



Building Evidence Systems to Integrate Implementation Research and Practice in Education

Norma Ming

Research, Planning, and Assessment, San Francisco United School District

**Building Evidence Systems to Integrate
Implementation Research and Practice in
Education**

Norma Ming

*Research, Planning, and Assessment, San Francisco
United School District*

Suggested Citation:

Ming, N. (2023). *Building evidence systems to
integrate implementation research and practice in
education*. William T. Grant Foundation.

AMID PERSISTENT AND EXPANDING INEQUITIES in education, the urgency of improving practice likewise grows, along with demands for better research use (ESSA, 2015). As a field, we need to improve not just the quality of research evidence (Ming & Goldenberg, 2021), but also the quality of research use and the processes supporting effective implementation of evidence-based practices. Whether framed as a problem of practice or research use, understanding implementation is critical for identifying and redressing the inequitable distribution of resources, facilitators, and barriers in our systems, which give rise to disparities in student outcomes.

Applying implementation science to education

Analyzing education through the lens of implementation science illustrates its potential for addressing fundamental challenges in education (Century & Cassata, 2016). Learning emerges from rapidly-changing experiences and high-intensity social interactions, which requires instruction to continually adapt. These adaptations vary in content and impact, possibly improving quality or undermining fidelity (Hill & Erickson, 2020; LeMahieu, 2011; O'Donnell, 2008; Penuel & Means, 2004). The complex social dynamics in classrooms and schools further compound the variation: Teaching is “dense with discretionary spaces,” in which educators make hundreds of micro-decisions daily (Ball, 2018). These decisions are mediated by how educators interpret them, emphasizing the importance of alignment between their conceptual understanding and the theory underlying the practice, to avoid misconceptions, biases, and inequities (Cohen, 1990; Jones & Wiliam, 2022).

Understanding and managing this variation requires moving one step back in the causal chain, as heterogeneity and adaptations occur not just on the level of “what works” for students (educational practices), but also on the level of “how to make it work” by educators and school systems (implementation strategies). Alongside staff quality and capacity, school success depends on other factors such as instructional systems, school climate, and community partnerships (Bryk et al., 2010). These are further shaped by organizational models (Rowan & Miller, 2007), governance (Mitra, 2022), finance (Baker et al. 2014; Lafortune et al., 2018), and myriad policies around standards (Darling-Hammond 2004), certification (Cochran-Smith et al., 2015), data use (Marsh et al., 2006), school turnaround (Redding & Nguyen, 2020), and other factors. These strategies may be provided in idiosyncratic combinations yet evaluated in isolation (or vice versa), complicating efforts to clarify which strategies are more effective under which conditions. Without a coherent understanding of the interplay across these multilevel strategies, we risk leaving educational improvement up to chance.

Implications

Applying implementation frameworks to improve education research and practice requires a shift in our approach to conceptualizing, producing, and using evidence. These span systems for data collection, evidence generation, and knowledge sharing.

First, we need more evidence that extends beyond the adoption phase to encompass the implementation phase (Aarons et al., 2011; Moullin et al., 2015).

This applies to both guiding intended implementation and documenting actual implementation. Studies demonstrating evidence of impact may not include sufficiently detailed evidence about implementation, especially to support adaptation (Ming & Goldenberg, 2021). Reporting guidelines can establish minimum standards for both synthesizing and applying the research (e.g., Hoffman et al., 2014; Michie et al., 2009; Phillips et al., 2016). More substantively, educators need to unpack the “black box” of programs to identify which components are essential (Chorpita et al., 2005; McLeod et al., 2017) and which adaptations are warranted (Chambers et al., 2013; Stirman et al., 2019). This requires greater clarity around the theories guiding implementation (Nilsen, 2015), as the transferability¹ of knowledge across settings depends on coherent ontologies for structuring that knowledge (NASEM, 2022b). As educators are perpetually adapting practices to fit their local contexts, tracing these adaptations over time and capturing their rationales offers a valuable stream of evidence to enrich our understanding of what works and why.

Second, we need better evidence about the relationships between factors influencing successful implementation and strategies to support it. Since adoption and implementation decisions are often made by different people facing different information and demands, locating and bridging those gaps is essential. Implementation science offers frameworks for examining interventions to shape individual-level behaviors (Michie et al., 2011); taxonomies of strategies for implementing systems-level change (Powell et al., 2012, 2015; Waltz et al., 2015); and protocols for mapping effective strategies to address specific implementation determinants (Fernandez et al., 2019; Kok et al., 2015). Examples include training, facilitation, audit and feedback, infrastructure, incentives, and regulation, which have close analogues in education. Some strategies may target individual-level knowledge, attitudes, and skills of implementers, while others may target organizational-level culture, communication, or information systems. Applying implementation science offers opportunities to build coherence and clearer connections across such diverse literatures as workforce development, standards and accountability, curriculum design, resource allocation, and school reform. Bridging these fields can yield better guidance for tailoring strategies across multiple levels of the system to support implementation.

¹ I use “transferability” rather than “generalizability” to recognize the legitimacy of rigorous small-sample methods which do not claim to generalize across multiple populations or settings, as well as the practical reality that the heterogeneity of educational phenomena and practices demands local adaptation (for further discussion, see Ming & Goldenberg, 2021).

Third, we need to rethink our broader evidence systems to shift norms in education practice and research. These encompass expectations for evidence, infrastructure to support gathering evidence, and mechanisms for knowledge exchange.

Expectations for evidence

Whether due to political concerns or capacity constraints, districts typically do not collect or share data systematically about the conditions and practices inside classrooms and schools. Even if well intentioned, the hyper-focus on student outcomes leaves invisible the root causes leading to those outcomes. Meanwhile, narrow standards of rigor in education research privilege controlled experiments of interventions over nuanced descriptions of the complex interactions in systems. We need to blend multiple forms of evidence across multiple levels, developing a continuum between research standards and practical standards for useful knowledge to improve implementation.

Evidence infrastructure

Establishing practical methods for collecting useful implementation data requires building systems based on a trustworthy, understandable structure for organizing and connecting data across different levels. Some efforts range from fine-grained learning process data from digital platforms (Steinkuehler, 2017), to data schemas for education technology research and development (BIRD-E, 2022), to ontologies for characterizing behaviors (NASEM, 2022b) and core components (Scher & Martinez, 2022). Yet educators also need flexible platforms for rapidly collecting and visualizing practical measures of processes for continuous improvement (Takahashi et al., 2022). Beyond the technical infrastructure of measurement standards and data systems, they need a social infrastructure for collecting implementation data efficiently and reliably. Since this is difficult to operationalize at scale, researchers could help develop guidance for practical sampling strategies, along with collaboratively training educators in collecting the data as part of their professional practice.

Mechanisms for knowledge exchange

Strengthening connections across the research and practice communities would further support capturing and learning from variation in implementation. A translational research-to-practice “push” model might frame this as educators adopting evidence-based practices, then testing adaptations locally (Lavis et al., 2003). However, the knowledge gained from those adaptations may not be consistently evaluated or shared elsewhere. A “pull” model might position practitioners as demanding that researchers study more useful questions for their contexts (Snow, 2016). Still, the supply of researchers and the timescale of co-

production are dwarfed by the sheer diversity in implementation. An alternate approach could cultivate more practice-based evidence (Green, 2008) through continuous improvement cycles, developing and sharing insights with other practitioners and researchers for ongoing study in different contexts (Bryk et al., 2011, 2015; Russell et al., 2017). Systematically investing in this capacity within education agencies would strengthen both the use of evidence in major decisions and the generation of new, practice-relevant research knowledge (Farley-Ripple et al., 2022).

Conclusion

Applying implementation science to education illuminates numerous opportunities to strengthen our evidence systems to better support practice and research. As described here, the most immediate goal is to improve education practice and outcomes (engineering). A second goal is to advance the evidence base in education about what works, for whom, under what conditions, and why, in order to achieve success more consistently (science). A third goal is to advance the evidence base about research use and impact in education so that decision-makers may use evidence more reliably to improve practice (meta-science).

Collectively, these transformations offer promise for creating a more robust system for integrating research and practice through shared understanding and evidence about implementation. Achieving these changes at scale requires funders and policymakers to align resources and incentives with these goals. This will support the research and practice communities in collaborating to rebuild and repair our educational systems to achieve more equitable outcomes through more equitable implementation.

References

- Aarons, G. A., Hurlburt, M., & Horwitz, S. M. (2011). Advancing a conceptual model of evidence-based practice implementation in public service sectors. *Administration and Policy in Mental Health and Mental Health Services Research*, 38(1), 4-23. <https://doi.org/10.1007/s10488-010-0327-7>
- Baker, B. D., Sciarra, D. G., & Farrie, D. (2014). *Is school funding fair? A national report card*. Education Law Center. <https://eric.ed.gov/?id=ED570455>
- Ball, D.L. (2018 Apr 15). *Just dreams and imperatives: The power of teaching in the struggle for public education*. Presidential address at Annual Meeting of the American Educational Research Association. New York.
- Bartanen, B., Grissom, J. A., & Rogers, L. K. (2019). The impacts of principal turnover. *Educational Evaluation and Policy Analysis*, 41(3), 350–374. <https://doi.org/10.3102/0162373719855044>
- Belsha, K. (2022 Mar 25). Hiccups and hard lessons: What it takes to bring big new tutoring programs to America's classrooms. *Chalkbeat*. <https://www.chalkbeat.org/2022/3/25/22995221/tutoring-pandemic-academic-recovery-recruiting-training-challenges>
- Blueprint for Inclusive Research and Development in Education, BIRD-E. (2022). <https://www.bird-e.org/>
- Bryk, A., Sebring, P. B., Allensworth, E. L., Luppescu, S. S., & Easton, J. (2010). *Organizing schools for improvement: Lessons from Chicago*. University of Chicago Consortium on Chicago School Research.
- Bryk, A. S., Gomez, L. M., & Grunow, A. (2011). Getting ideas into action: Building networked improvement communities in education. In *Frontiers in sociology of education* (pp. 127-162). Springer, Dordrecht.
- Bryk, A. S., Gomez, L. M., Grunow, A., & LeMahieu, P. G. (2015). *Learning to improve: How America's schools can get better at getting better*. Harvard Education Press.
- Carver-Thomas, D., & Darling-Hammond, L. (2017). *Teacher turnover: Why it matters and what we can do about it*. Learning Policy Institute.
- Century, J., & Cassata, A. (2016). Implementation research: Finding common ground on what, how, why, where, and who. *Review of Research in Education*, 40(1), 169-215. <https://doi.org/10.3102/0091732X16665332>
- Chambers, D. A., Glasgow, R. E., & Stange, K. C. (2013). The dynamic sustainability framework: addressing the paradox of sustainment amid ongoing change. *Implementation Science*, 8(1), 1-11. <https://doi.org/10.1186/1748-5908-8-117>

- Chorpita, B. F., Daleiden, E. L., & Weisz, J. R. (2005). Identifying and selecting the common elements of evidence based interventions: A distillation and matching model. *Mental Health Services Research*, 7(1), 5-20. <https://doi.org/10.1007/s11020-005-1962-6>
- Cochran-Smith, M., Villegas, A. M., Abrams, L., Chavez-Moreno, L., Mills, T., & Stern, R. (2015). Critiquing teacher preparation research: An overview of the field, part II. *Journal Of Teacher Education*, 66(2), 109-121. <https://doi.org/10.1177/0022487114558268>
- Cohen, D. K. (1990). A revolution in one classroom: The case of Mrs. Oublier. *Educational Evaluation and Policy Analysis*, 12(3), 311-329. <https://doi.org/10.3102/01623737012003311>
- Curran, G. M. (2020). Implementation science made too simple: A teaching tool. *Implementation Science Communications*, 1(1), 1-3. <https://doi.org/10.1186/s43058-020-00001-z>
- Damschroder, L. J., Aron, D. C., Keith, R. E., Kirsh, S. R., Alexander, J. A., & Lowery, J. C. (2009). Fostering implementation of health services research findings into practice: A consolidated framework for advancing implementation science. *Implementation Science*, 4(1), 1-15. <https://doi.org/10.1186/1748-5908-4-50>
- Darling-Hammond, L. (2004). Standards, accountability, and school reform. *Teachers College Record*, 106(6), 1047-1085. <https://doi.org/10.1111/j.1467-9620.2004.00372.x>
- Darling-Hammond, L., Wechsler, M. E., Levin, S., & Tozer, S. (2022). *Developing Effective Principals: What Kind of Learning Matters?* Learning Policy Institute. <https://eric.ed.gov/?id=ED620192>
- Domitrovich, C. E., Bradshaw, C. P., Poduska, J. M., Hoagwood, K., Buckley, J. A., Olin, S., ... Ialongo, N. S. (2008). Maximizing the implementation quality of evidence-based preventive interventions in schools: A conceptual framework. *Advances in School Mental Health Promotion*, 1(3), 6-28. <https://doi.org/10.1080/1754730X.2008.9715730>
- Every Student Succeeds Act. (2015). *Every Student Succeeds Act of 2015, Pub. L. No. 114-95 §114 Stat. 1177 (2015–2016)*. <https://www.congress.gov/114/plaws/publ95/PLAW-114publ95.pdf>
- Farley-Ripple, E., Ming, N., Goldhaber, D., Sarfo, A.O., & Arce-Trigatti, P. (2022). *Building Capacity for Evidence-Informed Improvement: Supporting State and Local Education Agencies*. <https://crue.cehd.udel.edu/wp-content/uploads/2022/10/Building-Capacity-for-Evidence-Informed-Improvement-October-2022-1.pdf>

- Fernandez, M. E., Ten Hoor, G. A., Van Lieshout, S., Rodriguez, S. A., Beidas, R. S., Parcel, G., ... Kok, G. (2019). Implementation mapping: using intervention mapping to develop implementation strategies. *Frontiers in Public Health*, 7, 158. <https://doi.org/10.3389/fpubh.2019.00158>
- Fixsen, D. L., Naoom, S. F., Blase, K. A., Friedman, R. M., & Wallace, F. (2005). *Implementation research: A synthesis of the literature*. University of South Florida, Louis de la Parte Florida Mental Health Institute, The National Implementation Research Network (FMHI Publication #231). <https://nirn.fpg.unc.edu/sites/nirn.fpg.unc.edu/files/resources/NIRN-MonographFull-01-2005.pdf>
- Grimshaw, J.M., Eccles, M.P., Lavis, J.N., Hill, S.J., & Squires, J.E. (2012). Knowledge translation of research findings. *Implementation Science* 7, 50. <https://doi.org/10.1186/1748-5908-7-50>
- Grissom, J. A., & Harrington, J. R. (2010). Investing in administrator efficacy: An examination of professional development as a tool for enhancing principal effectiveness. *American Journal of Education*, 116(4), 583-612. <http://dx.doi.org/10.1086/653631>
- Hill, H. C., & Erickson, A. (2019). Using implementation fidelity to aid in interpreting program impacts: A brief review. *Educational Researcher*, 48(9), 590–598. <https://doi.org/10.3102/0013189X19891436>
- Hitt, D. H., & Tucker, P. D. (2016). Systematic review of key leader practices found to influence student achievement: A unified framework. *Review of Educational Research*, 86(2), 531-569. <https://doi.org/10.3102/0034654315614911>
- Hoffmann, T. C., Glasziou, P. P., Boutron, I., Milne, R., Perera, R., Moher, D., ... Michie, S. (2014). Better reporting of interventions: template for intervention description and replication (TIDieR) checklist and guide. *BMJ*, 348 g1687. <https://doi.org/10.1136/bmj.g1687>
- Huguet, A., Coburn, C. E., Farrell, C. C., Kim, D. H., & Allen, A. R. (2021). Constraints, values, and information: How leaders in one district justify their positions during instructional decision making. *American Educational Research Journal*, 58(4), 710-747. <https://doi.org/10.3102/0002831221993824>
- Jones, K., & Wiliam, D. (2022 Oct 13). Lethal mutations in education and how to prevent them. Evidence-Based Education. <https://evidencebased.education/lethal-mutations-in-education-and-how-to-prevent-them/>
- Kennedy, M. M. (2016). How does professional development improve teaching? *Review of Educational Research*, 86(4), 945-980. <https://doi.org/10.3102/0034654315626800>

- Kennedy, M. M. (2019). How we learn about teacher learning. *Review of Research in Education*, 43(1), 138–162. <https://doi.org/10.3102/0091732X19838970>
- Kok, G., Gottlieb, N. H., Peters, G. J. Y., Mullen, P. D., Parcel, G. S., Ruiter, R. A., ... Bartholomew, L. K. (2016). A taxonomy of behaviour change methods: an intervention mapping approach. *Health Psychology Review*, 10(3), 297–312. <https://doi.org/10.1080/17437199.2015.1077155>
- Lafortune, J., Rothstein, J., & Schanzenbach, D. W. (2018). School finance reform and the distribution of student achievement. *American Economic Journal: Applied Economics*, 10(2), 1–26. <https://doi.org/10.1257/app.20160567>
- Lavis, J. N., Robertson, D., Woodside, J. M., McLeod, C. B., & Abelson, J. (2003). How can research organizations more effectively transfer research knowledge to decision makers? *The Milbank Quarterly*, 81(2), 221–248. <https://doi.org/10.1111/1468-0009.t01-1-00052>
- LeMahieu, P. (2011). What we need in education is more integrity (and less fidelity) of implementation. *Carnegie Commons Blog*, 11. <https://governor.hawaii.gov/wp-content/uploads/2016/09/What-We-Need-In-Education-Paul-LeMahieu.pdf>
- Liebowitz, D. D., & Porter, L. (2019). The effect of principal behaviors on student, teacher, and school outcomes: A systematic review and meta-analysis of the empirical literature. *Review of Educational Research*, 89(5), 785–827. <https://doi.org/10.3102/0034654319866133>
- Loewus, L. (2019, Dec 3). Data: How reading is really being taught. *EdWeek*. <https://www.edweek.org/teaching-learning/data-how-reading-is-really-being-taught/2019/12>
- Marsh, J. A., Pane, J. F., & Hamilton, L. S. (2006). *Making sense of data-driven decision making in education: Evidence from recent RAND research*. RAND Corporation. <https://eric.ed.gov/?id=ED605450>
- McLeod, B. D., Sutherland, K. S., Martinez, R. G., Conroy, M. A., Snyder, P. A., & Southam-Gerow, M. A. (2017). Identifying common practice elements to improve social, emotional, and behavioral outcomes of young children in early childhood classrooms. *Prevention Science*, 18(2), 204–213. <https://doi.org/10.1007/s11121-016-0703-y>
- Michie, S., Fixsen, D., Grimshaw, J. M., & Eccles, M. P. (2009). Specifying and reporting complex behaviour change interventions: the need for a scientific method. *Implementation Science*, 4(1), 1–6. <https://doi.org/10.1186/1748-5908-4-40>

- Michie, S., Van Stralen, M. M., & West, R. (2011). The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implementation Science*, 6(1), 1-12. <https://doi.org/10.1186/1748-5908-6-42>
- Ming, N. C., & Goldenberg, L. B. (2021). Research worth using: (Re)framing research evidence quality for educational policymaking and practice. *Review of Research in Education*, 45(1), 129-169. <https://doi.org/10.3102/0091732X21990620>
- Mitra, D. L. (2022). *Educational change and the political process* (2nd ed.). New York: Routledge. <https://doi.org/10.4324/9781003212294>
- Moullin, J. C., Dickson, K. S., Stadnick, N. A., Rabin, B., & Aarons, G. A. (2019). Systematic review of the exploration, preparation, implementation, sustainment (EPIS) framework. *Implementation Science*, 14(1), 1-16. <https://doi.org/10.1186/s13012-018-0842-6>
- National Academies of Sciences, Engineering, and Medicine. (2022a). *The future of education research at IES: Advancing an equity-oriented science*. <https://www.nationalacademies.org/our-work/the-future-of-education-research-at-the-institute-of-education-sciences-in-the-us-department-of-education>
- National Academies of Sciences, Engineering, and Medicine. (2022b). *Ontologies in the behavioral sciences: Accelerating research and the spread of knowledge*. <https://nap.nationalacademies.org/catalog/26755/ontologies-in-the-behavioral-sciences-accelerating-research-and-the-spread-of-knowledge>
- Nilsen, P. (2015). Making sense of implementation theories, models, and frameworks. *Implementation Science*, 10(53), 1-13. <https://doi.org/10.1186/s13012-015-0242-0>
- O'Donnell, C. L. (2008). Defining, conceptualizing, and measuring fidelity of implementation and its relationship to outcomes in K-12 curriculum intervention research. *Review of Educational Research*, 78(1), 33-84. <https://doi.org/10.3102/0034654307313793>
- Penuel, W. R., & Means, B. (2004). Implementation variation and fidelity in an inquiry science program: Analysis of GLOBE data reporting patterns. *Journal of Research in Science Teaching*, 41(3), 294-315. <https://doi.org/10.1002/tea.20002>
- Phillips, A. C., Lewis, L. K., McEvoy, M. P., Galipeau, J., Glasziou, P., Moher, D., ... Williams, M. T. (2016). Development and validation of the guideline for reporting evidence-based practice educational interventions and teaching (GREET). *BMC Medical Education*, 16(1), 1-10. <https://doi.org/10.1186/s12909-016-0759-1>

- Powell, B. J., McMillen, J. C., Proctor, E. K., Carpenter, C. R., Griffey, R. T., Bunger, A. C., ... York, J. L. (2012). A compilation of strategies for implementing clinical innovations in health and mental health. *Medical Care Research and Review*, 69(2), 123-157. <https://doi.org/10.1177/1077558711430690>
- Powell, B. J., Waltz, T. J., Chinman, M. J., Damschroder, L. J., Smith, J. L., Matthieu, M. M., ... Kirchner, J. E. (2015). A refined compilation of implementation strategies: results from the Expert Recommendations for Implementing Change (ERIC) project. *Implementation Science*, 10(1), 1-14. <https://doi.org/10.1186/s13012-015-0209-1>
- Redding, C., & Nguyen, T. D. (2020). The relationship between school turnaround and student outcomes: A meta-analysis. *Educational Evaluation and Policy Analysis*, 42(4), 493–519. <https://doi.org/10.3102/0162373720949513>
- Rivkin, S. G., Hanushek, E. A., & Kain, J. F. (2005). Teachers, schools, and academic achievement. *Econometrica*, 73(2), 417-458. <https://doi.org/10.1111/j.1468-0262.2005.00584.x>
- Rowan, B., & Miller, R. J. (2007). Organizational strategies for promoting instructional change: Implementation dynamics in schools working with comprehensive school reform providers. *American Educational Research Journal*, 44(2), 252-297. <https://doi.org/10.3102/0002831207302498>
- Russell, J. L., Bryk, A. S., Dolle, J. R., Gomez, L. M., LeMahieu, P. G., & Grunow, A. (2017). A framework for the initiation of networked improvement communities. *Teachers College Record*, 119(5), 1-36. <https://doi.org/10.1177/016146811711900501>
- Salganik, M. J., Dodds, P. S., & Watts, D. J. (2006). Experimental study of inequality and unpredictability in an artificial cultural market. *Science*, 311(5762), 854-856. <https://doi.org/10.1126/science.1121066>
- Saultz, A., White, R. S., Mceachin, A., Fusarelli, L. D., & Fusarelli, B. C. (2017). Teacher quality, distribution, and equity in ESSA. *Journal of School Leadership*, 27(5), 652–674. <https://doi.org/10.1177/105268461702700503>
- Scher, L., & Martinez, A. (2022). *Developing a core components nomenclature in education: An update on IES-funded work*. Institute of Education Sciences. https://ies.ed.gov/seer/core_components.asp
- Schwartz, S. (2019, Dec 3). The most popular reading programs aren't backed by science. *EdWeek*. <https://www.edweek.org/teaching-learning/the-most-popular-reading-programs-arent-backed-by-science/2019/12>

- Snodgrass Rangel, V. (2018). A review of the literature on principal turnover. *Review of Educational Research*, 88(1), 87–124. <https://doi.org/10.3102/0034654317743197>
- Snow, C. E. (2016). The role of relevance in education research, as viewed by former presidents. *Educational Researcher*, 45(2), 64-68. <https://doi.org/10.3102/0013189X16638325>
- Steinkuehler, C. (2017). *Learning process data in education research: Panel summary*. National Academy of Education. <https://naeducation.org/wp-content/uploads/2017/05/Steinkuehler-FINAL.pdf>
- Stirman, S., Baumann, A. A., & Miller, C. J. (2019). The FRAME: an expanded framework for reporting adaptations and modifications to evidence-based interventions. *Implementation Science*, 14(1), 1-10. <https://doi.org/10.1186/s13012-019-0898-y>
- Takahashi, S., Jackson, K., Norman, J. R., Ing, M., & Krumm, A. E. (2022). Measurement for improvement. In D.J. Peurach, J.L. Russell, L. Cohen-Vogel, & W. Penuel (Eds.), *The foundational handbook on improvement research in education*. Rowman & Littlefield Publishers.
- Waltz, T. J., Powell, B. J., Matthieu, M. M., Damschroder, L. J., Chinman, M. J., Smith, J. L., ... Kirchner, J. E. (2015). Use of concept mapping to characterize relationships among implementation strategies and assess their feasibility and importance: Results from the Expert Recommendations for Implementing Change (ERIC) study. *Implementation Science*, 10(1), 1-8. <https://doi.org/10.1186/s13012-015-0295-0>



60 East 42nd Street, 43rd Floor
New York, NY 10165
212.752.0071

wtgrantfoundation.org
info@wtgrantfdn.org
[@wtgrantfdn](https://twitter.com/wtgrantfdn)