

What We Want, Why We Want It: K–12 Educators' Evidence Use to Support their Grant Proposals

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Abstract This study analyzed educators' requests for grant funding to purchase desired educational resources or services. Specifically, it examined to what extent, and how, educators utilized research and other forms of evidence to support their decision-making. References to research were sparse, though applicants sometimes referred to local data or small-scale trials. Conceptual research use likely also lurked beneath certain statements. Applicant educators also showed special concern for certain topics, including student engagement/motivation and enhancing the cultural relevance of programming. The proposals varied considerably in terms of the robustness of underlying theories of action. This line of inquiry contributes to understandings both regarding a) educators' use of research and other knowledge sources to support their professional decision-making; and b) the nature of evidence use in education.

Keywords Research use; Evidence; Knowledge; Learning; Persuasion

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Introduction

Gaps between research and practice in education are persistent and concerning. Meanwhile, scholars aiming to understand and remedy it have struggled to investigate something (e.g., “research use” or “evidence-based decision making”) that has multiple causes and is elusive, if not invisible (Brown & Zhang, 2016a; 2016b; Cain & Allan, 2017). Accordingly, scholarly investigations of research use or engagement *in situ* have required novel approaches. Among the more promising techniques is to work backward from specific decisions that educators have made, aiming to unpack and uncover the ways in which research (or other sources of evidence) have figured into that decision (Farley-Ripple, 2016; Neal, Neal, Kornbluh, Mills, & Lawlor, 2015).

The present study begins with real outcomes/decisions—and overt supportive reasoning—from the “demand side” (Rosenblatt & Tseng, 2010, p. 201) of the research-use equation: written appeals made by teachers and other educators to a foundation connected to a national teacher/educator labor organization for enhancements or resources they argue will enhance teaching and/or learning. By studying these appeals/decisions in-depth and in context, this study aims to further elucidate how research and other evidence can inform educational decision-making.

The present study represents the initial phase of a larger study that will also include interviewing and case study approaches to illuminate both surreptitious research influence/application and the role of organizational features in enabling and constraining research use. It addresses two questions:

1. What are the characteristic patterns of educators’ evidence use within their grant proposals?
2. What features accompany and/or otherwise relate to the explicit use of research or data-based evidence within these proposals?

The literature review first describes research into educators’ use of research and other sources of evidence. It also reviews research showing how educators’ research use varies significantly by individual and context. Finally, the conceptual framework guiding the present study is explicated.

Educational evidence and research use

A number of explanations for persistent gaps between research and educational practice have been set forth, including the constant churn of goals, expectations, and reforms has led many educators to trust their own instincts/experiences over those of others (Lortie, 1975); educational research itself can be diffuse and difficult to access and/or use (Ball, 2012); some educators perceive the practical problems they face as being too complex for research to adequately address (Guthrie, 2011); and substantial sociocultural divides exist between those inhabiting contexts traditionally categorized as “research production” and “research use” (Caplan, 1979; for review, see Lysenko, Abrami, Bernard, Dagenais, & Janosz, 2014).

Also, considering basic research *access* issues (for instance, scholarly research is frequently published in restricted-access journals), educators are most likely to encounter research via third parties, in some mediated form (see Levin, 2013; Malin, Brown, & Trubceac, 2018). In such formats, the original research is susceptible to shifts, exaggerations, misinterpretations, and so forth. Indeed, research-practice trans-

lation is complex and can be politically fraught, as the decades-long reading wars clearly demonstrate (Pearson, 2004).

Although some view educators' (or others') use of tacit knowledge to support their professional judgments as being somehow "less than" the use of "scientific" findings or relevant theory, it can actually be an inestimable resource (Leonard & Sensiper, 1998). Moreover, even the tacit knowledge guiding educators' judgments might be shaped by relevant research and/or theory (especially that introduced via initial teacher education, leadership education, or ongoing professional development: Coldwell et al., 2017). This fact bears mention as it further underscores the complexities of research-practice relationships, and the associated difficulties faced by scholars who attempt to study them.

These and other features help to explain many educators' cautious or critical views regarding the usefulness of research to inform their professional practices. However, scholarship also shows educators' viewpoints vary substantially, with attitudes and opinions ranging from optimism to skepticism to cynicism (see review by Lysenko et al., 2014). Similarly, research shows organizational and contextual features can play key roles in mediating practitioners' attitudes toward, and engagement with, research (Brown, Daly, & Liou, 2016; Brown & Zhang, 2016a). The next subsection addresses aspects and conditions that relate to research use.

Educators' research use: Enabling factors

Though scholarship suggests generally low levels of research use by educators overall, some researchers have identified elements that can augment the extent and quality of the use of research. Whereas certain issues (e.g., the aforementioned broad cultural disconnects and access issues) are largely outside educators' control, others are more controllable. It can be helpful to organize the features associated with research use relative to the systems in which they originate (Lysenko et al., 2014; Rogers, 1995). Some features locate primarily "within" individuals (e.g., attitudes about research, skills to understand and apply research [Brown, 2017a; 2018; Galdin O'Shea, 2015; Goldacre, 2013]), and others reside more so within teams, schools, or organizations (e.g., aspects of culture and climate and infrastructure in service of productive teaming [Coldwell et al., 2017]). Also, thinking in terms of bridging/crossing systems, certain communication- and/or partnership-facilitating strategies can serve to strengthen connections between researchers and practitioners and to augment the development and spread of research and research-based evidence (Malin et al., 2018). Certainly, these features also interact: the extent to which an individual educator may be positively predisposed toward research relevance (generally, or with respect to a particular piece of research), for instance, is likely to be based on a complex interaction of personal and social-cultural factors.

How research (and/or other forms of evidence) can influence educational practice

This article has thus far outlined several explanations and contributors regarding research-practice gaps in education, and has noted that research use and engagement can vary substantially, with this variance stemming from a complex mixture of indi-

vidual, organizational, social/cultural, and cross-organizational factors. Now, it turns attention to the ways in which research (and/or other forms of evidence) can influence practice. Numerous studies and commentaries have examined this topic, including seminal work by the late Carol Weiss (e.g., 1979, 1980, 1982), who developed a survey to examine instrumental and conceptual uses of educational research by school and school system leaders. The first of these use types—instrumental use—can be described as follows: “when policy makers encourage education leaders to use research to inform their decision making, they implicitly invoke a theory of action in which evidence from research findings directly shape decisions related to policy or practice” (Penuel, Fishman, Haugan, & Sabelli, 2011, p. 2). Conceptual use, by contrast, occurs “when research changes the way that a person views a problem or the possible solution spaces for a problem” (Penuel et al., 2011, p. 2). Symbolic use, meanwhile, occurs when research evidence is used to validate a preference for a particular decision or to justify a decision already made (Penuel et al., 2011).

The distinction between instrumental and conceptual use is thus premised on how educators use research to make decisions and take action as a result. Specifically, instrumental use is thought to involve a direct translation from research to practice: i.e., with instrumental use, research evidence is seen as pointing toward a solution to a problem of practice, with this solution or strategy subsequently being accepted and/or implemented.

Conceptual use, however, is regarded as more indirect in that it points to situations in which research evidence guides or informs thinking in relation to a given problem or solution to that problem. Even just considering the more instrumental goals teachers may have for using research, a variety of sources would seem to imply that instrumental perceptions of research use tend to be unrealistic (Coldwell et al., 2017, Gambrill, 2010; März & Kelchtermans, 2013). As such, this article argues that research use is never 100 percent instrumental and, correspondingly, evidence-informed practice should be thought of as decision-making that encompasses a combination of knowledge types. This makes research use fundamentally conceptual in nature but with research evidence playing a greater or lesser role depending on a variety of factors, such as the availability of research evidence and its concreteness and the presiding contextual factors and practical knowledge also in play (e.g., Brown, 2017b).

Educators do not base their decisions entirely upon research evidence. For one, as Ben Levin (2013) notes, research is incapable of providing “recipes that can be blindly applied to practice. In many areas, there is simply not enough clear research knowledge to guide practice” (p. 16). Similarly, Coldwell et al. (2017) argues educators are unlikely to be convinced to adjust their practices by research evidence in isolation: such evidence needs to be reinforced by observed impacts and/or by hearing from trusted colleagues discussing how it has improved practices or pupil outcomes.

In this vein, Kara Finnigan, A.J. Daly, and Jing Che (2012) studied district-wide evidence acquisition and use and concluded educators frequently recycle approaches, basing their decisions on diverse evidence: anecdotes, popular press, personal experiences, local context, social contagion, and empirical data. Similarly, and in what can be viewed as a pilot to the present study, Malin (2016) analyzed educators’ requests for foundation grant funding to purchase desired educational enhancements,

and he identified several types of evidence that were presented. References to research were sparse and indirect. In contrast, Malin noted many untraceable authoritative statements and anecdotes (especially descriptions of applicants’ own, or their colleagues’, experiences with the proposed enhancement). Malin (2016) also uncovered three overarching findings: applicants were particularly interested in enhancing students’ motivation and engagement, evidence use appeared to vary by professional position, and applicants attended to establishing contextual fit. In the 18 proposals, just two vague research references were found, though in several instances preliminary action research processes leading to the request were described.

The present study features several improvements from Malin (2016). Most significantly, it draws from a significantly larger and more diverse educator sample: whereas Malin studied only a small sample of educators in one school district, the sample under study for the present study spans districts across the United States. Accordingly, it was expected to encounter more—and more varied—instances of research use, enabling a more definitive analysis of associated features. The present study reports solely upon the written content analysis of proposals, similar to the predecessor study. Phase two of the project aims to pursue follow-up interviews with lead applicants, in the hopes of obtaining a deeper understanding of their evidence use, as well as to discern the extent to which the application format may have influenced applicants’ thinking and reasoning.

Conceptual framework

Following Meredith Honig, Nitya Venkateswaran, Patricia McNeil, and Jenee Twitchell (2014), this study applies sociocultural and organizational learning theory and frame research (and other evidence) as a learning problem for educators. Specifically, as these individuals and teams encounter new ideas, whether from research or otherwise, it posits that they grapple with their meanings and how they can be integrated into their existing understandings and, potentially, their ongoing practices. They are thereby engaging in a sense-making process and, in fact, may edit the information in the process (also see Spillane, 2009; Weick, 1995). This framing, as Honig and colleagues (2014) argue, enables scholars to move beyond longstanding binaries between research “use” and “nonuse” and instead to focus upon the nuanced processes at hand. This study also assumes an ecological perspective, noting that the users, producers, and mediators of research are embedded in broader social, political, and economic contexts (Levin, 2013).

Leading into the study, it was reasoned that educators applying for National Education Association Foundation (NEAF) grants were in a somewhat ambiguous situation of needing to effectively argue for a particular enhancement but without clear guidance as to what forms of evidence they should advance as they “made their cases.” Details regarding the application, including key items and posted selection criteria, are located in Appendix A. These were interpreted as generally communicating with applicants that they would need to present some form of evidence and reasoning (e.g., “What is the need for this professional development? How did you and your colleagues assess the need?”) related to their decision-making, while not providing a clear signal regarding which types of evidence (e.g., the use of external research,

local data, or professional wisdom) the funder preferred. Accordingly, it was expected that an array of claims would be encountered, and earlier work made it seem likely that explicit research use would be relatively rare versus other forms of evidence use (e.g., anecdotes, belief statements, etc.). Patterns were sought among claims that were *not* explicitly linked to research, guided particularly by prior work from Malin (2016): coding applicants' claims relative to their explicit or apparent bases (experiential or anecdotal, beliefs/values, untraceable/authoritative statements, etc.). However, it was also assumed there would also be a fair number of explicit research or research-based claims. Regarding these, the aim was to both classify the type of use (following Weiss, 1979: i.e., instrumental, conceptual, or symbolic) and the circumstances and features surrounding it (e.g., professional, topical, personal, local/organizational), in an effort to better understand the context around research use.

Data and methods

This study relies upon qualitative methods, particularly including the directed content analysis (Hsieh & Shannon, 2005) of written grant proposals. The analysis begins with raw January 2017 application data for the NEAF Learning and Leadership Grants. The purpose of these grants is to “support the professional development of NEA members” by granting funds for:

- Individuals to participate in high-quality professional development like summer institutes, conferences, seminars, travel abroad programs, or action research), and
- Groups to fund collegial study, including study groups, action research, lesson plan development, or mentoring experiences for faculty or staff. (The NEA Foundation, 2018, n.p.)

Applicants, members of the National Education Association (NEA), can be awarded \$2,000 or \$5,000. The NEA, with about three million educator members (National Education Association, 2017) is the largest professional interest group in America and is incorporated as a union in most states. There were 147 applications in January 2017, representing 41 states and territories. Twenty-six (17.7%) applications resulted in funding awards, totaling \$70,000. The present study includes an analysis of 30 randomly selected unfunded applications (20.4% of total and 25% of rejected applications), and all ($N = 26$; 17.7% of total) funded applications. Thereby, 56 applications were analyzed, constituting 38 percent of the applications. The first author functioned as lead data analyst, while secondary authors served primarily as “critical friends.” A detailed coding scheme is located in Appendix B. As Colin Robson (2000) encouraged, a process of reflection, interpretation, and challenge was undertaken to jointly increase the understanding of the data, to assess agreement with coding, gauge the strength of the claims, and shape and reinforce final selections.

Limitations

This study includes some limitations. Most significantly, the reported findings derive solely from the content analysis of written grant proposals. It is likely that educators' research use in some instance has occurred by stealth and has not been detected here—in other words, research or theory may have shaped educator-applicants'

thought processes and decision-making, even if not explicitly noted within their proposals. A related concern is that the written proposals by themselves may more readily reveal instrumental or symbolic use than conceptual use, thus potentially leading to an artificial under-identification of conceptual research use. These limitations will be addressed in phase two of this project, which is to include the interviewing of a subset of applicants. Also, the subsample used here over-represented “funded” applications, thereby potentially leading to an overestimation of the frequency and depth of research use in the full application pool. Nevertheless, this project’s aims extend beyond the full application pool, and are more interested in sensing how the use of research and other sources of evidence augment educators’ thought and decision-making processes. As such, there is also unique value in *phase one* of this project. Educators are applying within an ambiguous context in which at least some form of evidence use (but not necessarily *research use*) is necessary. They must make a case for why *x* enhancement is promising and/or necessary—e.g., how/why it will enhance leadership, teaching, and/or learning. Within such a context, the manner in which applicants construct/present their arguments is illuminating in itself, saying something about the relative value they may assign to different evidentiary forms and/or the value they predict the funder assigns toward them.

Findings

This section presents findings in terms of: 1) characteristic patterns of evidence use (i.e., evidence use patterns writ large, including but extending beyond research use); and 2) a more detailed analysis of features surrounding the explicit use of research evidence. A small number of emergent observations that were not considered to be important to present but that did not fit neatly within the main research questions are also included.

Characteristic patterns of evidence use

Eight broad categories of evidence use emerged. Of these, three categories (statements of belief; authoritative, unsourced claims; claims of fitness to standards) likely included considerable conceptual and covert research use, while three more included the explicit use of research and/or descriptions of planned or completed research.

Professional anecdotes/experiences

Educators (applicants) frequently presented professional anecdotes/experiences to buttress or justify their broader requests. These were further distinguishable as *time-limited or time-unclear anecdotes* (e.g., the description of a particular incident or informal classroom effort and its noted effects) or more *long-term experiential extrapolations*. Sometimes these were presented as individual anecdotes, and sometimes team/collective anecdotes were noted.

Time-limited or time-unclear anecdotes occurred frequently. For instance, an English as a Second Language (ESL) teacher attempted to describe the potential dividends of a cultural trip/professional development experience in El Salvador: “Any time I mention that I have been to [their native] country, parents’ eyes light up in surprise.” A Spanish teacher, appealing for funds to pursue professional development in Peru, re-

counted: "I have seen the power of communicating with students and teachers in their native language." Sometimes, experiential insights were presented as being shared by colleagues. For instance, "teachers and administrators [in my school] have noticed that students ... have become increasingly stressed and anxious."

Longer-term experiential extrapolations were also fairly common. For example, a science teacher noted, "Having taught for more than 17 years, I find [parent communication] to be the most impactful but frustrating aspect of my practice." Noted another, "I have been running an after-school research club for the last two years. There [are] a healthy number of freshmen and sophomores in attendance." Another stated,

For the past six years I have been working to adapt my lessons so that they are more hands-on and use real world exploration. An area that I know very little about is aerospace science. This makes it difficult for me to find ways to have the students carry out real investigations while learning about space.

Statements of belief (values)

Educators also frequently advanced belief statements to support their proposals. Noted one, "I believe ... educators have a responsibility to fight hate through civic and character education, to help develop empathy in students." Some educators even presented multiple belief statements in succession as they built their respective cases. For example,

I believe that the connection between school and home is essential for academic success in the classroom, and I am constantly working on ways to improve that in my own classroom. I believe that professional development opportunities are essential to growth as an educator, and these sorts of professional development opportunities do not come along every day.

Belief statements were also sometimes presented as being shared. For example, "my colleagues and I believe that we need to adjust our current teaching practices to better meet the expectations of the new standards." Such statements were also sometimes couched as feelings or intuitions, as illustrated here: "As an Earth science teacher, I feel that there is no better way to understand your content than to interact with those landscapes and learn from them."

This category (and the next one) likely includes research use by stealth. For instance, theory or research may partially shape some educators' values or beliefs. Based on how they were presented, however, this was typically impossible to discern.

Authoritative, unsourced statements, or claims

Nearly all applications contained one or more one authoritative but unsourced statement/claim. In other words, a veritable "fact" is presented but without qualification (e.g., "I believe" or "it seems") or a nod to the source. These statements were further evaluated in terms of plausibility.

As an example of a plausible but unsourced claim, an educator stated, “High school students [in] 2017 are not entertained by textbooks.” Other examples included “right now there is a shortage of qualified US computer science/robotics professionals,” and, “it is well-known that many higher educational professors do not have the same knowledge about teaching.”

Certain statements (considered as topics/themes) raised the notion that many educators may share a type of “common sense.” For example, statements such as, “Teachers improving their instruction leads to increased student achievement,” may not legitimately require citation, and this type of logic supported numerous professional development (PD) related proposals. Similarly, many seemed to share the notion that it is worthwhile and beneficial for educators to strive (in various ways) to enhance their understanding of and connections with their students’ cultural and/or linguistic backgrounds. Many educators could consider this idea “common sense,” thus perhaps rendering reference to external research superfluous or cumbersome.

Certain authoritative claims seemed on their face somewhat less plausible. For instance, a computer science teacher applicant argued, “computer science benefit [sic] students no matter what field they want to go into.” Other statements, often presented back-to-back, struck as implausible based on their ambitiousness and/or their medically based claims—e.g., an applicant who claimed a particular discipline approach would positively alter students’ frontal lobe development and improve all aspects of student social and academic functioning.

Claims of fitness to standards or goals

As might have been expected (and partially in response to the application format), a key and frequent strategy was for applicants to note the fitness of their proposal relative to local or broader standards, goals, and priorities.

Related to *local* fit, some applications noted alignment with school or district goals. For instance, one applicant noted their district’s emphasis on personalized instruction and technology use, both relating to their proposal. Another referenced their district’s “workplace goal,” another described a “strategic plan,” and so on.

State and national goals or standards were also referenced with some frequency. The Next Generation Science Standards (NGSS) were referenced five times, and the Common Cores State Standards were referenced three times. For example: “Our school has recently adopted the [NGSS] and now our students’ achievement in science, as measured by state assessments, has decreased”; another educator noted her requested project would “engage students in age-appropriate ethnographic research aligned to Common Core standards.”

Claims of fitness to context (other)

Some other claims of fitness to context were noted, including claims of group *consensus* around a problem or solution, and claims that favorable infrastructure or processes were in place that would enable the request to be particularly successful (including, in certain cases, cross-sector collaborations). Each is discussed in turn.

Some applicants noted a group of local colleagues who were in agreement (i.e., *consensus*) that some approach or change was needed. For example: “my head teacher

and I discussed the lack of materials for our students.” Noted another, “After reflecting on our practice, my colleagues and I believe that we need to adjust our current teaching practices to better meet the expectations of the new standards.” These educators were seen as communicating a larger local demand and/or infrastructure that would benefit from the request.

Applicants who described favorable infrastructure within their schools/districts—such as references to existent or well-functioning professional learning communities, district committees, and/or district commitments to partially fund the proposals—were also noted. Others described the helpful existence of technology (e.g., “we are a 1:1 school,” “[technology] carts are available to support the digital dissections being proposed) or pointed to the district’s technological investments while noting local teachers were “still learning how to harness it” (thus, the need for a particular PD request).

The use of local data

Local (e.g., classroom, grade-level, school, or district) data were presented in some form within many applications. These were presented in one or more of the following ways:

- *Nonspecific/vague data use*: For instance, “We have too many (disciplinary) write-ups and suspensions”; “The need for further training was assessed while looking at current reading data from a curriculum-based measure”; and “[The school] has ... gone 1:1 with Chromebooks this year and the majority of our students have been more engaged than ever.”
- *Data use to underscore local need or illustrate a broad problem*: This subcategory was frequently included. Examples include “Our school is low-achieving ... failing scores for the past nine years”; “14 of my 15 students have case goals in reading”; and “The Dyslexia Center of Utah estimates that 70-80% of people with poor reading skills are likely dyslexic” (also see “Reference to External Research or Data/Statistics”).
- *Data use to presuppose the success of a proposed intervention/service/approach based on a pilot or pilot-like process*: For example: “More than half of our teachers participated in this [similar to the proposed] professional learning option last year and our students are benefiting from the effects of their learning. Last year, our school exceeded state expectations for student growth.” Another example: “I discovered that I did not have a single behavior issue or write-up during my 9-week Iditarod unit.”

Descriptions of research process: Underway, completed, or proposed

Although formal/explicit references to external research were rare (see the next subsection), descriptions of or pledges to engage in some (often loose/informal) form of research process were present in approximately 30 percent of the applications. These could be further subdivided in terms of whether they were underway/completed or proposed (e.g., if awarded x, I/we will engage in y). They also varied in terms of their formality.

The descriptions of research processes that were *underway and/or completed* included descriptions of data study, problem analysis, or root-cause analysis ($N = 4$), small-scale trials and related processes ($N = 3$), and collective book studies ($N = 3$).

Pledges to engage in research processes in the *future* included descriptions of action research plans ($N = 3$) and a plan to conduct a literature review, plans to create “research-based tools,” a plan to engage in a collective book study, and one applicant’s intention to build “research skills” by way of professional development (so as to improve the ability to guide students’ scientific endeavors in the classroom).

Reference to external research or data/statistics

There were seven applications (12.5%) in which a formal reference or formal references to some external research or data/statistics (excluding local demographics/test scores) were made. These included

- Direct quotations by Richard Allington (it also noted he was the “former president of the International Reading Association”) and Maria Botelho and Masha Rudman (2009).
- A reference to the applicant’s dissertation and a description of a key takeaway, and the presentation of other related research.
- The use of selected statistics (e.g., Office of Civil Rights data and a statistic from the Dyslexia Center of Utah).
- A reference to support a train-the-trainer approach to implementation/change.
- A reference to “several research based data and articles” found on a proposed program’s website.

Several vague references to research or to research-based or evidence-based material or approaches were also noted. For example, one person referred to “a 2014 study” supporting their premise that social-emotional learning could have major positive effects, and another noted, “we found multiple research papers supporting the use of adaptive materials.” Another described, “Multiple studies have found that students easily become engaged when teachers use technology, like social media, during class.” Another applicant claimed their proposed program was “evidence-based” and another noted they would create “research-based” tools and strategies.

There were also two instances in which educator-applicants described being inspired or guided by particular books, such as *Explore Like A Pirate* (Matera, 2015).

Research use: The analysis of characteristic features and supporting context

Potential causes for the observed research use were considered. Two broad features appeared to be related to research use:

- *Level of education.* In keeping with Brown (2017b, 2018), those who used research tended also to be individuals that referred to their graduate study and/or people who had earned doctorates. For example, one applicant (a high school music teacher) described their PhD in ethnomusicology, while another provided a direct link to their dissertation.

- *Professional position.* Among the sample, teachers in the sciences, nurses, social workers, specialist teachers (e.g., special education or reading specialists), and/or higher education faculty members appeared to be more likely to use research or describe current/future research engagement than others. For example, an assistant professor of math (early childhood) cited numerous studies related to their proposal, and a school nurse detailed current (e.g., tracking the incidence of referrals) and future (e.g., a planned literature review) research engagement.

Additional observations

Attentiveness to diffusion/spread

One application question asked educators to describe how they would assure the project's continuation and share the learning that occurs. Some applicants described elaborate sharing processes, and a large number suggested they would somehow share beyond school/district boundaries. Typically, such sharing was to occur via professional groups and conferences/convenings and/or via networks (see next subsection).

Respect for networks and collaboration

A general and somewhat pervasive respect for or desire to grow/strengthen professional networks and collaborations was evident in many proposals. One educator shared what appeared to be a widespread perception: "The way to become better is by collaborating with others in the field, sharing ideas, and bringing those ideas home to implement at our site." Another educator noted that wider networks were beneficial for students, who could "develop professional networks [via their participation in robotics activities and competitions], thereby increasing [their] career resilience."

Commitment to measurement or disciplined inquiry

The application questions did not require applicants to address whether/how they would measure or assess the effectiveness/impact of their requested activity/service. Consequently, few applicants described intentions to do so, but there were a few exceptions. For instance, applicants seeking to implement conscious discipline described how they would collect and evaluate "ongoing data," and another applicant noted that they would collect pre- and post- surveys and facilitate focus groups. Others made vague reference to planned assessment or implied that they would be monitoring and/or actively seeking to reduce undesirable student behaviors. And, as noted in a prior section, a small number of applicants proposed to engage in disciplined research (e.g., action research or critical participatory action research).

Robustness/clarity of "theories of action"

Although educators were not asked to present "theories of action" in so many words, the robustness/clarity of underlying theories of action seemed to separate weaker and stronger applications. Some educators explicitly developed the kinds of if-then statements (sometimes several in sequence) that can characterize theories of action, whereas others did not, instead leaving unsaid some assumptions that might have

buttressed or countered their proposals. On the weaker end were proposals primarily to enhance one's career advancement, with little detailed analysis of how a project might be expected to enhance leadership, teaching, and/or learning. On the other end were theories of action that were well developed, explicit, and appeared to be founded on robust claims. For instance, one applicant who sought support to learn a new approach argued that her better-engaged students "will result in fewer behavior disruptions, which results in more time for learning, and a more positive moral [sic] for the entire class." As another example, applicants seeking to build a community garden noted:

Our number one workplace goal is to improve classroom efficiency and improve peer collaboration. With the implementation of the school garden at each school location our workplace efficiency will increase tremendously. Having a school garden within close proximity will reduce time teachers devote to lesson-planning and duplicated efforts among teachers trying to develop and create new avenues for learning. The garden will offer one less step in searching for and setting up new science experiments which can be a challenge and is also time-consuming for teachers. Classroom efficiency provides opportunity for furthering cross-curricular teaching methods and allows the teachers a greater opportunity to achieve state standards by which they are held. By increasing efficiencies of classroom time, teachers will be afforded the freedom to embrace, learn and incorporate new supporting curriculum and encourage collaborative creativity.

Attentiveness to change processes

Application questions did not explicitly prompt educators to speak to the change process and how they might aim to promote positive change. Accordingly, considerable variation around "attentiveness to change" was noted. Most applicants paid little mind to this dimension of implementation, understandable in certain cases (e.g., when requesting small-scale projects involving one or a very small number of educators) but less understandable in others (e.g., when seeking funding for a large, ambitious project). Representing the positive side, for instance, were the garden applicants who described a steering committee, a preexisting and pivotal partnership with a community organization, and planned teacher surveys to shape ongoing implementation supports and PD decision-making. Another applicant team described a phased, three-year rollout process based on the success of an earlier pilot, ongoing data collection, with a goal of ultimately reaching "model status."

Prominent, recurring concerns

A small number of recurring concerns were at the heart of numerous proposals. First, increasing student engagement (or "interest" or "motivation") was a prominent concern. Sometimes this concern was coupled with another major one: enhancing/improving cultural relevance or connections (and/or improving students' "global perspectives" or "global citizenship"). Said one applicant, "Our students need lessons that are engaging, rigorous, and relevant to achieve success." Several applications fo-

cused on STEM or STEAM and/or better leveraging or integrating technology, which is apt given this grant's focus.

Discussion

Underpinning this article is the broad belief that the use of research by educators can lead to beneficial outcomes. In particular research-informed decisions can positively benefit not only teaching and learning but also how schools are organized and run more generally. As such, major educational decision-making, including requests for funding, should, where possible, be grounded in logical research-informed arguments for why specific resources should improve educational provision, including how such improvements will enhance student outcomes. Based on this assessment of the quality of the applications above, the strongest applications are those with explicit theories of action that also incorporate local data and deep contextual understandings. Also, educators' use of research is likely to be principally conceptual in nature, which means more effective applications will demonstrate how research and local data/knowledge play out within given contexts to affect change. Correspondingly, funding agencies should require applicants to develop theories of action to explicitly state how and why a given project—if successfully funded—will lead to improved knowledge, practice, and outcomes in its specific setting.

Drawing on Dean Fixsen (2017), this article suggests that research has a substantial role to play in helping teachers develop strategies for action. For instance, the following example uses Fixsen's approach in combination with the findings of Stoll, Bolam, McMahon, Wallace, & Thomas (2006) to develop a theory of action for professional learning communities:

IF there are professional learning communities, THEN there will a scheduled time for teachers to discuss their work and the work students produce; and IF teachers share their work and the results with each other, THEN they will be able to learn from each other's successes and draw upon the expertise of their colleagues around common challenges (and so on until we reach impact for students).

Meanwhile, a theory of action approach provides space for educators to make use of tacit knowledge and to take the local context into full account. This is because a theory of action also requires details regarding the operationalization of interventions. In other words, also required will be a detailed description of the activities, resources, interactions, supporting structures, processes, policies, and routines used to roll out—or bring to life—the intervention to ensure that it has the desired effect. Furthermore any theory of action could also be used to set out how the impact of the funding could be measured, since data can be used to ascertain the extent to which each logical step has had its desired effect as well as explore the success (or lack of it) of how the intervention has been operationalized (see Guskey, 2000, for how the data might be used to measure impact, and Brown, 2017b, for how teachers' use of theories of action lead to more effective decision-making). Overall, then, a theory of action approach should result in more effective and efficient decision-making while also enabling researchers to understand how and why their approaches have been successful and to share successful interventions more widely.

This research contributes to understandings of educators' use of research and other sources to support their professional decision-making. First, the data show that some educators linked a theory of action with the clear and explicit incorporation of local data and context. This is encouraging, as it suggests a sophisticated evidence use through these grant proposals. Second, this work contributes to a larger body of literature suggesting that student motivation/engagement is a primary concern for educators, with one implication being that research or theory that can shed light on or suggest means of enhancing these aspects (generally, and/or with respect to particular student groups/ages) will be in high demand. Finally, the work provides empirical work on the nature of evidence use in education. Moving forward, the hope is that future research can and will continue to analyze the relationship between educators, the use of evidence, and decision-making.

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Appendix A: Grant proposal items and listed selection criteria

Main Grant Proposal Items (Excluding Demographic Information)

SUMMARY. In 100 words or fewer, give a summary of the project you're proposing. Write in a way that you'd feel comfortable with the NEA Foundation sharing on our website to describe your project. (For examples of how to write a summary, please view our Grantee Archive for descriptions of our recently funded grants.)

What is your professional development plan? What are your goals in this learning? What learning resources do you plan to use?

How, when, and where will the learning be accomplished?

How does the proposed professional development advance your professional goals? How does it advance your workplace goals?

What is the need for this professional development? How did you and your colleagues assess the need?

How will this project continue beyond the grant period? How will you continue sharing the knowledge gained in this project?

Listed Selection Criteria

- Proposed goals for student achievement are challenging and rigorous
- Proposed work engages students in critical thinking and problem solving
- There is alignment between goals, assessment, activities, and budget
- The project is collaborative and can be sustained in future years and/or adopted by other educators

(From The NEA Foundation, 2018)

Appendix B: Application analysis: Initial coding scheme

- *Lead applicant*: role, subject, highest degree, grade level
- *Secondary applicants*: (same)
- *Application content/topic area*: e.g., science, math, reading, visual art, foreign language, physical wellness, social-emotional
- *Students targeted*: grade level, subpopulation (if applicable)
- *Primary expressed motivation for applying*
- For each source of evidence/knowledge used to support the request, code:
 - Application of existing research?
 - If yes, code:
 - type of research use (e.g., instrumental, symbolic, political, conceptual)
 - research findings, quality and performance data, population data and statistics, evaluation data, other (Ward, 2017)
 - source (or note if unsourced) and identify source by type following Farley-Ripple & Jones (2015)
 - discipline drawn from (Malin & Paralkar, 2017)
 - author/s
 - how research was located/identified
 - direct source or brokered/mediated (e.g., colleague, intermediary person/organization, encountered via social media) (Cain & Allan, 2017)
 - Use of vague terms such as “research-based” or “based on brain science”? (Malin, 2016)
 - If yes, appraise validity of statement
 - Description of knowledge produced by systematic research?
 - If yes, code or identify:
 - Circumstances in which research was carried out (who is involved, why)
 - Was requested service/product or related found to be beneficial in some way? How (e.g., student achievement increased, ease of implementation, motivation increased, teachers or students liked)?
 - Additional context (e.g., Professional Learning Communities [PLC])
 - Description of knowledge produced by unsystematic research or ambiguously systematic research?
 - If yes, code or identify circumstances/context (same as above)
 - Was requested service/product said to be beneficial in some way? How (e.g., students liked, achievement increased, student motivation increased, easy to implement, teachers liked, etc.)?
 - Description of evidence used that is not obtained via research
 - If yes, code: scientific/factual knowledge, technical knowledge (e.g., practical skills, experiences), practical wisdom (professional judgments, values, beliefs) (Ward, 2017)
 - Traceable to a particular source? If yes, note
 - Presentation of contextual information relevant to application (e.g., fitness to context)?
 - If yes, summarize if locally obtained, neighboring or similar district
 - Cost considerations or local implementation considerations?