Building Equity
in Research-Practice Partnerships

ON THE BACK
How to create equitable partnerships

+ What is a research-practice partnership?

Research-practice partnerships (RPPs) are mutually beneficial and open-ended collaborations between educators and researchers seeking to improve educational practices and outcomes. Learn more about RPPs at:

researchandpractice.org
learndbir.org
wtgrantfoundation.org/RPP

+ What do we mean by equity in research-practice partnerships

Equity in RPPs means that all partners have shared interest and equal voice in the purpose, conduct, and outcomes of a study. Because partners often come from different institutions with distinct vocabulary, communication structures, and work practices, special attention is needed to ensure that all partners experience the projects as equitable.

equitable partnerships =

+ Challenge power dynamics and hierarchies.
+ Equally value all knowledge, experience, and skills.
+ Collaboratively develop shared language and vocabulary regarding research, educational theory, and practice.
+ Create opportunities to share local knowledge and histories (e.g., the school, program, community, sociocultural contexts, etc.).
+ Collaboratively define research questions, purpose, goals, and definitions of success.
+ Represent broad local interests in project conversations (children, families, practitioners, researchers, and other community members).
+ Regularly clarify and surface needs, wants, and expectations relating to the partnership and partners' professional contexts.
+ Respect the pressures, demands, schedules, and resources of partners' professional lives.
+ Attend to the changing needs of the collaboration as research questions and educational strategies shift over time.

By Jean J. Ryoo, Michelle Choi, & Emily McLeod

RESEARCH + PRACTICE COLLABORATORY

How can we create partnerships that are truly equitable?

Building equity among partners is essential to supporting equity-focused education and research. Use the ideas and guiding questions below to facilitate how your RPP establishes, engages, and encourages equity. Read more of how we build equity in RPPs at researchandpractice.org/equitystory

ESTABLISHING EQUITY

Form an equitable foundation through organized discussions that build shared meaning and language.

- **Create a shared meaning for "equity."**
  - What do we mean by "equity" in this partnership?
- **Identify possible privileges and inequities.**
  - What experiences and expertise does each partner bring?
  - How can we bring a greater diversity of skills, knowledge, and expertise to this group?
  - How can we productively address issues of race, class, gender, sexuality, age, education, and experience?
- **Develop common definitions.**
  - How do we know if we have the same definitions for project topics related to learning, teaching, etc.?
- **Define shared project outcomes.**
  - What impact will our project have?
  - What will we know, be able to say, and understand as a result of working together?

ENGAGING EQUITABLY

Decide how resources and constraints will be addressed in an equitable way.

- **Identify and negotiate collaborative activities.**
  - How will decisions about the partnership, big and small, be made?
  - Who is involved, when, and doing what for various project activities and stages: deciding research questions, designing activities, gathering and analyzing data, developing resources, testing and refining, disseminating outcomes, sharing at conferences and events, etc.
  - How will partners work together and be compensated (e.g. meeting space, wages, meals, travel)?
- **Discuss how to deal with very real institutional and professional limits.**
  - What pressures, demands, and timeframes impact partners' professional lives and contexts (e.g., teaching responsibilities, school/organization policies and initiatives, evaluation and assessment)
- **Decide how resources (both tangible and intellectual) are distributed and allocated.**
  - How will time, money, and resources be divided across the partnership and how will this impact the work? (e.g., the researcher(s) may have more time to review data but may want to involve educator partners in analysis. Can substitute teachers be paid for so educators can work with the RPP?)
  - How will documents and data be shared and reviewed (asynchronous/synchronous, on/off-line)?

ENCOURAGING EQUITY

Develop respectful processes for monitoring perspectives and responding to conflicts.

- **Discuss plans for communicating honestly and repairing relationships as needed.**
  - Are we using modes of communication that promote transparency and inclusive participation?
  - What actions should we take to recognize when tensions arise and ensure respectful reconciliation?
  - What are our "deal breakers" and "non-negotiables"?
- **Develop routines for reflecting on project and partnership progress.**
  - When should we check-in about how our RPP is going?
  - Are all partners getting what they need and want?
  - How will we adjust course if necessary?

Discovery: Getting to Know One Another

Adapted by Angie DiLoreto, Bellevue School District

Overview: Since researchers and practitioners come from different types of institutions, a "discovery" phase is helpful for setting up organizational structures, illuminating the cultures and practices of the partnership institutions, and supporting the development of equitable teams that will engage in the work. An explicit discussion of partnership norms should precede this discussion.

Provide a shared introductory statement about the work of the partnership here:

To assist in getting to know each other, each other's institutions and institutional context, the lead from each institution should prepare to share around the following questions:

What interested you most about engaging in this specific partnership work?

Consider the intersection of your home institution and this partnership:

What does your institution value? How would we see evidence of that value?
What might others be surprised to learn about your institution?
What are current concerns in your institution?
What changes do you anticipate in the next 6 months, in the next year?

Consider the intersection of your individual context and this partnership:

What do you personally value? How would we see evidence of that value?
What might others be surprised to learn about you?
What are your current concerns?
What changes do you anticipate in the next 6 months, in the next year?

Listeners should seek to understand the context of the presenter and ask questions to clarify as needed.

This material is based upon work supported by the National Science Foundation (NSF) under grant DUE-1238253 and DRL-1626365. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the NSF.

Bellevue School District

Sample Memorandum of Understanding (MOU) for Partnership Work

Purpose
The following Memorandum of Understanding (MOU) was created between a state university and a large, urban school district as part of a research-practice partnership. The partnership's goal is to adapt the district's curriculum to the new vision for K-12 science education laid out in the Next Generation Science Standards.

The specific content of this MOU is unique to the needs of this project and abilities of the partners involved. Research-practice partnerships are not plug-and-play. Nevertheless, its format and tone may be useful for those looking to write an MOU for a productive, reciprocal research-practice partnership.

Note that the tone of this document is fairly informal. This MOU was intended for use among team members, to shape their understanding of the partnership, rather than for external use. It is important to communicate openly and honestly within a partnership about issues like needs and capacity, in order to make decisions collaboratively and prioritize successfully.

This MOU was created through several rounds of revision and discussion between the school district and research teams. This process incorporated feedback from all major team members.

Format
Black Text = Written by members of the district team
Blue Text = Written by members of the research team

Three Potential Activity Roles for the University in the Partnership

The MOU here focuses on the researchers' role in the project, rather than outlining each partner's role.

1) Technical assistance / "deep dive" with a small set of teachers
School District: The project's PD model and resources are formally limited to the PD events—summer days and three school-year release days. The PD model targets teachers' instructional planning practices as the connection to change their classroom teaching practices.
However, we know teachers need more support in the classroom to substantially change teaching practice, and we know we have more to learn about how teachers take on the focal NGSS practices, what effect the project's activities have on teachers' classrooms, and what additional supports teachers need.
Research Team: I want to push on the model. The university team should be present to support classroom implementation, then the project isn't that different from "traditional" PD. We have to be really careful about providing support that is not sustainable.

In these numbered items, the partners articulate district needs and suggest beneficial areas for researcher involvement.

Close work with a small set of teachers seems most aligned to the university's interests and can fuel more effective project PD events.
We agree with this. Also, we hope to facilitate connective engagement in the period between official PD days with a larger group of teachers.

RESEARCH + PRACTICE COLLABORATORY

Advice for Developing a Research Design that Employs Design-Based Implementation Research (DBIR)

Developed by Bill Penuel of the Research + Practice Collaboratory

Purpose

This brief provides guidance for how to design a research plan using DBIR. It can also serve as a resource for preparing a research proposal to a federal agency or foundation that employs a DBIR approach. This guidance is informed by the development of the approach in a range of settings, including projects of the Research+Practice Collaboratory.[1]

Background

There is increasing interest in developing more collaborative approaches to research and development. DBIR is one of those approaches, and several agencies and foundations are currently encouraging proposals that employ a DBIR approach. Researchers developing proposals or serving as peer reviewers may benefit from guidance about how to build or evaluate a research plan. This document is intended to provide some guidance to the field, from people familiar with the model that can help build a common understanding of DBIR as an approach.

When To Use a DBIR Approach

DBIR is a potentially suitable approach for both "early-" and "late"-stage research and development projects, that is, within exploratory, design and development, efficacy, and effectiveness or scale-up studies. DBIR is not just an approach for testing existing interventions, nor is it wedded to any particular type of method. Any time a team is developing resources or materials for students and for teachers, or teachers and instructional coaches, DBIR may be an appropriate approach. A key element of "DBIR thinking" is to realize that all interventions require participation across multiple levels of systems. An intervention designed for teacher and/or students to use in the classroom requires the buy-in and participation of coaches or administrators to become scalable to many classrooms. It is also key to align the research questions, theoretical frameworks, and research methods to the stage of research (Pages 4-6 Guidance).

What Makes a Project a Good Example of DBIR

DBIR includes many elements of more established research and development approaches, including iterative design and gathering of evidence related to the efficacy of resources, materials, or tools. What distinguishes DBIR Projects from others is that all four features of DBIR are present (see the guidance on page 3).

There are two good questions to ask in order to check whether your proposed project fits the definition:

[1] The ideas expressed in this guidance document are those of the Research and Practice Collaboratory project and are not necessarily those of any agency that funds research.

Question 1: Could practitioners and researchers come to agree on the description of the problem of practice you are addressing?
DBIR projects all involve the collaborative negotiation of the goals for the work, and as part of that negotiation, projects organize around a shared problem of practice. This is a key characteristic of any research-practice partnership, whether or not the partnership has adopted a DBIR approach.

A proposed DBIR project should take as a goal identifying a problem of practice that can be recognized by all stakeholders as the most important problem to be addressed in the project. If the problem is stated in terms that only other researchers would recognize as important, then it is not a DBIR project. Ideally, the research plan should indicate who has helped or will help define the problem of practice and describe the process used to define the problem. Because problem definition is ongoing, the plan should also describe how and when the team will re-visit its problem definition.

Question 2: How will implementation evidence be used to inform iterative design?
Many projects use evidence of student learning to improve resources, materials, and tools. Few, however, develop evidence of how educators implement tools that is then used to inform refinement of the tools. Implementation evidence should focus on what educators choose to implement, how they adapt materials to fit their circumstances, and why they make the choices and adaptations they do. It should be informed by theory (see Page 4 guidance), which is used to help inform iterative design. An implementation research study does more than develop evidence of fidelity, since fidelity analyses give little insight into why educators make the choices they do about implementation or into the organizational conditions that shape implementation.

Where to Learn More About DBIR

http://researchandpractice.org
http://learndbir.org
Web sites with readings, presentations, and case studies of DBIR

http://nsse-chicago.org/yearbooks.asp
NSSE Yearbook on Design-Based Implementation Research (2013)
The free introductory chapter provides the origins and key features of the approach.
The chapter on theory and methods provides an overview of potentially useful theories and methods of DBIR.
The evidence framework chapter provides some guidance for developing a systematic plan for developing and warranting claims in DBIR.

Two journal articles provide an overview of the approach:

Penuel, W. R., Fishman, B. J., Cheng, B., & Sabelli, N. (2011). Organizing research and development at the intersection of learning, implementation, and design. *Educational Researcher, 40*(7), 331-337.
Penuel, W. R., & Fishman, B. J. (2012). Large-scale intervention research we can use. *Journal of Research in Science Teaching, 49*(3), 281-304.

Key Features of Design-Based Implementation Research

These features can be used as to investigate how aspects of a proposed project follow a DBIR approach.

Teams form around a focus on persistent problems of practice from multiple stakeholders' perspectives.

- Teams are comprised broadly and can include teachers, school and district leaders, researchers, students, and community members.
- Identifying problems requires ongoing negotiation, with careful attention to issues of authority and power in who defines problems and possible solutions.
- Problem identification can benefit from carefully orchestrated processes to identify root causes, key change drivers, and practical theories of action.

To improve practice, teams commit to iterative, collaborative design.

- The ultimate aim of design is to improve teaching and learning practice, at scale, even though the work can start small.
- The objects of design typically encompass both materials for students and the professional development and other supports needed to implement curricula and programs with integrity.
- Design process should allow teams to "get things basically right fast" and/or "fail early and fail often."
- Design process should be participatory, involving as many of the relevant stakeholder groups as is feasible.

As a strategy for promoting quality in the research and development process, teams develop theory related to both classroom learning and implementation through systematic inquiry.

- DBIR gives a central role to the production of research and evidence that informs (but does not determine) changes to design.
- Theory both guides and emerges from design and the implementation of programs and curricula.
- For any given problem of practice, multiple theories are likely to be needed but especially a theory of implementation.
- Any resources, materials, or tools developed through DBIR embody testable conjectures about learning and implementation.

Design-based implementation research is concerned with developing capacity for sustaining change in systems.

- One strategy for promoting sustainability of designs is to develop capacity through intentional efforts to develop organizational routines and processes that help innovations travel through a system.
- Capacity for continuous improvement is an attribute of the larger system that includes researchers, not just the field of practice.

DBIR Questions and Methods Mapped to Different Phases of Research

Phase of Research	Potential Research Questions	Potentially Useful Methods / Data
Exploratory: Negotiating the Focal Problem of Practice	What problem of practice should be the focus of our joint work?	Analyses of available data from multiple sectors Research evidence related to domain learning Perspectives and values of stakeholders (including non-school actors) Improvement science methods: Root Cause Analysis Change Laboratories
Design and development: Co-design	What should be the focus of our work? To what extent do teams leverage the diverse expertise of stakeholders? What co-designed tools might help address the shared problem of practice?	Documentation of design rationales Participatory design routines Ethnographic analyses of the co-design work
Design and development: Early implementation research	How do implementers adapt the innovation to their local contexts? How do implementers use the innovation to reconstruct their practice? What are the appropriate measures of impact from early cycles of improvement?	Observations and analysis of implementation Interviews Practitioner documentation of enactment Principled assessment design (e.g., evidence-centered design, construct modeling)
Efficacy	What is the potential impact of the innovation on teaching and learning? What mediates impacts on learning?	Randomized Controlled Trials Interrupted Time Series Designs Explanatory Case Studies
Effectiveness and Scale Up	What supports are needed to implement the program effectively across a system? What are the conditions for sustainability?	Experimental comparisons of different means of support Explanatory comparative case analysis

Potentially Relevant Theories and Frameworks for DBIR

The list below is a sample of theories and conceptual frameworks that are relevant for use within and across different levels of systems. The list is not exhaustive, but comparing theories across frameworks can give proposal teams a sense of how theories differ, depending on the level they target.

Theories and Frameworks Related to Children and Youth's Learning

Leveraging everyday ways of thinking and doing to support disciplinary learning (Nasir, Rosebury, & Lee, 2007)
Local instruction theories developed for teaching particular ideas (Gravemeijer, 2004)
Productive persistence and learning (Yeager & Dweck, 2012)
Supporting learning across settings (Azevedo, 2013; Bell, Tzou, Bricker, & Baines, 2012; Ito et al., 2013)
Learning as making and producing (Kafai, 2006)

Theories and Frameworks Related to Teacher Learning

Pedagogical design capacity development (Brown, 2009)
Theories of curriculum use (Davis & Krajcik, 2005; Remillard, 2000, 2005)
Professional learning communities (Grossman, Wineburg, & Woolworth, 2001; Horn & Little, 2010)

Teachers Related to Organizational Change and Diffusion

Sensemaking (Coburn, 2001; Weick, 1995)
Institutional theory (DiMaggio & Powell, 1983; March & Olsen, 1984; Spillane & Burch, 2006)
Distributed leadership (Spillane, 2006; Spillane, Halverson, & Diamond, 2001)
Social capital theory (Coburn & Russell, 2008; Frank, Zhao, & Borman, 2004; Lin, 2001)

Theories that Relate Changes Across Levels of Systems

Learning as transformation of participation in changing practices (Lave, 2012; Lave & Wenger, 1991; Rogoff, 1995)
Cultural-Historical Activity Theory (Cole & Engeström, 2006; Engeström & Sannino, 2010)
Learning in complex adaptive systems (Eidelson, 1997; Lemke & Sabelli, 2008; Maroulis et al., 2010)

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Talking Points for Different Audiences About Potential of RPPs

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The potential value of research-practice partnerships varies by stakeholder group. Understanding these groups' concerns is key to persuading them to invest in a partnership approach to research and development. The talking points below are statements grounded in research on the dynamics and outcomes successful partnerships, though they are certainly not true of all partnerships. You can use them as guides to craft a "pitch" to a local policymaker, a state policymaker, or a prospective partner that includes additional information about the specifics of the investment you want someone to make in a partnership.

Local and State Policymakers

- The involvement of external researchers in an improvement effort can give us a neutral, independent voice on its impacts.
- In a partnership, we can answer research questions we care about.
- Researchers are accountable to help us focus on our problems.
- We can trust researchers working in close partnership with us to be sensitive to political issues relevant to the district.
- Research partners can inform design of complex policy initiatives with multiple moving parts.
- Research partners can help us identify evidence-based programs to implement that are a good fit to our district or state's needs.
- Research partners help guide decisions about where to direct resources and funding for an existing problem but no existing intervention exists.
- Research partners can conduct research during the development of a policy or initiative to help improve it.
- Research partners can inform the design of policies and RFPs for grant programs in ways that reflect research evidence for a given area.
- Access to researchers can strengthen messages to support particular initiatives.
- Research partners can share evidence with us from other states about how to bring things to scale at the level of a state.

Education Leader (potential partner)

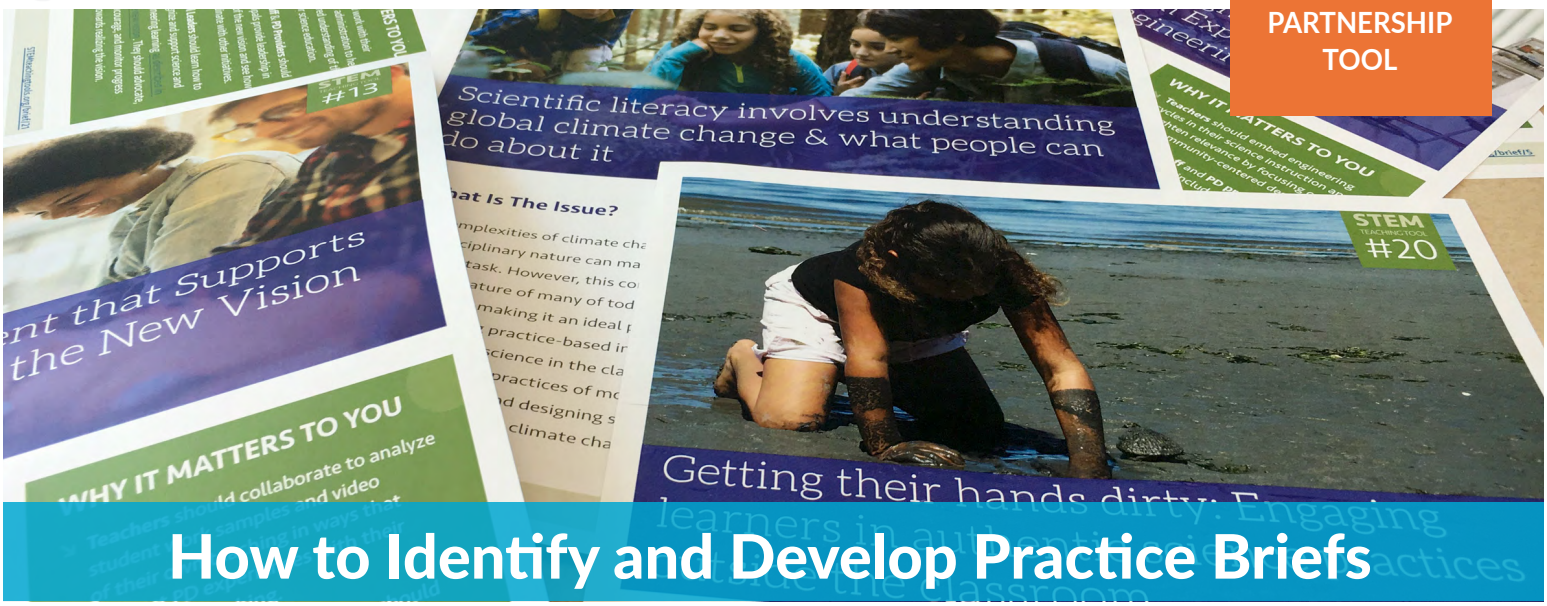
- A research partner can help us to identify evidence-based programs to implement in a range of areas.
- A research partner brings resources (e.g., staffing, professional development design and delivery, and other resources) to implement initiatives we already have going on.
- Research partners can help us to develop and test effective interventions that address problems of practice.

- Research partners can be thought partners on issues of concern to the district.
- Research partners can help broker access to others in the research world.

A Principal Investigator (potential research partner)

- Education leaders are in a position to make an impact on practice that is informed by research.
- Education leaders can bring research alive, so that it does not just sit in a journal that few people read.
- The direct involvement of education leaders in research can make for more compelling grant proposals.
- The questions to ask in research will be more relevant and useful to educators you want to reach.

PARTNERSHIP TOOL



How to Identify and Develop Practice Briefs

About This Tool

Purpose: To provide a "how to" document for identifying and authoring practice briefs that can be used to support practitioners and researchers in their educational improvement activities.
Audience: Members of a partnership responsible for authoring and/or editing resource collections related to the work.
When to Use: When a partnership is developing insights and approaches that are ready to be more broadly shared with educational practitioners.

What Is a Practice Brief?

A "practice brief" is a short document designed to support educators with research-based information as they improve their practice and work to give all students access to meaningful learning experiences.

With that goal in mind, each brief should:

- Integrate a focus on equity throughout each tool
- Focus on a specific, broadly felt problem of educational practice
- Gather the best knowledge from both research and practice to help readers more fully understand each issue
- Highlight what people in different roles can do to address this problem of practice, providing context, actionable advice, strategies, and tools, all of which should connect to educators' everyday work
- Suggest ways to take action with respect to the problem of practice by linking off to other tools, articles, websites, and resources
- Prompt further reflection and support discussion among colleagues

Who Uses Practice Briefs?

Practice briefs are designed to meet a variety of needs in education. While several of their uses are detailed below, we also encourage users to employ them creatively in ways that fit their goals and context.

- Individuals can use briefs to reflect on and refine their practice. Briefs can help educators align their teaching with the latest knowledge from both research and practice and make their instruction more equitable.
- Professional development sessions, professional learning communities, and project meetings can use practice briefs to spark conversation and brainstorm about a particular topic or to focus discussion and promote a shared understanding.

- School, district, informal, or state education leaders can use practice briefs to orient themselves to particular issues or problems of practice and consider ways to support their teachers. Practice brief authors may want to include a section in each tool specifically aimed at school and district leadership, offering insights into how district-level staff and PD providers might help support implementation of the suggestions in each brief.
- Pre-service teachers and educational researchers can use practice briefs to better understand the challenges educators regularly face, making them more aware of problems of educational practice and introducing possible approaches and tools.
- Organizations can offer practice briefs as small "nuggets" of helpful suggestions for their members, embedding them into email newsletters, websites, or social media outreach.

Practice brief creators should also consider authoring practice briefs aimed specifically at particular parts of the educational ecosystem, like informal educators or assessment designers. Consider bundling or tagging your tools to help users find related resources. For example, STEM Teaching Tools include tags like "Assessment" and "Informal Education" to help users locate the information most relevant to them.

Part 1: How to Launch a Brief Development Initiative

Step 1: Learn About Why a Brief Development Initiative is a Useful Partnership Activity

Research-practice partnerships investigate and work on problems of practice that impact teaching and learning in educational settings. These partnerships can develop useful insights and tools based on close collaboration between researchers and practitioners.

Academic papers may not be the most straightforward way for busy educators to find or process information. Practice briefs allow research-practice partnerships to share research-based knowledge from their work quickly and straightforwardly with educators who can readily use the information to inform their practice.

For example, read more about the impetus for the STEM Teaching Tools practice brief initiative, a project of the Research + Practice Collaboratory.

Step 2: Identify the Audience, Purpose, and Structure for the Practice Briefs

Identify the desired communication initiatives for the partnership. Briefs about research and practice have been shown to be useful resources for educational improvement projects. Practice briefs—of the kind discussed here—frame a problem of practice, identify relevant ideas and resources, and prompt practitioner reflection. Research briefs, on the other hand, synthesize existing research around topics and problems of practice in order to highlight known problems or findings that can inform progress.

For a particular practice brief project, formally identify your audience, purpose, and scope. A brief creation project often emerges out of a long-term relationship between researchers and practitioners. This relationship could take the form of a university-district partnership, a collaboration between researchers and educator professional associations, or inquiry group meetings on topics that bring researchers and practitioners together. Importantly, this foundation can help participants better imagine or envision their audience—as researchers already have had close, frequent interactions with practitioners. This preexisting relationship can also help a practice brief creation project identify potential authors from a variety of backgrounds, both in research and practice.

Once audience, purpose, and scope have been identified, develop a desired structure and template for the briefs. Again, if a practice brief creation grows out of a preexisting research-practice partnership, participants are likely to be better-equipped to identify what categories of information practitioners need and what type of knowledge researchers and practitioners will be able to provide.

Step 3: Get Feedback from Stakeholders on the Approach

Develop a sample practice brief using the template created in Step 2. Put it through an iterative pilot testing process to "tune" the approach to the needs of all of the intended audiences.

Step 4: Identify an Editorial and Production Team

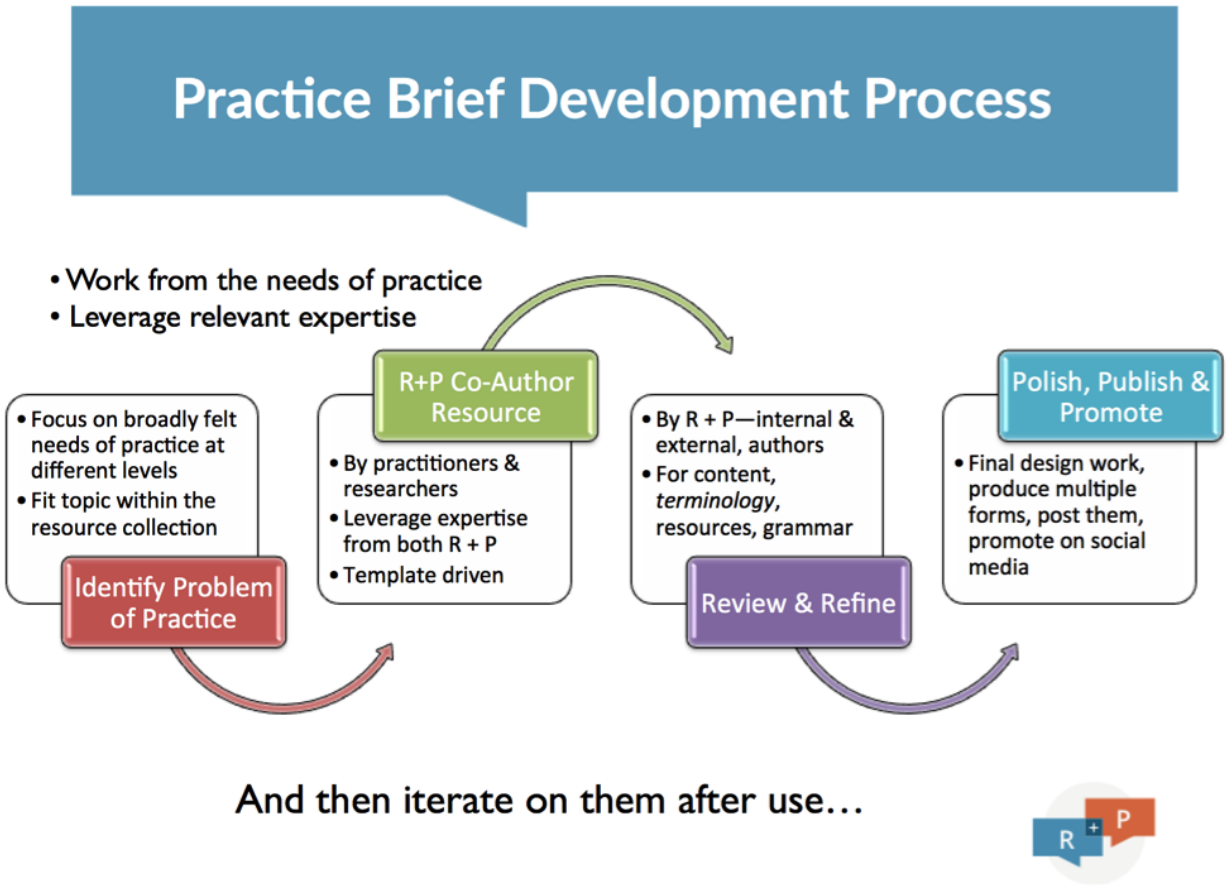
Develop the authoring, editorial, and production strategy for your initiative. Your editorial team should be a small group of both practitioners and researchers to be involved in the editing process of every brief. This

consistent editorial voice helps keep the tone and style of the briefs uniform across the collection.

The authors of your briefs should involve a variety of diverse voices from both research and practice. This group should be involved in identifying brief topics and in the writing of the briefs.

A production team should develop a structured template for the layout of the briefs. A similar design approach to all briefs allows readers to more easily navigate and use the collection over time.

Part 2: How to Author a New Practice Brief



Step 1: Identify a Problem of Educational Practice to Focus On

The goal with each brief is to develop a resource that will support educational progress around broadly felt problems of educational practice. The identified problem or topic should be grounded in the needs of practitioners (classroom teachers, informal educators, district staff, etc.)—and not in what researchers simply believe to be relevant to practitioners.

The selected focus for the brief should also fit coherently into the broader collection of resources being developed. This helps ensure that the brief collection can serve as an ongoing learning resource in support of deeper learning and capacity building (e.g., by having individuals read a sequence of briefs).

Consider the scope of a particular brief carefully. Can it be adequately covered in the space laid out in your brief template? If not, you may consider breaking it up into smaller topics. However, you may elect to not feel completely bound by your template either; if a brief would be more helpful to your readers if you expanded the word count or change the template, you might elect to alter it or develop a non-standard brief.

Step 2: Researchers and Practitioners Co-Author an Initial Draft

Practice briefs are intentionally designed to include the most relevant knowledge from both research and practice in ways that illuminate and resource progress on the identified problem of practice. The best strategy to ensure this is for the briefs to be co-authored by

researchers and practitioners—from initial brainstorming to writing and through refinement. This allows for the knowledge from academic practice and from teaching practice to be leveraged and coordinated in the brief. As mentioned above, we recommend using a structured template for the layout of a brief.

Step 3: Review and Refine the Draft Through Internal and External Review

The editor/editorial team of the collection should deeply review and revise the brief in order for it to be further focused, elaborated, edited down, articulated with other briefs, and aligned to broader educational vision documents as appropriate (e.g., *The Framework for K-12 Science Education*). (For more on creating an editorial team, see Part 1, Step 4, above.)

If the editor is a researcher, a review pass should then be made by a practitioner to weed out unnecessary technical terms and to focus the language used on terms of practice. Technical academic language should be used strategically, as absolutely necessary. The revised brief is then sent to out for external review by researchers and practitioners with relevant expertise. They are asked to suggest refinements to the texts and tools referenced in the brief. The editor incorporates the reviewer feedback and produces an updated brief draft. This includes identifying the full set of potential images and external resources that are to be linked to. The document is then proofread for grammar and style.

Finally, the original authors are provided with the opportunity to refine the penultimate draft of the brief. The editor takes their suggested final edits and produces the final brief to the published.

Step 4: Polish, Publish, and Promote the Brief

The final production design work is completed for the brief—layout, linking, imagery, etc. A single brief might be represented in both web and standalone document forms—depending on the approach.

The brief is published in relevant outlets, probably including social media, in ways that fit the resource distribution strategy. Establishing partnerships with professional associations that serve practitioners is a very productive way to disseminate the practice briefs. Developing a systematic social media strategy is also a worthwhile investment of time and effort as a way to connect directly with practitioners.

This work was created as part of the Research + Practice Collaboratory project. The Research + Practice Collaboratory brings educators and researchers together to develop more equitable innovations for STEM teaching and learning. Learn more at researchandpractice.org.

The Research + Practice Collaboratory is supported by the National Science Foundation (NSF) under grant DUE-1238253 and DRL-1626365. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the NSF.

Part 3: Sample Practice Brief Template

This template is based on an existing Research+Practice Collaboratory brief collection called STEM Teaching Tools. Template features may be more or less appropriate, depending on the specific strategy being employed.

STEM Teaching Tools Template

Based on STEM Teaching Tool #3, stemteachingtools.org/brief/3

What is the Issue? Concise title and description of the problem of practice, topic, or issue

Things to Consider: Knowledge from research and practice about the topic/issue, highlighting what educators need to know

Specific Guidance: Explicit steps that educators can take, and tools to support relevant work

Links to Related Resources: Other related resources in the practice brief collection

STEM TEACHING TOOLS #3

Practices Should Not Stand Alone: How to Sequence Practices in a Cascade to Support Student Investigations

What Is The Issue?

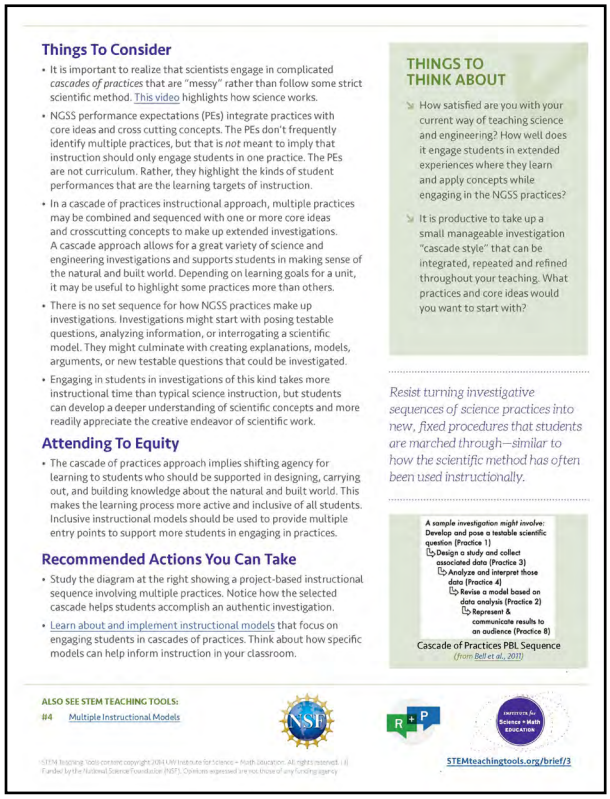
The science and engineering practices in the NGSS should strongly shape instruction—and be integrated with disciplinary core ideas and cross-cutting concepts. But some people might treat the practices as "stand alone" activities to engage students in. Research shows that it is more effective to think about designing instruction as a *cascade of practices*. Practices should be sequenced and intertwined in different ways to support students in unfolding investigations.

WHY IT MATTERS TO YOU

- **Teachers** should intertwine and sequence multiple scientific practices in their teaching in ways that integrate the conceptual ideas of science.
- **District staff** and **PD providers** should highlight for teachers that students' productive engagement in scientific practices can overlap and seem messy
- **School leaders** should understand that a "cascade of practices" approach looks different from the "scientific method" instruction that administrators may be more familiar with.

BY PHILIP BELL AND KATIE VAN HORNE | SEPTEMBER 2014 STEMteachingtools.org/brief/3

Why it Matters to You? Rationale for how/why the issue is important for different stakeholders in education



Things To Consider

- It is important to realize that scientists engage in complicated *cascades of practices* that are "messy" rather than follow some strict scientific method. This video highlights how science works.
- NGSS performance expectations (PEs) integrate practices with core ideas and cross cutting concepts. The PEs don't frequently identify multiple practices, but that is *not* meant to imply that instruction should only engage students in one practice. The PEs are not curriculum. Rather, they highlight the kinds of student performances that are the learning targets of instruction.
- In a cascade of practices instructional approach, multiple practices may be combined and sequenced with one or more core ideas and crosscutting concepts to make up extended investigations. A cascade approach allows for a great variety of science and engineering investigations and supports students in making sense of the natural and built world. Depending on learning goals for a unit, it may be useful to highlight some practices more than others.
- There is no set sequence for how NGSS practices make up investigations. Investigations might start with posing testable questions, analyzing information, or interrogating a scientific model. They might culminate with creating explanations, models, arguments, or new testable questions that could be investigated.
- Engaging in students in investigations of this kind takes more instructional time than typical science instruction, but students can develop a deeper understanding of scientific concepts and more readily appreciate the creative endeavor of scientific work.

Attending To Equity

- The cascade of practices approach implies shifting agency for learning to students who should be supported in designing, carrying out, and building knowledge about the natural and built world. This makes the learning process more active and inclusive of all students. Inclusive instructional models should be used to provide multiple entry points to support more students in engaging in practices.

Recommended Actions You Can Take

- Study the diagram at the right showing a project-based instructional sequence involving multiple practices. Notice how the selected cascade helps students accomplish an authentic investigation.
- Learn about and implement instructional models that focus on engaging students in cascades of practices. Think about how specific models can help inform instruction in your classroom.

THINGS TO THINK ABOUT

- How satisfied are you with your current way of teaching science and engineering? How well does it engage students in extended experiences where they learn and apply concepts while engaging in the NGSS practices?
- It is productive to take up a small manageable investigation "cascade style" that can be integrated, repeated and refined throughout your teaching. What practices and core ideas would you want to start with?

Resist turning investigative sequences of science practices into new, fixed procedures that students are marched through—similar to how the scientific method has often been used instructionally.

Cascade of Practices PBL Sequence (from Bell et al., 2011)

ALSO SEE STEM TEACHING TOOLS:
#4 Multiple Instructional Models

STEMteachingtools.org/brief/3

Reflection Questions: Prompts or quotes related to the topic that support educator reflection and discussion about their practice

Equity: Highlight the equity dimensions of the topic explicitly in every brief

Convincing the Public of the Importance of Research-Practice Partnerships

William R. Penuel, University of Colorado Boulder
Dan Gallagher, Seattle Public Schools

Partnerships do not always address problems that, when fixed, make for good nightly news stories. One reason why is that partnerships often focus on implementation of initiatives, and most people and journalists think of implementation something simple and straightforward, certainly not newsworthy.

A recent report of the FrameWorks Institute (http://www.frameworksinstitute.org/) called *Just Do It: Communicating Implementation Science and Practice* note that many people believe that implementation is a matter of just doing what works. Below is a brief outline of an argument related to how to counter that belief, appealing to values of innovation and ingenuity that the Frameworks Institute argues can help the public appreciate the importance of tackling problems of implementation.

Our argument outline focuses on adapting the argument to address why the work of partnerships in improving implementation is important for education. Your argument will need to be more specific, tailored to how your partnership is supporting implementation of a particular program or initiative.

Argument Outline for Partnerships:

- Problems of implementation make many programs less effective than they could be.
- The complexity of educational system leads to many problems of implementation.
- Partnerships engage, even embrace, complexity with innovative, evidence-based strategies.
- There's a need to apply ingenuity and innovation to problems of implementation, and partnerships can generate novel solutions to persistent problems.
- They develop new solutions, because they bring people together who don't normally think and work together but who have relevant expertise to solve big problems.
- In the past, partnerships have developed effective solutions to problems of implementation, resulting in big improvements to outcomes. That can happen here, too, if we invest in partnerships to solve our problems of implementation.