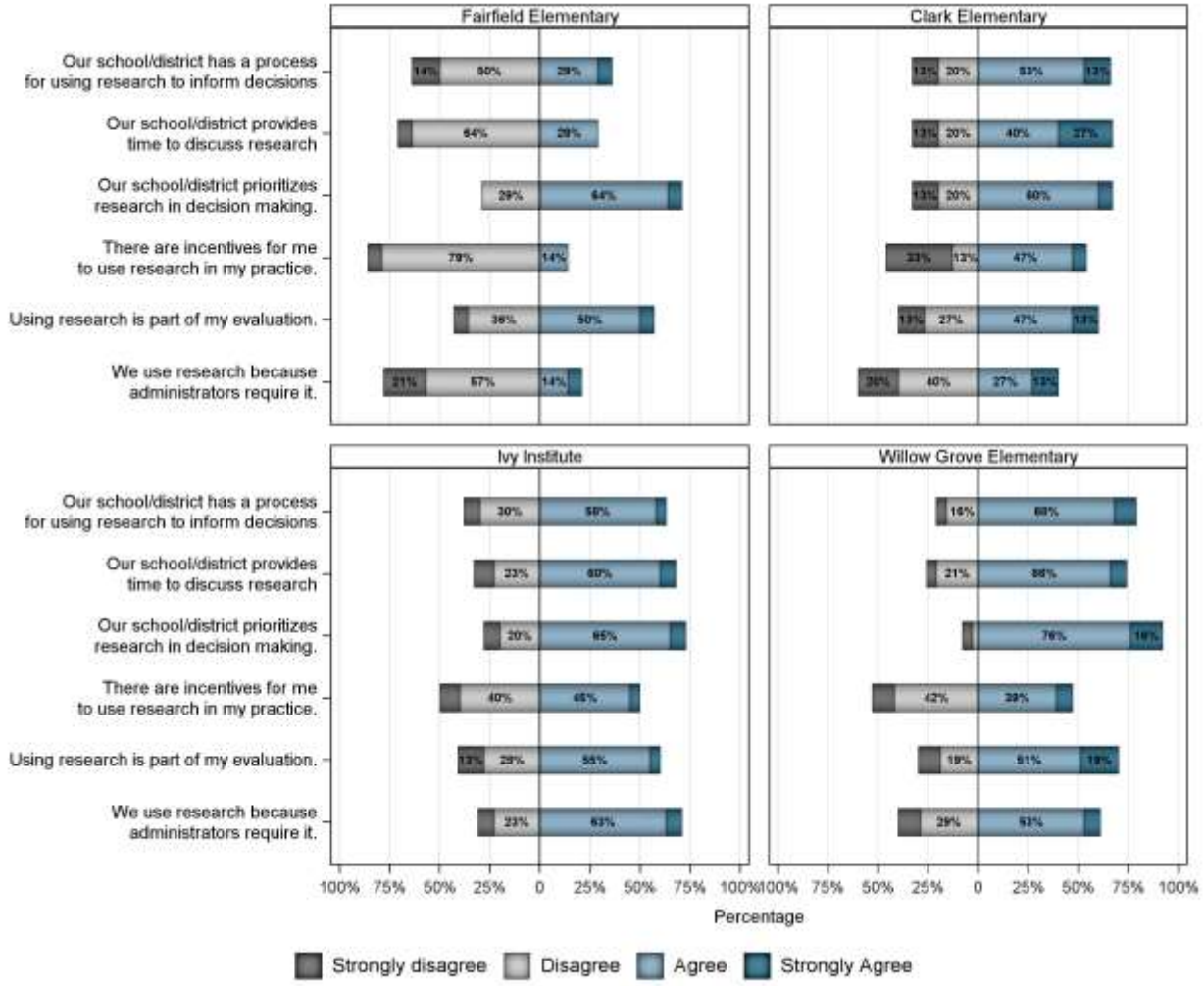
The bottom line. Deep-use educators value products that make the work of evidence use easier—whether products designed to support action, programs that helped them achieve their goals, or

tools that facilitated their engagement with research. Notably, different products appeared to serve different aspects of improvement work, which provides insight into how to package research to facilitate its use.

Organizational context: Processes

The extant literature emphasizes the importance of organizational context and conditions for research use, including processes and incentives that support or encourage research use. Educators, in our case, study schools, on average, reported higher levels of agreement (mean = 2.61 on a scale of 1 [lowest] to 4 [highest]) about such conditions in their school than the rest of the SEE-S sample (mean = 2.50). However, reports varied among our case study schools, particularly in terms of incentives and the perception of requirement (Figure 10). However, survey responses merely provide an indication of whether supports exist, not what they look like. Further, these items capture a narrow set of school processes, limiting our ability to see the dynamic work of evidence use in schools. Our qualitative data provide much greater insight into these issues and more.

Figure 10. Perceptions of Structures, Processes, & Incentives



Research use is embedded within common school processes.

In deep-use schools, we found research use embedded within four types of school processes: instructional processes focused on meeting student learning needs, learning processes centered on improving teacher knowledge and skills, decision-making processes addressing school-wide needs and issues, and human resources processes related to staffing the school. These processes are not unique to deep-use schools, and are, in fact, present in all schools, yet the expectations of and support for research use within them appears to be a defining feature of the case study schools.

One of the ways this is accomplished is by using processes to introduce research into school

practice. This strategy was frequently noted in instructional and decision processes. A coach at the Ivy Institute described visiting a PLC and hearing teachers describe challenges with teaching students to read. As she described her practice, "I'm going to check it out . . . I have a lot of teacher books that are going to give ideas, do some research on it, and then try to get back to them as quickly as possible." In this case, research became part of teachers' learning about and implementation of literacy instruction. In Fairfield, decisions about social-emotional learning supports for students returning to in-person learning involved committee recommendations based on research and other information from a national website (PBIS.org). In this case, the committee expectations for developing research-based recommendations introduced research into school decision-making processes.

Another way processes are leveraged is through reinforcing norms and expectations for research and data use. Two schools described how hiring and supervision processes were carried out, with the Ivy Institute providing the most detail. In this case, a teacher explained:

> It's kind of included in that process, that interview process, you know, how do you use the data? How do you use the research? What are you going to do with this information? . . . teachers have to believe in that. And they're not going to hire a teacher . . . who isn't into the data or the research, because that's just kind of the core of the school.

In this situation, teaching candidates actually completed a data analysis activity during the interview. Another educator at Ivy described expectations for her own learning: "When we build our professional development plans, we do have to include, you know, like, what, you know, like, our action steps, why we're going to take those action steps and then the research behind those action steps."

A final means of embedding research into school processes is implementation of processes that reflect research-based practices. This is evidenced earlier in our report as forms of embedded or latent use of research.

Research use is important in curriculum or program adoption processes.
Reflecting earlier findings about instrumental use, all four schools described the importance of adopting curricula or programs with research bases, though it took different forms. In Willow Grove, district leaders were most often responsible for identifying and evaluating evidence behind curriculum to be adopted, and educators at the school level expected that of their district and

trusted that process. At the Ivy Institute, however, school staff were charged with identifying potential research-based programs. As the principal described it:

> The ones that are on that team that's researching it, they've narrowed it [to] what would be best for our school. And so from what they've narrowed it down to, you can tell they've done their research on various ones . . . And then they bring it back to the community for us to look over and decide.

A district administrator in Clark articulated how a strong research basis could justify districtwide expectations for implementation:

> We've been very loath to do a new adoption because of how the expectations and instruction change and we don't want to, you know, drop three quarters of million dollars on textbooks and only have teachers use them half the time or half the teachers using some of the time. So we're really trying to find more again research-based approaches that we feel confident that we can have as a districtwide expectation: "Here's why you need to use this, because this is what the research supports will happen if we do this."

All four schools have book study processes for teachers—and also, in some cases, for administrators. Book studies are a clear example of introducing research into school practices, and books themselves are a common way for educators to engage with research. Further, a high level of engagement was expected. Educators reported making posters to showcase learning from a given book, preparing lessons to teach each other about the book, working in teams to read and present on a chapter, and hosting online discussion boards that were the basis for in-person discussions. One described it as "just like a college class basically when you're assigned all that fun stuff to do." One variation was article studies. For example, one school purchased a subscription to *Education Leadership* and asked educators to bring an article to every meeting.

Book studies were enacted thoughtfully as part of school improvement and professional learning initiatives. One district reported book study among principals and central office staff, which was part of a district administrator's approach to coaching leaders on where the district was going and why. Often book studies were successful when they mapped closely to new initiatives or programs in the school. One teacher in Clark explained, "Yeah we kind of use [a book] as, this is the North Star. Like, a lot you do have to come back to this, because this is what the research shows, this is the best practice." In Fairfield, the principal reported high engagement with a book on school

discipline, which fit well with the implementation of a new classroom management program. Further, book studies were not considered *additional* work but part of the improvement and learning work itself; they were embedded within school processes. For example, Clark used every other staff meeting (already designated and protected time) for book study. Successful book studies were highly practical. The book itself and the discussion around it helped teachers reflect on their practice and apply ideas to the classroom.

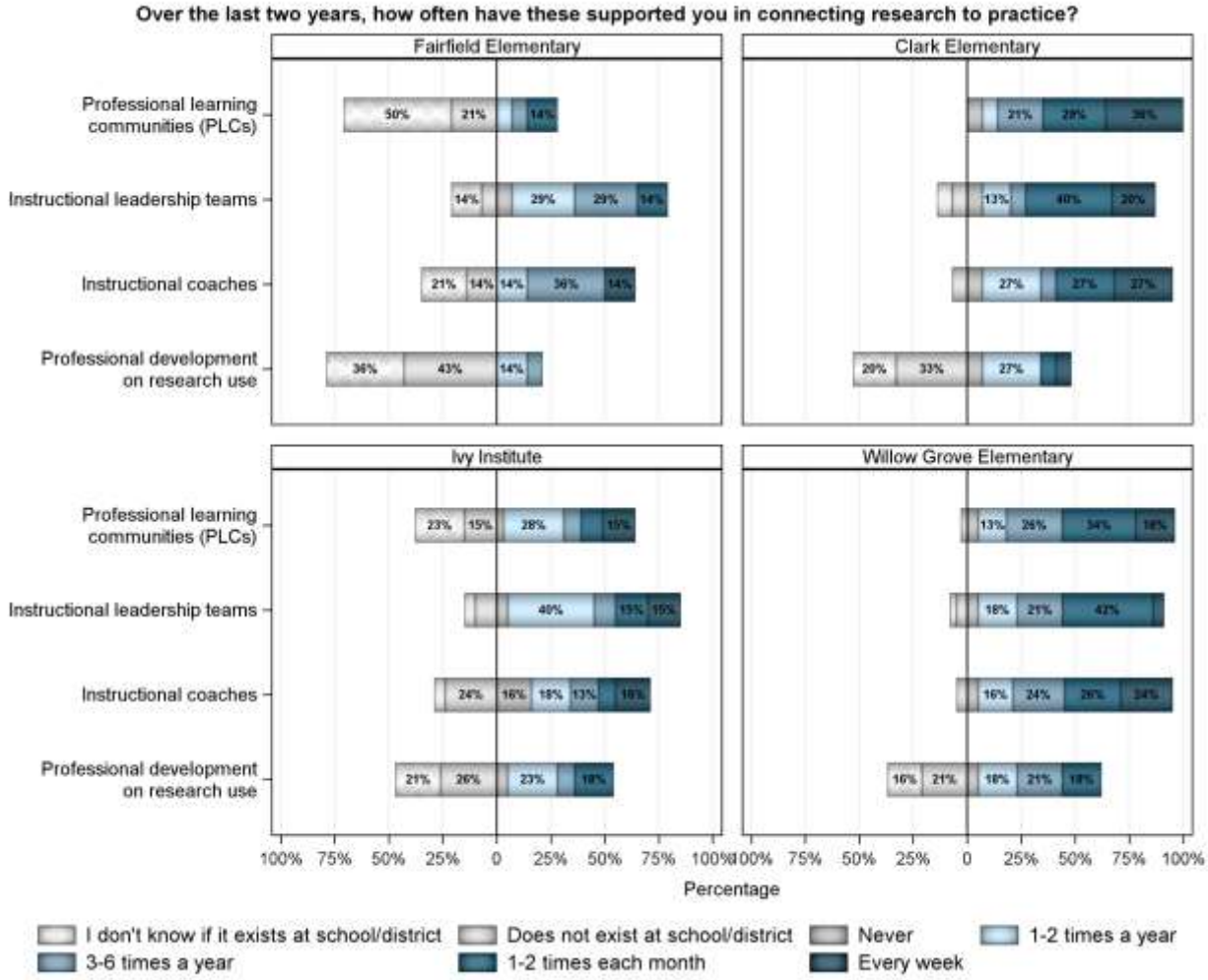
The bottom line. We find it worth repeating that integrating evidence into school processes and routines makes using it *the* work, not *more* work. Deep-use schools provide actionable models for how school processes can introduce and collaboratively engage with research, reinforce norms, and model research-informed practice.

Organizational context: Structures

A second dimension of organizational context that shapes research use is the extent to which supportive structures are available *and* whether they are used. Figure 11 presents case study responses to items about common school structures and their role in research use on the SEE-S, which are similar to the larger sample of educators.[4] Additionally, case study schools reported two to three additional specialized research use structures (e.g., consultants, subscriptions, partnerships) that supported research use, which was also typical across the larger sample.

[4] Fairfield responses to PLCs were heavily in favor of "I don't know" which, based on qualitative data, we interpret as differences in language. At Fairfield, structures most schools refer to as PLCs were known as teacher-based teams and took on broader functions than PLCs.

Figure 11. Reported Use of Organizational Structures to Connect Research to Practice



Interviews with educators in our case study schools provided a much more nuanced picture about the ways in which structures—whether typical ones found in many schools or additional resources designed to improve evidence use—could be strategically leveraged to support engagement with research.

Common school improvement structures are leveraged to support research use.

The processes described earlier are often enacted within larger school structures, which provide important space and support for research use. Deep-use schools leveraged structures that are typically present in schools as spaces or sites for research use. In this way they (a) supported

widespread opportunities for engagement with research, as all staff participated in at least one of these structures, and (b) ensured protected time for research use within the regular school schedule or routine. Like processes, structures ensured that research use was part of the normal work of the school, not in addition to it.

Table 4. Common Organizational Structures with Examples of Support Provided

Structure	How leveraged to support research use
Building leadership teams	Building leadership teams (BLTs) comprised of staff representing different grade levels as well as different roles (e.g., coaches, special educators). Leadership teams were integral to many school improvement decisions and offered a means for pushing resources and plans out to the rest of the staff. For example, an administrator at Fairfield explained: > A lot of times I know when I bring something from one of my committees to BLT I try to bring the research to them that drove our decision. And a lot of times it'll go the opposite way too, so like BLT will see something that's going on and will bring some research to . . . us. And then we all talk about it as a collaborative and then they decide how to push it down into the team. Deep-use schools also leveraged BLTs to build educator capacity by exposing them to research use in school decision-making and socializing them to research use expectations.
Standing and ad hoc committees	Specific decisions or areas of work were often supported by other committee structures, including standing committees (e.g., for RTI or PBIS) and ad hoc ones, created to respond to an emergent need such as adopting a new school-wide behavior program. Such committees were charged with identifying and recommending research-based programs, requiring that those on the committees participate in the search for, and evaluation of, relevant research.
Professional learning communities (PLCs)	All four schools engaged teachers in professional learning communities (PLCs), most often by grade level or content area, which met regularly for professional learning and instructional improvement work. These processes, described earlier, often featured research or research-based practice. A Willow Grove administrator described one experience:

> We had a PLC last year on writing. And so we did a lot of . . . work on just evaluating the Bookworms writing program, which is what we were beginning to [implement], but we also looked at developing rubrics and looking at student work and all of that stuff that went along with . . . Bookworms and also what we know is best practices.

Although PLCs are a very common school structure, some interviewees emphasized the intensity and focus with which they are used. A Clark educator recounted the experiences of a colleague who moved to a different school:

> She was like, "'There's no PLC [at the new school]. They don't understand what it means." [At Clark] we meet together, we plan together, we look at grades, or overall scores together and we talk about why or where, what we need to do to change it, what kind of interventions are or are not happening. She's like, "[Teachers in the other school] think that PLC means that we got together and we talked about, 'We're all teaching this page. Okay let's go back to our class and do our own thing.'" That's not the point, like the PLC the planning part is so minuscule to the actual look at the data, see what the students are telling you that they need more of, let that guide your instruction.

Coach and interventionist positions	Many schools and districts have coaches or other specialist positions in place to support student and teacher learning. Deep-use schools employed literacy coaches, intervention specialists, Title 1 coaches, and evaluation and assessment coordinators. Districts also had curriculum coordinators and directors responsible for issues related to teaching and learning. These individuals were regarded as having expert, research-based knowledge and served as credible sources for research. They often directly shared research with educators. For instance, at Fairfield, an administrator described a speech therapist:

> Everything she does is research based because of the scoring on the different screeners she gives the students and things like that. So like she's out in a classroom right now giving help to a teacher on how to intervene and provide intervention to a student before it gets to her. So . . . [staff members] definitely support each other as far as intervention, they support each other as far as just kind of building each other up:

	"Hey you know, I read this. Maybe this will work in your classroom."
Faculty meetings	Deep use schools had monthly or biweekly meetings, often by contract, to handle school business with the entire staff. These meetings became opportunities to move school-wide initiatives forward and to reinforce research use. Some schools used them for school-wide professional learning, for book study, to explore data, or to develop buy-in for improvement work. An administrator at Clark stressed that meetings focused on research-based improvement efforts: That staff meeting's not a staff meeting where we talk about lunch room and stuff like that. . . . We're going to talk about, "What can we do best for our school?" You know, "How can we improve our school?" Every school can be improved. You know as wonderful as I believe this school is, it can be improved, right?
Professional development	Districts and schools allocated professional development (PD) time for teacher learning. Many examples of PD at both the district and the school focused on research-based practices. Although specific PD in finding, accessing, reading, and applying research was not evident in these schools, research evidence was often invoked to support buy-in and implementation of research-based practices. An educator from the Ivy Institute characterized how the school used research in choosing PD opportunities as well as their structure for sharing what was learned: When someone does, you know, choose to go to professional development. . . . what usually happens is, you know, we picked that professional development because it's shown research . . . then the group of people, usually, two or three people sometimes go to a different professional development, then when they come back to the school, maybe later that month, when we have a staff meeting, they present about what they've learned, and they kind of do a . . . teach the rest of us what they learned, and they bring back that information to our school.
District central offices	All four schools viewed their central office or district administrative staff as support for research use; and, in the cases where we interviewed district staff, they viewed themselves as being in the service of supporting schools. District

leaders supported research use by:

- Mobilizing their expertise directly to schools (e.g., coaching);
- Hosting districtwide PD that engaged research or focused on research-based practices;
- Engaging consultants or speakers to bring research-based ideas into school practices;
- Creating or providing access to an online library of resources; and
- Supporting technology platforms that facilitated collecting and sharing information or data (e.g., Panorama, Share Point, Qualtrics).

Districts were instrumental in offering research-use specific structures.
Much like the larger sample of schools from which these cases were drawn, common school improvement structures were most often used to support research use. Yet a few research-use specific structures did also emerge in these interviews, and when present, were valuable support for engaging in research use. In contrast to school improvement structures, which were largely school-based and school initiated, research-use specific structures were often facilitated by the district.

Some of these structures were systems adopted districtwide. Products that support research use (discussed earlier) were sometimes systemwide supports for research use. For example, Fairfield's district offered Panorama a research-based program for collecting and analyzing school climate data, which plays a major role in school decision-making, according its the teachers and administrators. Educators engaged with these data at staff meetings, in PLCs, and as individuals reflecting on their own practice. The district in which Clark Elementary is housed offers an online library.

Schools also varied in the external resources they had access to in their improvement work. Although all four schools mentioned a local university, Clark Elementary appeared to leverage its relationship with the university to strengthen research and data use. This effort included arranging for credit for school-based professional learning, collaboration on innovative teacher preparation programs, solving problems of practice, and getting assistance with instructional coherence and alignment. (We discuss relationships with universities more broadly later in this report.) Additionally, external speakers were brought in as experts on local initiatives in two cases, Fairfield

and Clark, to discuss mindset and literacy research and standards-based grading, respectively. External consultants also played a significant role in Fairfield. These were former educators brought in to work with the entire staff as well as individual teachers on at least a monthly basis. The role of these consultants was widely recognized as beneficial for improving literacy instruction in the school. Specifically, the consultants brought research and research-based practice, with educators appreciating that they "break it down for us" and they "make it practical." Fairfield educators especially noted that the partnership was ongoing, not just a one-day training but regular, consistent time.

The bottom line. While school processes become a means for engaging in and sustaining research use, organizational structures are critically important sites and supports for use and for expanding participation school-wide. Typical structures are leveraged for research use purposes, again, integrating research use into the regular work of schools. Research-specific structures and supports, which when available are often enabled through the district, often work through these more typical structures to enhance engagement with research. The importance of school structures, like processes, highlights the importance of a framing capacity for research use as an organizational, rather than an individual, issue.

Organizational context: Culture

Although dimensions of culture are woven throughout other dimensions of our conceptual framework and in the SEE-S, our analysis of interview data revealed its distinct contribution to research use. The culture of deep-use schools is central to their use of research, frequently understood simply as "how we do it." In fact, several educators interviewed expressed surprise that our team was interested in how they work, not recognizing their schools as different from others. When unpacking what was distinctive about deep-use cultures, we noted four common themes across all schools, described below. However, we also note that some features of these schools may support particular dimensions of culture.

School context supports culture of research use.

All four case study schools are elementary schools, which tend to be less siloed and more collaborative than secondary schools. Further, they are not large schools, with staffs of between 17 and 33, which may reduce barriers to developing strong, positive school cultures. Lastly, two schools had somewhat unique histories and organizations. Ivy Institute is a charter school, which may mean that it has greater autonomy in how the school is run, how the school is staffed, and who the school serves. As an administrator noted, "I mean, our school mission is such that . . . we

have high expectations of our students and of our staff. And so, because of that maybe, the school itself attracts staff who are also, you know, nerdy, or . . . want a research base." Clark Elementary was historically a STEM-focused magnet school emphasizing inquiry through problem-based learning, though it is not a selective or choice school and is part of the traditional district governance structure. An administrator there stated, "The teachers we've hired and brought in want to increase their knowledge."

Deep research use requires a growth mindset among adults and a commitment to improvement and change.

Educators with whom we spoke consistently reported beliefs about the need for continuous instructional improvement at the individual and organizational level. Educators were often proactive about improving their own practice, or expressed that the teaching practice is always evolving. Describing Willow Grove, an administrator stated:

> In general, the culture here is, we're going to push it. Yeah. Because that's what's best for us in our practice, but also it's what's best for kids to grow them. So we're going to always be questioning whether we're doing enough, [whether] we're doing what's best.

When new ideas are brought to the table, educators also reported being open to them and willing to change, especially if doing so would benefit their students. A teacher at Fairfield explained:

> Like we're just very diverse, we have different needs, wants [and] everything and we recognize that. And so, then we're open to that research that's coming out because I think a lot of the research that is coming out applies more to our students because they don't learn in the typical fashion or way. And I shouldn't say all of them do, but a lot of them thrive off of new opportunities and new ways of thinking.

The drive toward instructional improvement is sometimes described as a "growth mindset" and is reflected in high levels of commitment among staff to the often challenging work of instructional change. Several teachers acknowledged the hard work that goes into improvement efforts. One Clark educator noted:

> I think the huge thing, collegially, is truly working on putting your ego aside and doing what's best for kids. And those hard conversations are what grows. You can ask any of the teachers I work with. What do we say? We can do hard things, just like we tell the kids. Well

> it's the same with us. We can have hard conversations with each other. We can have hard conversations with the parents. We can have hard conversations with the kids. Because it takes all of us.

Educators also noted that this commitment is not a short term engagement, and described sustained efforts to both make decisions and see initiatives through. An Ivy Institute administrator described, for example, how her school may make decisions about new programs or curricula:

> Obviously, this is not a one-time thing. It takes at least a month, because I don't want to take everyone's time . . . but like we talk about these things in cycles, and then we typically take one off, like once a week. Okay, well, now let's compare these two. Okay, well, this is our last two, let's come back to it. Do we still feel like it's going to hit the criteria? . . . And then at that point, we make a decision as a team . . . it's constant conversation.

As another example, a Clark teacher described the district pushing teachers and schools to recommit to the math curriculum with fidelity to ensure students experience continuous growth as they move from one grade to the next, as well as a drive to recommit to the inquiry-based learning approach on which the school was founded. Educators and leaders saw the improvement work as a long game.

Research use is part of a virtuous cycle of doing what is best for students, implementing new practices, seeing results, and then doing it more.

Consistent with a growth mindset and commitment to continuous improvement, educators in deep-use schools believe deeply in doing what is best for kids. As the principal of Willow Grove explained:

> I think that it's just the continually wanting to get better. You know, end of the year conferences are going on right now. And so we're talking to teachers about how their years have been. And they constantly ask, "Well, what can I do? What can I do to get better?" Or "I haven't been able to get this kid, what can I do?" And so it's really just, the teachers are really willing to try whatever it is, if they think that it will pay off in terms of student achievement. And so I really just think it kind of goes to just the culture that we've built here, and just wanting to really do what's best for kids.

"What's best for kids" is described in terms of work that promotes student learning, growth, and performance; remarkably absent are references to test-based accountability systems. Rather, teachers hold themselves accountable to children, to each other, and occasionally to the public.

Furthermore, doing what is best for kids is closely aligned with the use of research in deep-use schools. A Willow Grove administrator articulated this connection well:

> And for us, when we're talking to teachers about it . . . we kind of use the analogy of like, a medical term of when you go to the doctor and you're being told you have cancer or something like that. You don't want something that worked 10 years ago, you want like, "What is it now?" Because things are changing. Technology changes. And that's the same thing with education. We want what the research is showing right now is working with kids and what's being effective now within this, so that kind of goes along with like the programs and the curriculum and everything that we do here.

Similarly, a Clark administrator described an especially strong teacher advocate in their building who explained why guessing about what works for kids is not good enough: "What does the data say we need to do? We need to look at this, we need to research this some, or else we don't know. I mean, we're guessing."

This position leads to a virtuous cycle: research-driven improvement boosts teacher buy-in and reinforces cultural commitment to using research. Fairfield Elementary experienced such a cycle in its experience working with issues of school climate, behavior, and attendance. This commitment was also evidenced in Willow Grove's implementation of the evidence-based curriculum Bookworms, cultivating teacher buy-in with improvements in student learning. A teacher from the Ivy Institute summed it up best: "[Other teachers] see you know, I've done this research. This is what's going to help my kids, this is what I'm going to do and then you see the kids thriving with it."

This virtuous cycle is a strong incentive for the continued use of research in deep-use schools. It demonstrates an alignment of values—from a growth mindset to doing what is best for kids to seeing positive results. Notably absent from our interviews were extrinsic rewards or incentives for research use. A few educators noted that activities related to research use, such as sharing a strategy that is working in your classroom or serving on a committee that was responsible for finding research-based programs, may be recorded in formal teacher evaluations or considered

extra pay for extra work, but educators did not describe these as compelling reasons for using research.

Trusting professional cultures facilitate deep research use.
Perhaps most importantly, underlying all aspects of the work of deep-use schools is a strong culture of trust. This feeling was described both implicitly or explicitly by everyone we interviewed. Common vocabulary that reflected this sentiment included "team" or "family," as well as ubiquitous use of the word "we." As an administrator at Fairfield put it:

> I feel like in my seven years here [Fairfield] has just changed so much and the people love being here. They love their co-workers. . . . [and] building those relationships with each other and with our students. It just became like this big family atmosphere and I think it became a place [where] people saw the change happening, and they wanted to be a part of it.

This sense of trust went well beyond friendliness and collegiality. Indeed, it manifested in several important ways that had direct implications for research use. Trust enabled a sense of collective responsibility, the notion that the student body are "all our kids." The language of family also suggests a shared commitment to the school. Collective responsibility is closely associated with collaboration, which—as described in the prior sections—is consistently supported by common structures and processes that engage educators across the school in research-driven instructional improvement work. Collaboration was evident between schools and the district as well. For example, a teacher in Willow Grove shared:

> We have a district where we, they've always kind of pushed best practices. And so it's changed. I mean, being here 15 years, . . . I've seen a lot of things change, but they've always wanted to have best practices in place. And it's all about student growth and improvement.

Trusting relationships also created a supportive working environment. Teachers viewed their schools as ones in which where colleagues actively helped one another and in which leaders and coaches were there to support, not merely evaluate, their practice. A teacher at the Ivy Institute explained, "Everybody's just here to help each other." The supportive environments in deep-use schools improved access to and the flow of research-based practice across the school. Because educators trusted one another, they often sought new ideas and strategies for particular

challenges, and it was acceptable to need help. This was particularly notable in Fairfield and Clark Elementary Schools. A teacher in Fairfield illustrated the rich culture of sharing in their school:

> And it's just really cool how we work together. We scaffold off each other's ideas and in PDs we give, sometimes other teachers will present on topics of what they do really well so then they can share it with the other teachers . . . Everyone really loves the research and new ideas and even veteran teachers are open to learning from others, and just new research that comes out.

A Clark administrator explained that sharing was also part of the district culture:

> It's not just top down, you know, me sharing, "Hey here's what you need to look at." [Principals] are really sharing with each other, the things that are going well, what their ideas are, something even from our teachers. "Our teacher's doing this and it's working great," and sharing those ideas out, so I just can't probably speak highly enough about that collaborative culture that's been built here. And principals really working and being willing to share ideas together.

At the school level, Clark's focus on inquiry methods was enhanced by the collaborative culture. As a teacher explained, "There's not a class on inquiry methods of instruction. You need your colleagues. And when you have your colleagues working together, working on inquiry methods, that becomes your go-to base."

Another feature of trust is transparency or openness. The school structures and processes described earlier enabled participation and engagement in decision-making about improvement work. Additionally, openness meant receptiveness to new ideas and feedback, as well as being able to have difficult conversations. One teacher from Willow Grove shared how their school valued teachers' voices: "Our administration has always been pretty good about wanting feedback from the staff and what the staff wants and what the staff thinks." Similarly, a relatively new teacher at Fairfield described feeling confident about sharing her knowledge despite her youth.

Other schools felt that trust enabled them to talk openly about challenges they faced as individuals and as a school. For example, using data in faculty meetings or PLCs can lead to difficult conversations, which can only take place in an environment of trust. One educator described how these conversations were experienced in their school:

> And that's when you get together with your colleagues and have that professional discussion because if your colleague did better than you did, what did you do? And it's not a shame game. It's very much . . . it's not about what I did wrong, it's what I can do better.

Difficult conversations extend to using research. At Clark, educators engaged with racial inequity and social justice by reading *Other People's Children* by Lisa Delpit. One teacher called this book study a success:

> Just because of the openness and the community that it created for school. It was a safe zone as we discussed the study. And I think it brought more clarity to some people, and yes, we didn't all agree, I will definitely put that out there. And we didn't agree with it, but we could appreciate each other and understand where people come from. Because maybe I don't agree with you, but I can see why you're thinking the way you are now because you were open with me.

As noted, educators often felt accountable to each other, reinforcing growth mindsets. In this way, trust also fueled improvement and even productive competition. We heard similar stories in the three schools of teachers comparing student results and competing in what educators felt was a healthy and collaborative way. For example, an administrator at the Ivy Institute described discussions in faculty meetings:

> Okay, so then we have instructional practice. Okay, well, how come [name]'s kids did a whole lot better than [name]'s kids? Like, what did you do that was different? So not only are we talking about data and research, we're also talking about like that collaborative aspect, because now what I'm gonna do is try to take some of her instructional space pieces, bring it into my space and be like, "Okay, this was bomb. Let's keep going." And it happens all throughout.

This healthy sense of competition extended to bringing new ideas from outside the school. A Fairfield administrator found using data comparisons motivational:

> I just pull up our academics. Like, "Are we on track with the rest of the school district?" And then you know, sometimes I'll reach out to the other principals or vice principals and say, "What are you doing in this area? you're more successful in this than we are."

Because these schools associated improvement with use of research, the spirit of collaboration and competition contributed to a virtuous cycle.

Lastly, trust manifested in autonomy and flexibility in both school and teacher decision-making in each of the four schools. For example, in Willow Grove, an administrator explained that they had worked to build teachers' capacity to self-lead PLCs, while in Fairfield, administrators valued staff input in all manner of decisions. Autonomy and flexibility seemed to characterize school relationships with the district as well; in all schools, educators reported being able to provide feedback or pushback on district initiatives. For Clark in particular, the superintendent acknowledged that the school's strong teachers drove the focus on research and improvement, and a Clark teacher explained that the district offered school autonomy to decide what is best for the school and then "see how it works."

The bottom line. Ultimately, the cultures of these elementary schools held teacher professionalism in high regard. This position was expressed among teachers, through collective responsibility and improvement mindsets, but also from administrators at the school and district, who not only created opportunities for teacher feedback and leadership, but also valued them. In such cultures, structures and processes that involved teachers in a meaningful way could thrive.

Organizational context: Leadership

Leadership is not explicitly part of the measurement framework of SEE-S, so that quantitative evidence of perspectives on leadership are not available to compare deep-use schools to the larger sample of educators. In our qualitative data, however, many of the factors that shaped use in deep-use schools can unequivocally be traced back to leadership. Leaders contributed in specific ways to the use of research in their schools: through their own use, by designing or shaping organizational supports for research use, and by creating broader conditions that supported research use.

School and district leaders' own engagement with research shapes practice.
Leaders engaged with research to inform their own practices, which also served as a model for others. They "walk the talk" of research use. An administrator at Fairfield, for example, used Panorama data to reflect on her own effectiveness as a communicator, and took action based on what she learned. Participants interviewed for this case acknowledged this example as well. Other district and school leaders reported ways they had used research to shape their own practices, whether looking for "how to be an effective coach and an effective school leader" or reading books

as a district administrative team.

Leaders' own use of research also made them key research brokers. Leaders frequently found and shared research resources with each other and with staff. In Fairfield, an administrator explained:

> That can be as simple as I walked down to my [colleague's] office and I sat down with her one morning, and she may be "Hey [name] have you read this article?" And I'll be like, "No, what article?" and we start having a conversation, and then we openly discuss, you know, what are the findings of this, what are our concerns of this, what can we do as a building to kind of help the impacts that are going to happen to these kids?

District leaders shared research as well. For example, a Clark administrator noted, "Our superintendent is really big in the research. He reads all the time and he's always got something for you," while an Ivy Institute administrator recounted a central office administrator sharing research on early grade retention when the school faced high numbers of students being retained in kindergarten. As a result of the practice of sharing research, leaders were often a "go-to" resource for many educators in these deep-use schools.

School and district leaders directly influence organizational capacity for research use.
Leaders contributed directly to the organization's use of research in several ways. They reinforced an evidence-informed improvement agenda by allocating key resources to evidence use, including time, financial, and human resources.

First, leaders set a vision for evidence-informed improvement. As described earlier, all four schools demonstrated strong improvement-oriented cultures, but leaders ensured that improvement was informed by research. They framed issues in terms of evidence, asking what strategies would help them achieve goals, or questioning why the school was engaging in—or should engage in—a particular practice. Both questions invoked research and data as supporting evidence. An Ivy Institute administrator shared her framing of a recent conversation with staff about the school's literacy program: "And so the conversations that we had was, 'So if not this, then what? Like what do you have that shows it's going to work?'" Leaders also aligned improvement goals and actions with evidence. For example, we earlier provided as an example of organizational processes how Willow Grove used data and research to shape its improvement planning process which, in turn, drove their work for the upcoming year. At the Ivy Institute, school administrators drew on data about student learning to work with staff to find research-informed curricula that would better

meet the needs of their diverse student population. These and other examples illustrate how leaders consistently tied improvement work to evidence, including both external research and local data. Finally, leaders built buy-in for improvement initiatives by bringing research to the table. An administrator of Willow Grove provided a clear example:

> With anything, teachers are a little hesitant again, they want to know that it's going to pay off for them. At the end of the year, they want to know that all their kids are in the green. And so the conversations that we had was, so if not this, then what? Like what do you have that shows it's going to work? And like they couldn't answer that. And so it's like, well, but if the research says that this is what's working, and you can't tell me, you can't show me anything better than get what what's it going to hurt you to try? And so that's really kind of how we got the buy-in was saying, if not this, then what?

Second, leaders directly supported organizational use of research through staffing and professional learning. Some schools specifically incorporated expectations for research and data use into hiring decisions to ensure staff embraced evidence-use norms. Similarly, leaders were directly involved in selecting staff to serve on teams, to share work in staff meetings, or to attend professional learning. These were strategic opportunities to shape evidence use in schools. Furthermore, leaders shaped the content of professional learning, whether bringing in experts or consultants, or selecting presenters in professional learning sessions. Leaders in deep-use schools are intentional with staff time. For example, in Fairfield the principal “tapped” a teacher to provide PD to her peers, after seeing this teacher's skill in implementing an intervention and using data to track progress and adjust instruction. In Willow Grove, the principal encouraged staff in graduate school to share what they were learning.

Third, leaders directly influence organizational processes, structures, and culture. As described earlier, leaders created or leveraged organizational structures as opportunities for research use, including book studies, building relationships with universities to offer courses for staff, and purchasing subscriptions to journals. While district leaders were often responsible for creating new structures to support research use, school leaders influenced the organizational processes that occurred within typical school structures, embedding research and data use into school routines. For example, principals deployed coaches (or administrators in coaching roles) to work with educators on the implementation of evidence-based programs through professional learning communities. They also used staff meetings to present and discuss data or research (e.g., book studies), and engaged teams and committees in using evidence to make decisions about

instructional improvement.

Leaders cultivate conditions that indirectly support research use.

In addition to *directly* shaping research use practices, leaders in deep-use schools cultivate a broader set of enabling conditions that may indirectly contribute to organizational capacity for research use. These efforts include actions that promote trust, transparency, and collaboration, as well as engaging in distributed leadership.

Leaders built trust within the organization in several ways. Leaders were visible in all aspects of the school's work and participated in a supportive, rather than evaluative, role. Principals and assistant principals were responsible for formal evaluations, but more often reported ways that they served as coaches, sounding boards, resources, and mentors. Many teachers acknowledged this as well. A teacher at Clark explained: "

> Our principal is very friendly and comes almost daily just to be in your room. It's not to watch you or anything, just so the kids know he's here and I think that's a big part of it is having a principal that is part of your community instead of above your community.

Further, leaders make themselves available and open to their staff, which contributes to trust but also to transparency. For example, in Fairfield, an administrator described the administrative team's relationship with teachers:

> Teachers definitely share . . . They're like, "Oh, we saw this research, we thought, maybe the staff would be interested in it." Sometimes it's just something like that, or sometimes it is talking about like, "Hey, this is what we know, this is where the kids are, how can we use this to get them here?" And we have a very open door policy with our staff and we talk about it a lot. Yeah it's definitely a two way street. Very much a two way street.

Leaders actively encouraged collaboration and sharing between teachers and administrators and among teachers.

Relatedly, leaders modeled change and vulnerability and positioned themselves as constantly learning and growing. A particularly helpful example came from Clark, where an administrator identified ways in which they had grown as a leader:

> When I came here the teachers wanted to definitely be a part of the decision-making process and they always . . . asked me, "So where's the data for that?" you know? And [I responded] like, "I don't know I just feel that way." "You can just feel that way, that's wonderful you feel that way, but [name], you're the leader. You can't just feel that. You've got to tell us where's it at," and so it changed my perspective, a lot.

One of the most notable supporting conditions for research use evident in our deep-use schools—and evidenced in several other sections of this report—is distributed leadership. This phrase implies not only that leadership is shared among multiple educators rather than concentrated in the positional leader(s), but also reflects a dynamic view. As defined by Spillane (2005), in "a distributed perspective, leadership practice that results from the interactions among leaders, followers, and their situation is critical" (p. 145).

Both school and district leaders practiced distributed leadership across many domains of school functions, including engaging staff in decision-making, soliciting feedback on practices and programs, engaging teachers in key processes like curriculum adoption, encouraging teacher autonomy and professionalism, and promoting teacher advocacy. Distributed leadership in these instances fostered collective responsibility for improvement and school-wide participation in evidence use. Not surprisingly, in all of the interviews, leaders almost exclusively used "we," rather than "I" or "they," when describing their improvement work, and they publicly recognized and valued teacher contributions (e.g., through invitations to lead professional learning).

The bottom line. School and district leaders—especially principals—exerted strong influence over school culture, processes, and structures which, as described above, leveraged research and other evidence in improvement efforts. Further, in distributing leadership, they cultivated individual and collective capacity to support research use across multiple dimensions of the schools' work. These findings—and the practices described here—exemplify strategic knowledge leadership, a key component in schools' absorptive capacity.

Relationship between communities

A persistent barrier to research use has been the lack of relationships between practitioner communities and the researcher community. As suggested in our discussion of *search*, it was less common for educators in these schools to report directly connecting with research organizations or researchers. When asked about the resources educators turn to, educators in our case study schools rarely went straight to those sources (between 4 and 6% of resources mentioned could be characterized in this way). This finding is fairly typical among the larger sample of SEE-S

respondents. Similarly, educators in case study schools reported rarely reaching out to researchers in the last year: 0 times in Fairfield, 1 in Clark, 1 in Ivy Institute, but 5 in Willow Grove. The same was true for hearing *from* researchers, which had a slightly different pattern among schools: 2 in Fairfield, 1 in Ivy Institute, and 2 in Willow Grove. At the same time, educators in case study schools reported wanting to connect with researchers and knowing how to connect with researchers to a slightly greater extent than those in the larger sample. Qualitative data help us understand what relationships with the research community look like in deep-use schools.

Direct relationships with researchers are limited.
Across schools, we found few mentions of direct connections with researchers and no examples of researchers reaching out directly to these deep-use schools, with all of the limited interaction being sought out by educators. However, two illustrations highlight the potential value of such opportunities. The first featured a scholar invited to speak in a professional learning event in Clark Elementary's district. The second occurred at a conference, at which educators at Willow Grove were able to hear directly from *Bookworms* developers Walpole and McKenna. That both occasions were mentioned by multiple educators suggests that, although sparse, direct connections to research, perhaps specifically ones that foster engagement and interaction, were valued.

Deep-use schools have a variety of professional partnerships with higher education.
All schools mentioned relationships with local institutions of higher education (IHEs), though these took different forms across sites, and the role of research in these relationships was unclear. Relationships based on teacher preparation, including student teaching in Fairfield and an "innovative teacher preparation program" in Clark are one form, with benefits to school staff and to pre-service teachers. Other relationships featured opportunities that directly supported school improvement efforts. In Clark, for example, district leadership worked with a local IHE to support instructional alignment and coherence, and the principal sought recommendations for addressing the issue of getting students to school on time. In Ivy Institute, school staff worked with a local university on writing curriculum for the school. Still other relationships featured professional learning, including opportunities to learn about online/remote learning (Willow Grove), arranging credit with a local institution for district professional learning (Clark), and multiple instances of teachers attending graduate school in cohorts (mentioned earlier under in the section titled "Capacity").

Across cases, interviews suggested that school or district leaders felt comfortable reaching out to these institutions for support and that leaders saw those relationships as having value. However, none of these relationships was described as relating to research, whether seeking research-based

practices from IHE staff, engaging in research with the IHEs, or seeking support for implementation of new practices. For example, staff did not refer to relationships with *researchers* at universities, but rather with people they know of, had met, and worked with. This does not mean that exchange of knowledge and sharing of research did not occur in these activities and relationships, but rather that access to—or use of—research may not have been the primary driver of the joint activities.

The bottom line. Similar to our bottom line for search, even deep-use schools experience weak ties to the research communities. However, all cases had relationships to local IHEs, and regarded them as valuable resources to draw upon for instructional improvement. These findings suggest the *potential* that collaboration between schools or districts and universities holds for supporting research-informed improvement and the critical importance of relationships in establishing those connections.

Brokerage

A theme across the Center's qualitative and quantitative work has been the importance of brokers, those individuals and organizations that serve as links between research and practice, often taking up roles sharing research or building capacity for engaging with or implementing research in practice. Brokers can be external to the school but also internal. Quantitative data from the SEE-S show that educators in our deep-use schools had similar networks and engaged in similar brokerage activities as respondents from the larger sample of schools. Educators in these four schools relied on each other and the district for research-based information. When asked about the individuals, organizations, and media sources they turned to for research, between 52% and 61% of the resources named in each school were considered local. Research information was also mediated by external sources, with between 32% and 41% of resources named coming from intermediary organizations. Furthermore, a majority of educators in our deep-use schools expressed that sharing research is expected of their role (Figure 12) and that the vast majority of them reported sharing research and local knowledge, as well as helping others in their school to find and use research.

Figure 12. Percentage of Case-Study School Educators Engaged in Activities Related to Brokerage

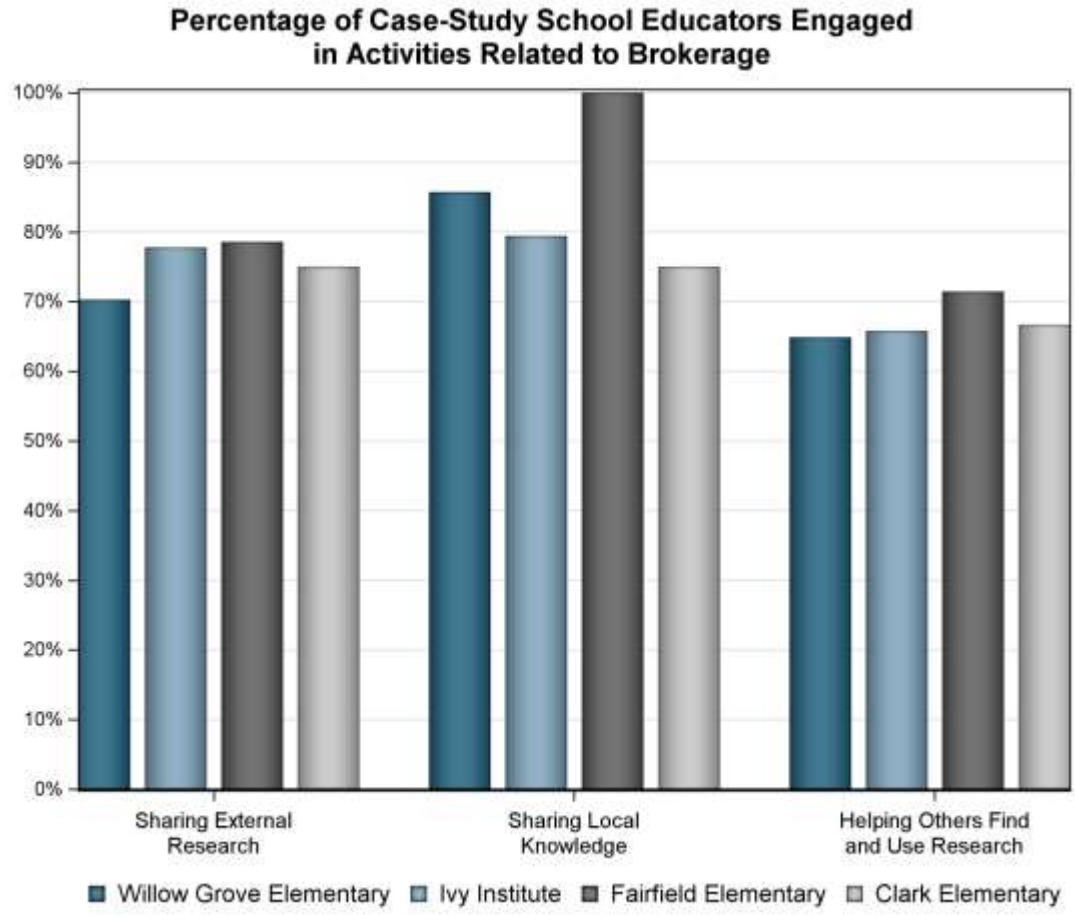
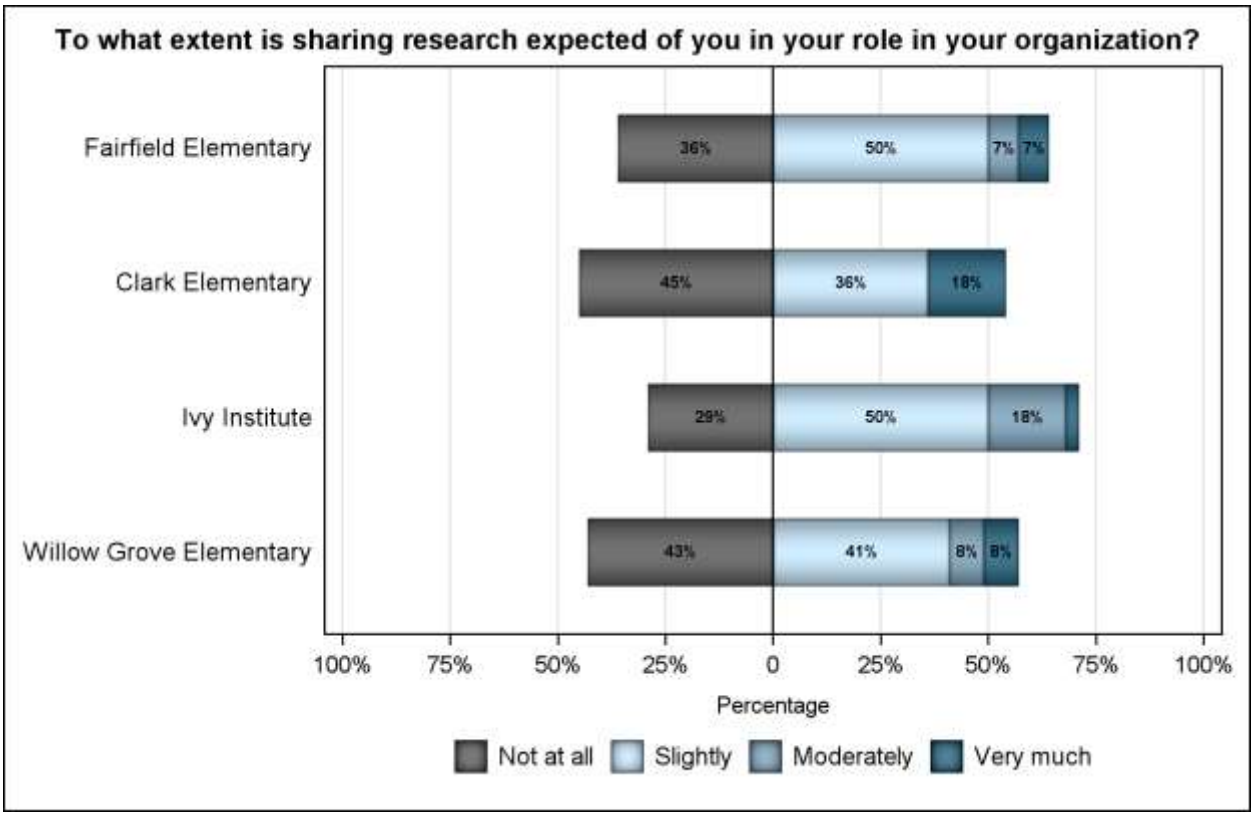


Figure 13. Reported Extent of Expectation to Share Research



Qualitative data confirm that educators in deep-use schools rely heavily on brokers to support engagement with research, helping us to understand who serves in these roles and what they do to support schools' use of research.

Brokerage is widespread and is taken up formally and informally.

The role of broker was taken up by many actors in our deep-use schools. Some of these roles are by design. For example, coaches in particular are critical brokers (see prior discussion of structures), with roles designed to help educators to learn about and implement research-based practices. Additionally, external consultants, including the literacy coaches in Fairfield and members of the local university in Ivy Institute, helped educators use research. However, broker roles were taken up more widely and not always by those in formal leadership positions. As described earlier in this report, teachers regularly shared ideas and practices, led professional learning about research practices, or brought research from their graduate programs. Similarly, school and district administrators—including principals, curriculum supervisors, superintendents, and other formal leaders—were frequently described as serving in brokerage roles, directly sharing research or

creating opportunities to engage with research or even serve as researchers themselves.

Broker activities happen both formally and informally. As described earlier, common school structures such as PD, PLCs, staff meetings, committee meetings, and leadership teams are sites for research use, which is often led or facilitated by individuals serving as brokers. However, brokers also support research use in less formal ways, holding casual conversations with colleagues, responding to ad hoc requests for information, or even through social media. A district administrator noted about a colleague that "he's sharing the things that he reads and saying, "Hey, here's something I learned from this and how can you implement this?" At Willow Grove, an administrator similarly described a colleague "that's always pushing out new research that she's finding and you know, pushing that out to us, whether it's on Instagram, or you know, like somehow or on teams." Whether formal or informal, educators preferred continuous support to a one-time encounter (e.g., a single professional development activity). As one educator explained:

> I think one like research-based PD isn't enough because you have so much information thrown at you, and then, when you want to apply it you kind of get overwhelmed or you kind of forget all of the details, so those monthly PD's, or even like three times a year, you're able to really be able to apply it, analyze it, ask more questions and then keep going.

Brokers streamline access and engagement with research.

Brokers engaged in diverse activities when supporting research use. At its simplest, brokerage involved sharing original research, including research articles or books. A teacher in Willow Grove described a colleague as frequently coming to the table with research,

> if she's found an article or something that goes along with what we're doing or validates what we're doing . . . And so we usually if somebody is bringing an article to the table is probably going to be her.

Brokers also share interpretations or summaries of the research. A teacher in Clark explained how a district staff member supported them: "So when I'm usually speaking to her it's about a struggling something and she's great at pulling a book off the shelf or telling you well, this is what this person says." Other times, brokers synthesized broader information, for example, about programs. For example, at Ivy Institute, where teachers were heavily involved in gathering information to inform program adoptions:

> they kind of had built a committee to look at different programs, and then based on research to see which ones according to the research, we're going to do the most or do the best for our school . . . . then they brought them to the rest of the general education teachers this is what we have found, which one do you think is going to work best for us?

In both sharing and synthesizing research, brokers vetted or curated information, making decisions about the kind of research most relevant to the issue or need at hand. We describe this earlier in this report when exploring the process of *search* as requiring critical thinking and reflection on its application. Vetting can include evaluating the quality or source but also the relevance to school context, as described clearly by an administrator at Willow Grove, where research filtered down to the school:

> I think from the top down, also having people that are doing, doing some homework on their end, you know, and then kind of filtering it a bit and bringing it back to us and saying, Okay, these are some really good books or articles or things that we'd like for you guys to check out.

In addition to sharing research, brokers supported engagement in research-based practices. This could include demonstrations of best practice (which we note is not always clearly research-informed) in professional learning or could occur through technical assistance. For example, an administrator in Fairfield shared how a consultant helped staff work through implementation of research-based practice. "Like we knew the standards, but she helped us break them down in vocabulary that went with them and essential questions that went with them, basically, how to use them effectively." A particularly instructive example came from an educator in Fairfield who described the role of the literacy consultants in supporting their use of a research-based practice:

> I feel like they took it like this big group of research and this book that's 600 pages long and they really broke it down and said, "Okay, this is what we can do with this now, how do you see using in the classroom? Here's some ways we've seen it used in the classroom."

This type of support highlights the importance of brokers' ability to tailor what and how they communicate research to local needs. This effort goes beyond selecting information, and reflects a process of communicating the information in a way that fits with the task as well as the knowledge and skills of those with whom they are sharing.

The functions of brokers described here serve an important role in research use, reducing the volume of information that educators may need to engage with and increasing the probability that the research will be relevant and useful for educators. However, these functions seem to require that effective brokers have particular characteristics (much like research), which our interviews confirmed. First, brokers with prior teaching or administrator experience were viewed as credible. Throughout our interviews, comments such as "she used to be a teacher" or "they're lifelong educators" emerged. A second characteristic is having some knowledge of the local context, or being an "insider" in the district. Local knowledge enables brokers to effectively vet or tailor information to educator or school needs. Lastly, brokers are trustworthy. We described earlier in this report the strong cultures of trust that characterize these schools, which becomes important to educators in making decisions about whom to turn to for guidance about practice. As a teacher in Ivy Institute explained:

> that's more dependable than even just looking on the internet, because you don't know who's writing those things. Whereas if it's a colleague of yours, or somebody you admire or respect, you're going to take their word before reading something on the internet.

Other times, brokers were viewed as "experts," which may pertain to knowledge of the research (as in the case in Willow Grove when an administrator described district coaches) or simply deep knowledge of a specific program or practice (as in the case in Fairfield, when the administrator sought to feature their teachers in school-wide professional learning).

The bottom line. Deep-use schools rely on brokers to bring external information into the school and to move research-based ideas within the school, but they also are trusted to vet information and reduce the burden of finding and evaluating evidence. Importantly, trusted brokers have certain characteristics that relate to their knowledge and experience, which may help them be successful in supporting school-wide engagement with research.

Taking a broader view: Takeaways and implications

Our purpose in this work has been to explore how evidence use policies are enacted in "deep-use" schools. These schools stand out in our quantitative data capturing use of research for school improvement and offer insight into promising research use practices. Further, by exploring the conditions surrounding those practices, we begin to paint a more complete picture of what might be needed to strengthen the role of research more broadly. At the same time, we note that the quantitative data on factors shaping research use suggest that these case study schools are quite similar to those in our larger sample, and that both qualitative and quantitative data suggest the four case study schools have different approaches to using and supporting the use of research. In this section, we take a step back to look at the findings across data sources and research questions and offer what we believe are key lessons of this work.

There is more than one approach to "deep-use."

One of our most important observations in the analytical process was that in spite of many commonalities, the four cases demonstrated notably different approaches to evidence use being employed. On one hand, we found that Willow Grove often deferred engagement with research to district "experts," trusting decision-makers at other levels of the system to provide guidance that they, in turn, implemented, engaging with other evidence (e.g., data) to support their work. This notion of deferred use is explained by Yoshizawa (2020) as an outcome of imposed or sanctioned use of research; for example, when districts or states suggest lists of evidence-based programs from which schools may choose. Deferred use implies a "top down" model in that it is district-driven and hierarchical, and may potentially be seen as de-professionalizing. However, in Willow Grove, this type of deferred use was experienced differently: educators at this school had positive views of this approach and experienced the ability to leverage expertise as support and not as a means of excluding their voice in decision-making. A teacher offered the following perspective:

> We count on people from the district and our school administration to know the most about the research, but we're going to implement we are the ones, "Okay, you told me to do that. I'm gonna go try it. I'm gonna go do it." But I mean, we prefer it because like I said, I don't have time to do the research.

This description highlights the idea that, in this school and district, staff have specific roles and rely on each other to play those roles. These relationships between school and district are thus viewed as supportive and are enabled by trust, illustrating one of the ways in which central offices support research-informed practice in schools.

On the other hand, we also observed a more teacher-driven or "bottom-up" model of research use, with ideas moving up from the teacher through levels of the organization to school and district-level administrators. Clark Elementary is an example of a "deep-use" school employing a "bottom-up" approach to research use. In this school, we saw teachers heavily involved in identifying problems, collecting, evaluating, and sharing evidence, and even decision-making. For example, this school frequently engaged in regular book studies, and teachers brought forward their ideas and suggestions for which books should be read. At Clark, the leadership team was teacher driven rather than principal driven. Rather than asserting positional authority, the principal was often viewed as a decision-making partner and advocate to the district, supporting teacher-led use of research. One teacher detailed an example of the kindergarten teachers approaching the administrator to advocate for more play time for their students:

> And we were like, "Evidence says this needs to happen." . . . But [principal] was on board with it and said, "I would even stand up to the district for it, you have evidence that shows, you know, research that shows that it's helpful, so I'm not opposed to it."

This approach to research use emphasized teacher leadership and autonomy, enabled again by a trusting relationship between the district and school.

Our two other cases seemed to employ aspects of each model in different ways, resulting in a sort of hybrid approach. In these schools, we saw a more distributed, balanced interplay between teachers and leaders. At Ivy Institute, for example, teachers were engaged in collecting, evaluating, interpreting, and sharing evidence, yet the agenda for research use (i.e., decisions about adopting a new curriculum) were more leader-driven. The school-level and, at times, district-level, administrators were generally responsible for identifying problems and delegating information-collection tasks to teachers. Once teachers collected evidence, they shared it with the rest of the staff to inform decision making. While the ultimate decision-making power lay with the administrators, the process was collaborative and teachers' recommendations were taken into consideration. Fairfield Elementary employed a similar hybrid approach. Through many different types of teams, teachers were actively engaged in using evidence to drive the improvement work of schools but often with the support of district staff and resources, which was facilitated by the principal.

While quite different approaches, both "top-down" and "bottom-up" models can create conditions that facilitate deep-use of research evidence, it is important to note that these are not the only two possible models—nor are they mutually exclusive. They illustrate different ways educators can participate in using research and reflect the local context, capacities, and norms. They also illustrate different approaches to distributed leadership practices that support engagement in evidence-informed decision-making. This finding reinforces that evidence use policy is enacted and adapted in diverse ways, but also offers additional information and guidance about these (and likely other models) that may be needed to support school and district implementation.

It's not the *what* but the *how*.

Even before conducting any interviews for this case study, we noticed from the SEE-S survey data that the schools identified as deep users of research are, in many ways, indistinguishable from schools in the larger sample. Quantitative data presented in this report often bear that out. The four schools in this case study did not have additional specialized organizational structures or processes to facilitate research use. They did not offer any unusual incentives to encourage research use. The types of problems they faced and the types of decisions they made in response were not especially unique. So, the interviews conducted for this case study were critical to surfacing mechanisms and conditions that enable them to shine as deep users of research. In looking at our findings, we discovered that it is not necessarily *what* these schools have or do that is unique, but *how* they do things. This *how* appears to boil down to four key, mutually reinforcing conditions that we describe as a "virtuous diamond": culture, leadership, organizational structures, and processes. Our data suggest that each of these factors is inextricably connected and equally important.

The culture of a school permeates everything within these cases. The case study schools shared important cultural characteristics that impacted their use of research, including a growth mindset, commitment to improvement and change, and trusting professional environments. Underlying these characteristics is a belief (eventually borne out in experience) that using research helps educators achieve their goals for student learning. Cultivating this type of open, research-attuned culture leads to more authentic use of research. In these case study schools, this outcome was evidenced by the fact that not only was there a lack of symbolic research use in the case study schools, but also there was evidence of active efforts to prevent it (e.g., requirements to provide research-based "proof" to support proposed actions/decisions) and a desire to engage more deeply.

We found that this culture is strongly influenced by leadership. In these cases, school and district leaders modeled research use in their own practice and shared research with staff, providing an example of research-based improvement for others. Additionally, leaders in case study schools often served as key research brokers themselves, not only sharing how they had used research to improve their practice but also directly sharing research evidence. This process not only contributed directly to research use but fostered a culture of sharing and trust. Further, we heard from leaders that the culture of their school shaped their leadership as well.

Organizational leadership and culture directly impact the two other points of the diamond: organizational structures and processes. For example, school leaders influence how school structures are used and what resources are available to support. For example, leveraging structures such as leadership teams of staff meeting for evidence use both protected time for those practices and ensured widespread engagement, ultimately reinforcing a culture of research use. Furthermore, leaders set explicit expectations for the role of research in key school processes—such as curriculum adoptions or professional learning—which were enacted in the context of school structures.

Thus, synergy among the four points of the "virtuous diamond" in case study schools facilitates many aspects of deep use of research, from participation to interpretation to search. But it is important to restate that these elements—culture, processes, structures, and leadership—are conditions of every school. Nearly all schools in our sample reported having, for example, PLCs. All buildings have leaders. Although our work is not longitudinal, we suspect that this virtuous diamond has evolved and strengthened over time and has not always been present. In fact, multiple principals explained that it has been a journey, and that these schools were not always functioning in the way they do presently. What we take from this finding is that the potential for a virtuous diamond exists in most schools—that capacity for evidence-informed improvement is present yet untapped. And it is our hope that in describing these schools and their work, we can begin to imagine ways of tapping that potential across the educational system.

Brokers are key entry points for research.

The virtuous diamond highlights the critical importance of organizational or collective capacity for research use, and our findings suggest that these may be foundational conditions for deep use. Yet, we describe additional factors that shape research use in these cases, many of which tie directly to the role and capacities of influential individuals who serve as brokers.

Deep-use schools' engagement with research to some degree starts with knowledge and skills of key staff to find, vet, and share that information—ultimately shaping whether and what research finds its way into schools. Across schools, these roles are strategically delegated to different staff, including teachers tasked with finding curricular options, leaders who share research, or district staff and external consultants which help educators use research to address student needs. Embedded in their work are other factors we describe in our findings, including perceptions of research quality, search strategies, and their prior experiences. We found that these factors are interrelated to some degree. For example, prior experiences influence knowledge of research, as we found when describing the benefits of graduate education for finding, sharing, and interpreting research. Similarly, we found that credibility as a broker is enhanced by prior experience as an educator or school leader, which enables them to tailor information to local needs. And when engaging in search strategies, brokers use their criteria for research quality and preferences for products to vet resources.

In this sense, we find that individual capacities and perspectives of brokers may be particularly important in shaping school practices, particularly as they pertain to the types of research and research products that are considered. This finding means that building knowledge and skills among school and district brokers may be a productive lever for strengthening the role of externally produced research, and that efforts to improve dissemination of research products could benefit from collaboration with these influential staff.

Nonetheless, we would argue that building capacity among individual educators and leaders is an important but insufficient strategy for strengthening research use among schools. While key staff are influential in what research finds its way into schools, without the organizational capacity described earlier, we suspect that schools are unlikely to be able to engage deeply with research as part of their improvement initiatives, resulting in isolated or symbolic use of research.

Where do we go from here?

We believe our findings offer promising directions for strengthening the role of research in educational improvement. We note that the four schools represent different communities, governance arrangements, and visions for their work. None was particularly privileged or particularly high-achieving, but they were successful in terms of growth, closing gaps, and other aspects of student learning. We imagine many elementary schools could see themselves across these cases, and that what is happening in these schools might be possible in theirs. To help them get there, we offer a few starting points.

First, the case studies featured in this report illustrate that implementation of evidence-use policy takes many forms, ranging from "top-down" to "bottom-up" and with multiple approaches between. Returning to the literature on policy implementation, it is not surprising to see variable approaches to using research that reflect local norms, contexts, needs, and resources. These findings do highlight, however, that school and district leaders may need guidance on how to develop a contextually appropriate approach to evidence-informed improvement and strategies for building local capacity. In developing that guidance, we highlight the importance of the collective capacity of the organization and that investments that focus only on individual capacity building will be unlikely to achieve the deep use evidenced in this project.

Further, findings position research use not as new or additional work for schools but as embedded in the work of schools: not more work, but *the* work, an implication of which is that support for research use is not incidental but intentional and strategic. This embedding is true within the school—the structures, processes, culture, and leadership, which we call the virtuous diamond, work to reinforce each other. But this finding is also likely true with respect to district support. While we did not focus on the district role, it emerged as a significant, supportive factor, often the source of research-specific structures and expertise. When we did speak with district administrators, they affirmed ways in which their work intended to support schools' use of research. These findings affirmed the importance of taking a systems perspective on research use (Honig & Venkateswaran, 2012).

Second, these findings highlight potential levers for improvement. On the practice side, we argue that a high leverage starting point would be to prepare school and district leadership for roles as evidence-use leaders. Although our findings decidedly emphasize the collective capacity for research use with these four systems, rather than individual capacity, leaders have a high degree of influence on the conditions that most seem to support research use—the virtuous diamond. Further, they were often key brokers that facilitated access to research or that brought in resources that supported research use. However, leadership for research use does not figure strongly in existing frameworks for leader preparation or effective leadership, though we have called for it elsewhere (Farley-Ripple, 2020).

On the research side, we note that even among deep-use schools, preferences for products, qualities of research, and search reflect priorities very different from what we find in traditional research. These preferences suggest deeper change than merely adjusting dissemination practices. Rather, these findings point to a need to rethink *what* is researched, *how* it is researched, and where and how it is communicated. As a starting point, educating researchers about these

preferences, especially the importance of contextual relevance, trust, and credibility, can help inform their work in the short and long term.

Last, this project demonstrates the value of mixed-methods research in the study of research use. The field needs a better understanding of practice at scale but simultaneously requires attention to nuance and context. The notion of *use* itself is a complex, social process not easily measured, and understanding its relationship to is context is even more challenging. The center's work demonstrates that quantitative measures—here, the SEE-S—are helpful in characterizing the distribution of different dimensions of use. Our sample draws on these data and allowed us to identify *deep-use* schools as significantly different from the larger sample. We also found that although the survey data provided insight into deep-use school conditions that support research use, we found few differences between deep-use schools and the larger SEE-S sample. In this sense, the qualitative data helped contextualize and deepen our understanding of the larger survey findings. Interviews provided insights needed to better understand, for example, the criteria that educators use to evaluate research. Interviews also expanded our framework and highlighted the critical importance of leadership in nearly all dimensions of research use. Perhaps most importantly, the qualitative data provide rich, practical examples of what deep use looks like —something simply not possible with quantitative measures. Therefore, the mixed-methods approach used here helps expand our conceptual and practical understanding of research use in schools.

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Appendix A. Sample for SEE-S

A two-stage stratified random sample was used to select public school districts using the Common Core of Data as the sampling frame. Districts were stratified on urbanicity (i.e., suburban, rural, urban) and then sampled with probability proportional to size (i.e., total enrollment). Schools within districts were stratified by school level (elementary, middle, high) and then randomly sampled within strata with probability equal to the proportion of schools from that district in that strata. Charter schools that were part of a larger network were stratified on network size (i.e., 8% of charters were in networks with <5 schools, 1% of charters were in networks with ≥5 schools, 91% of charters were independent), and then charter networks and independent charter schools were sampled with probability proportional to size (i.e., total enrollment) within strata, with a restriction of no more than two large networks included in the sample. Public and charter schools with fewer than 10 teachers were excluded from the sampling frame. Schools were offered a monetary incentive of up to $1,000 each if the school's final response rate was ≥ 90%. Lower response rates yielded smaller incentives (e.g., $900 for 89%–80%; $800 for 79%–70%; etc. with minimum = $100).

The *SEE-S* was administered to school-based practitioners and administrators during the 2018–2019 and 2019–2020 school years. A total of 134 traditional public schools from 21 districts, as well as 20 charter schools, were successfully recruited into the sample for the field trial administration of the *SEE-S*. Schools from 18 different states were represented in the sample. Our sample had an equal number of "Suburban" and "Urban" districts participate. With regard to the distribution of schools by grade level served, our sample mirrored national statistics from the 2018–19 school year (NCES, 2020). More specifically, 55% of schools in our sample fit the definition for an elementary school (e.g., K–5 or K–6), which matches the national percentage of 55%. Sixteen percent of our sample was middle schools (e.g., typically grades 6–8), which matches the national percentage of 16%. Twenty-one percent of our sample was high schools (e.g., typically grades 9–12), whereas the national percentage is 22%. The remaining 9% of schools spanned wider grade ranges (e.g., K–8 or K–12).

The overall individual-level response rate for the *SEE-S* was 53%. The response rates by school varied from a low of 0% to a high of 100%. The average school response rate was 56%.

The sample consisted of 4,415 school-based practitioners and 25 district staff. A number of different school personnel were eligible to take the *SEE-S*, among others, this included teachers, principals, assistant principals, and instructional coaches. Table 5 depicts the distribution of participants by role for the *SEE-S*.

Table 5. SEE-S Participants by Role

Staff Role	***Frequency***	***%***
Classroom teacher	2818	63.8
Special education teacher	420	9.5
Arts or electives teacher (e.g., CTE/STS, music, art, P.E., etc.)	298	6.7
School administrator (e.g., principal or assistant principal)	181	4.1
Paraprofessional or teacher assistant	152	3.4
Instructional coach	129	2.9
Interventionist	126	2.8
Guidance counselor	108	2.4
Librarian	44	1.0
Speech language therapists	43	1.0
Health professional (e.g., school nurse)	32	0.7
District administrator/staff	25	0.6
Technology/media specialist	25	0.6
School psychologist	8	0.2
Occupational therapist	5	0.1
Physical therapist	1	0.02

N = 4,415 Individuals who completed at least one full portion of the survey (e.g., *Depth of Use*)

Appendix B. Survey items used to calculate depth-of-use sub-scale scores

Depth of use scores were calculated for those respondents who were classified as "Familiar" with an organizational decision. To be considered "Familiar" with an Organizational Decision, respondents needed to have at least an average score of 1.5 on a 0–3 scale across these three items (0 = "not familiar," 1 = "somewhat familiar," 2 = "very familiar," 3 = "very familiar"):

Although you may or may not have been involved in the decision you described above, how familiar are you with each of the following aspects of the decision process?

1) The information used to inform the decision

2) The process for gathering the information

3) Who was involved in gathering information and/or making the decision

External Research

The External Research DOU score was calculated with responses to this survey item:

To what extent did the following types of information influence the decision?

- *Articles, reports, books, or summaries based on external research or program evaluation (paper or web-based).*

Survey respondents who indicated that external research had "some influence" or "heavily influenced" the decision were shown this item, which enabled researchers to confirm the external research. Only answers that were confirmed as external research were used for the calculation of the external research DOU sub-score:

Please tell us about a research or evaluation study that influenced the decision, including as much information as possible about the study author, title, or web URL."

Local Research

To what extent did the following types of information influence the decision?

- *Research or program evaluation conducted by central office staff*

- *Research or program evaluation conducted by teacher(s) or principal(s)*
- *Research or program evaluation led by students or local youth*

Respondents who said that any one of those items had "some influence" or "heavily influenced" were shown a validity filter to identify the product(s) produced from the research, and respondents who selected "I don't know" were omitted.

Data Analysis

To what extent did the following types of information influence the decision?

- *Other formal analyses of school-wide or district-wide data*

Respondents were excluded if they did not know what was produced by the analysis and if selected 2 out of 3 items related who did the analysis, the data that were included, and the kinds of analyses that were completed.

Search: Direct to Research

Search: Direct to Research was a binary indicator coded 1 if at least one of these 6 items were checked 'Yes.' (These 6 items were in two separate SEE-S survey items.)

1) *Were these pieces of evidence found as a result of any of the following searches? Check all that apply*
    - *Library or research database search (e.g., ERIC, Google Scholar)*
    - *By collecting references from one or more bibliographies*
2) *You stated that evidence from articles, reports, books, or summaries based on external research or program evaluation influenced the decision. Please identify who or what provided you with that evidence?*
    - *An external researcher or research organization*
    - *A Regional Education Lab or Comprehensive Center*
    - *The What Works Clearinghouse*
    - *A peer-reviewed academic journal*
    - *Faculty or course from your undergrad/grad program*

Interpretation

Interpretation was the sum of the number of the 5 responses that were checked "Yes" in the following item.

The following set of questions asks about how information was interpreted. Please indicate whether participants in the process engaged in the following:

- *Determined whether the information was of high quality*
- *Determined whether the information was relevant to our school/district*
- *Worked to make sure the information was understandable to others impacted by the decision*
- *Made connections between the information and current practice*
- *Developed a shared understanding of the information*

Participation

Participation was the sum of the number of people who were involved in gathering and evaluating evidence.

Who were the key people involved in gathering and evaluating evidence to inform the decision? Were they also involved in making the decision?

1. School Board
2. Principal
3. Asst. Principal
4. Teachers
5. Students
6. Instructional Coaches
7. Special Educators
8. Para-educators/Teaching Assistants
9. Curriculum/Instructional Supervisor
10. Support Services Staff
11. District Superintendent
12. Research/Evaluation Staff
13. Other Central Office Staff
14. PTA / Parents
15. State/Federal Staff
16. External Program Developer(s)
17. External Researcher(s)
18. External Consultant(s)

Decision Stages

The score for *Decision Stages* was calculated as the number of stages in which evidence was used in the decision-making process.

The information collected for this decision may have been used at various points in this process. Please click in the center of the circles if the information was used to . . .

- *Identify a problem in your school or district*
- *Determine reasons behind a particular problem*
- *Identify multiple potential strategies for addressing the problem*
- *Select which strategies to implement*
- *Inform how best to implement the decision*
- *Adjust the solution to improve implementation or outcomes*

Frequency

Calculated as the expected proportion of decisions, within a school, for which external research, or local research, or local data analyses influenced the decision.

Appendix C. Codebook

Table 6. Coding framework

Parent Code	Definition	Child Codes	Definition
Depth of Use (1S)			
Evidence Used by School	The nature of the information used to inform decisions about policy or practice. Including specific references items; Not limited to research - want to understand all kinds of relevant info		
Frequency	Regularity with which evidence is used to support school improvement efforts. Can be broad and inclusive (e.g., does not need to give specific times/schedule, could also be more general indications of regularity, for example "quite a bit"		
Interpretation	Processes through which information is transformed into knowledge (sensemaking). NOTE to pay attention to this and the who does this/is responsible for it/etc.		
Participation	Who engages with evidence - whether collecting evidence, evaluating evidence, or actual decision-making with evidence.		
Problem/decision Context for Evidence Use	Kinds of issues are schools working on when engaging with research evidence, including decisions made or challenges facing; focus only on problems/decisions that are in the context of using evidence.		
Purpose of Research Use	To what end are educators engaging with research.	Instrumental	To adopt or change policy or practice (e.g. in a specific decision)

		Conceptual	To develop new understandings, as frameworks to guide action/thinking
		Strategic/political	To develop buy in for a particular strategy or issues
		Symbolic	To justify a decision after it has been made, paying "lip service" to using research.
		Embedded	Implementation of routines that reflect research-based practices or ideas.
		Imposed	Use because required to by policy, mandate, grant, etc
Search	Mechanisms and strategies through which evidence is obtained.		
Professional Background	Respondents' descriptions of their own professional background.		
Perspectives & Assumptions (2S)			
Educator Capacity	Educators' descriptions of own abilities to critically consume research. Any indication of capacity to find and collect evidence, interpret and apply evidence, or communicate with others about evidence. This is not Org-level capacity.		
Organizational Leadership	Discussions that give insight into the structure, attitudes, behaviors, etc. of school/district leadership. More broadly, capturing leadership-related discussions even if not explicitly related to research use.		
Problems of Practice	Perspectives on whether evidence addresses meaningful problems of practice for educators/schools, whether it is useful/helpful for improving policy/practice. Not		

	exclusive to "research" evidence, but all discussions of the usefulness of evidence used/engaged with.		
Products Used	The products or kinds of products educators find most useful (e.g., sources, tools, characteristics of them, etc.)		
Relationships between Communities	What does the relationship between research and practice look like, including push/pull/exchange and knowledge of and desire to connect. Any discussion of relationships/engagement with individuals/groups outside of the school should be captured with this code.		
Research Brokers	Individuals, organizations, media sources that connect educators and researchers and what they do (can be researchers, intermediaries, other educators). Also discussions of respondents' own brokering activities (what they do and why).		
Research Quality	Any description of criteria educators use to determine that evidence is high quality.		
Organizational Context	Aspects of the organization and its setting that enable/facilitate/or relate to the use of research.	Culture	Beliefs about the importance of research as a means to inform practice. This code should be applied when the value/culture/norm described is at the organizational-level, individual/personal values should be coded only when they are clearly, explicitly tied to research (other personal values, such as discipline for example,

			should not receive this code).
		Structures	Department, formal relationship, institution, person with a specific responsibility that influences decisions about research, practice, or the connections between them; this is different than PROCESS, so for example, IES is an institution (structure), but funding is a process. Not only which are present, but how important/how often are they used.
		Processes	(How things work) that influence decisions about research, practice, or the relationship between them. (i.e., hiring process, decision-making process, school-based processes). Including documented guidelines for using research, providing time for research use. Looking for more formalized, routine processes rather than descriptions of activities that occur in individual classrooms.
Other	This code should be applied when there's something interesting, but it doesn't fit in these other parent code categories. Also, "School Background" captured with this code, which includes any discussion of the school's history, context, size, characteristics, etc.		

Vignette	This code captures quotes or stories to be used in vignette writing.