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Research-Practice Partnership Strategies to Conduct and Use Research to Inform Practice

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Research-Practice Partnership Strategies to Conduct and Use Research to Inform Practice

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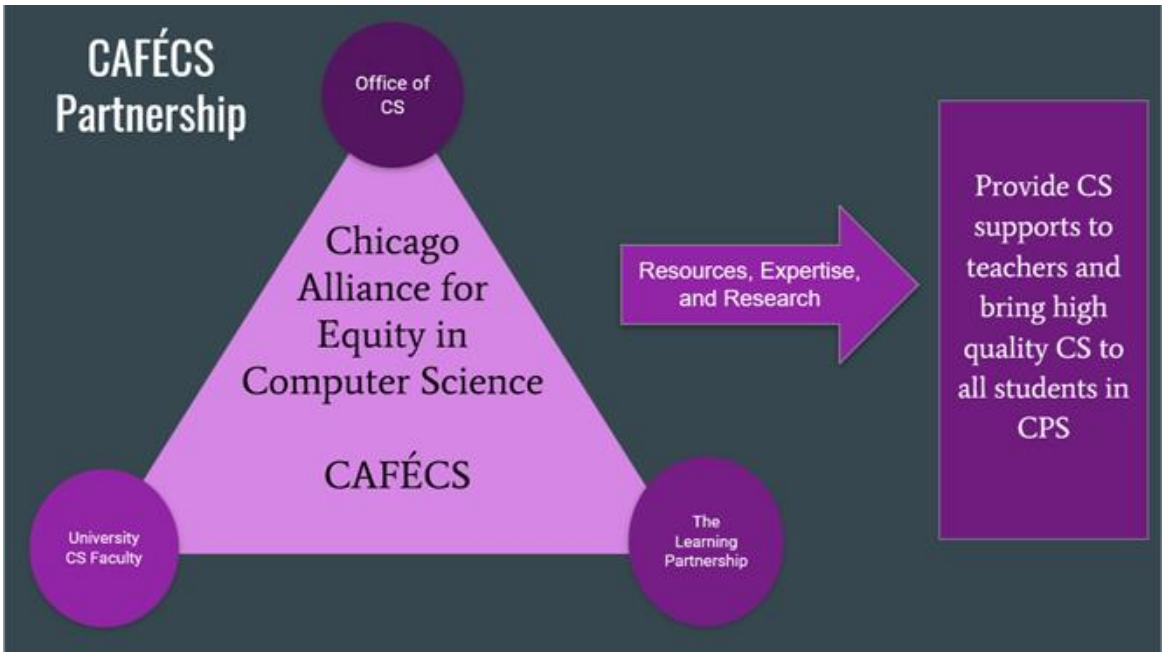
I. Introduction

Given the complex challenges inherent in improving the quality of education, research-practice partnerships (RPPs) aim to bring together research and practice educators to conduct and use research to improve outcomes for students. This collaborative approach is challenging, and often requires members to adopt new ways of working (Coburn, Penuel, & Geil, 2013). RPPs have the potential to provide an infrastructure and mechanisms to integrate and unify research, policy, and practice, in contrast to traditional research processes in which research, policy, and practice can be in tension (Desimone, Wolford, Hill, 2016). The RPP literature is still young, and rich descriptions related to what these activities actually look like in practice are just beginning to emerge. This paper describes tools and routines that the CAFÉCS RPP uses to systematically and collaboratively conduct and use research to inform practice.

II. Context

The CAFÉCS RPP is a partnership among Chicago Public Schools (CPS), The Learning Partnership, DePaul University, Loyola University Chicago, and University of Illinois at Chicago. This team of education researchers, university computer science faculty, and K–12 educators aims to support computer science education in Chicago. The mission of CAFÉCS is as follows: “To ensure that *all* students in Chicago participate in engaging, relevant, and rigorous computing experiences, CAFÉCS addresses problems of practice through research and development that increases opportunities for *all* students to pursue computing pathways and prepares *all* students for the future of work” (cafecs.org). Figure 1 is a graphic representation of the partnership.

Figure 1: CAFÉCS Partnership Graphic



While CAFÉCS formally became an RPP in 2017, the partnership had been established several years earlier between a CPS high school computer science teacher, a CPS district administrator, and three university computer science faculty. Members of this team shared an ambitious vision and goal to increase computer science opportunities for students in Chicago — at that time only about one-fourth of high schools offered any computer science courses. The team brought the Exploring Computer Science (ECS) curriculum and professional development program to CPS and engaged in efforts to transform the landscape of computer science in CPS to ensure that all students had access to an introductory computer science course. ECS was selected because of its focus on three strands: equity, inquiry, and computer science concepts (Goode, Margolis, & Chapman, 2014).

The efforts of this team resulted in the passing of a landmark high school computer science graduation requirement policy in Chicago Public Schools. The class of 2020 was the first class to fulfill this graduation requirement. In June 2020, roughly fourteen thousand students in the Chicago Public Schools (CPS) graduated high school having completed a one-year computer science course. The CAFÉCS RPP played a major role in supporting the successful implementation of this initiative, and continues to engage in research to further its mission (McGee, 2020).

The work of the CAFÉCS RPP is funded primarily through the National Science Foundation's CSforALL RPP program. This program was initiated to address a key challenge facing school districts across the United States as they strive to develop more robust and equitable computer science opportunities: limited research. Because computer science education is a relatively new content area for K–12 schools, there is currently limited research to help guide computer science education. Much research is needed to better understand how to equitably scale computer science opportunities across rural and urban settings in the United States.

Literature Review

RPPs are viewed as a potential mechanism to address this need. RPPs are a relatively recent development in the world of education research, having been first described in 2013. Since then, they have gained significant popularity, with a growing research base to define what they are designed to do, how to structure their work, and how to measure their effectiveness. Farrell et al (under review) provide an updated definition of RPPs as: "a long-term collaboration aimed at educational improvement and transformation through engagement with research, intentionally organized to connect diverse forms of expertise and to ensure that all partners have a say in the joint work."

The intentionality of the RPP structure allows researchers and educators to set a shared agenda and engage in collaborative problem-solving. This balanced engagement improves overall buy-in and use of research findings, addressing one of the main goals of RPPs — to impact decision-making in education through the use of research evidence (NNERPP, 2019).

At present, few studies point to what effective use of research looks like and what conditions need to be in place to maximize its potential (Gitomer and Crouse, 2019). Conaway (2019) argues that successful use of research by practitioners is dependent upon nurturing relationships and providing space to interpret research evidence; his suggestion that "research must be embedded in organizational structures and personal, trusting relationships" is something that RPPs are well-equipped to facilitate.

There have also been recent advances in understanding goals of effective partnerships and how to create and maintain equitable RPPs (Henrick, Cobb, Jackson, Penuel, Clark, 2017; Penuel, & Gallagher, 2017; Bevan, & Penuel, 2018), but more research is needed to understand how and in what ways partnerships support and foster research use (Tseng, 2017; Coburn, & Penuel, 2016).

Farrell & Coburn (2016) present the concept of absorptive capacity to describe factors that impact school districts' capacity to integrate research to improve current practice. With the multitude of activities and responsibilities that teachers and school leaders face every day, RPPs are a potential solution to address this problem and help facilitate the use of evidence by presenting findings and research evidence in a manageable, relevant, and timely way to lead more directly to enhancement of educational practices.

Study Design

This study seeks to answer the question: How does CAFÉCS systematically and collaboratively conduct and use research to inform practice? Data used in this analysis come from four years of evaluation data, and include an analysis of team documents, meeting observations, and annual interviews with eight to 29 members of the CAFÉCS RPP team. Table 1 includes the number of interviews from each organization included in the analysis. Data were coded and analyzed using the Dedoose software to document progress towards accomplishing the goals of the partnership, the challenges the partnership has faced, and to document progress along the RPP effectiveness dimensions (Henrick, Cobb, Penuel, Jackson, Clark, 2017). Data were triangulated with meeting observations and project documents.

Table 1. Number of interviews by organization with number on leadership team in parentheses

Year	**OCS**	**LP**	**University**
Y1	4 (4)	1 (1)	3 (3)
Y2	8 (3)	7 (1)	2 (2)
Y3	15 (3)	7 (1)	3 (3)
Y4	18 (3)	8 (1)	3 (3)
Totals	45	23	11

III. Findings

The CAFÉCS partnership promotes research use within the CPS Office of Computer Science. CAFÉCS evaluation findings indicate that the research produced through the partnership provides the Office of Computer Science with valuable information to understand the success and challenges of their computer science initiatives. Members of the Office of Computer Science report that CAFÉCS research has helped the department understand implementation of the ECS course district wide.

CAFÉCS research has shown that CPS teachers have been able to support all students to achieve equivalent ECS learning outcomes regardless of gender, race, or ethnicity (McGee, McGee-Tekula, Duck, McGee et al, 2018). In addition, CAFÉCS research found that more students are taking additional computer science courses because of their positive experience with ECS (McGee, McGee-Tekula, Duck, Dettori et al 2018). CAFÉCS research also found a positive influence of taking the ECS course on students' passing rate on the AP CSA exam (Boda & McGee, 2021). Finally, CAFÉCS has preliminary research indicating a positive relationship between teachers' attending ECS PD and their students' success in the course (McGee, Greenberg et al, 2018). These findings are critically important to understanding how the ECS course supports the mission of the Office of Computer Science and CAFÉCS - that all students engage in high quality computer science opportunities.

Partnership data sharing requires ongoing collaboration and learning between multiple departments within Chicago Public Schools. The analyses conducted on ECS implementation were possible through ongoing collaboration to collect, organize, and analyze large amounts of district data. In order for partnerships to conduct useful research, the partnership must have access to the necessary data. Because CAFÉCS research aims to be responsive to the evolving

needs of the district, data needs for the partnership cannot be fully anticipated at the beginning of a grant, making it necessary to adapt traditional ways of requesting data within a large urban school district. CAFÉCS worked with the CPS External Research Team to put processes and agreements in place specifically designed for partnership research. This included developing a CAFÉCS RPP data sharing agreement with the CPS External Research Team. The CAFÉCS relationship with the External Research Team has deepened as a result of formalizing as an RPP, and now includes regular partnership meetings between the CPS External Research Team and The Learning Partnership, as well as group meetings with all research partners in CPS. These group meetings provide opportunities for the External Research Team to articulate their vision related to partnership research and build a shared understanding of best practices for partnership research within CPS. In addition, there is significant collaboration between the data strategist in the Office of Computer Science and the data analyst from The Learning Partnership.

CAFÉCS uses a Collaborative Research Framework to align the collaborative research method with the identified district problem of practice. The Collaborative Research Framework (See Table 2) orients all partners to the types of research methodologies that are most appropriate to answer particular problems facing CPS. Working in partnership requires methodological flexibility to ensure that the research design is best suited to solve the specific problem of practice identified by the Office of Computer Science. In addition, the mode of research impacts the level of collaboration needed within the partnership.

Table 2: CAFÉCS Collaborative Research Framework

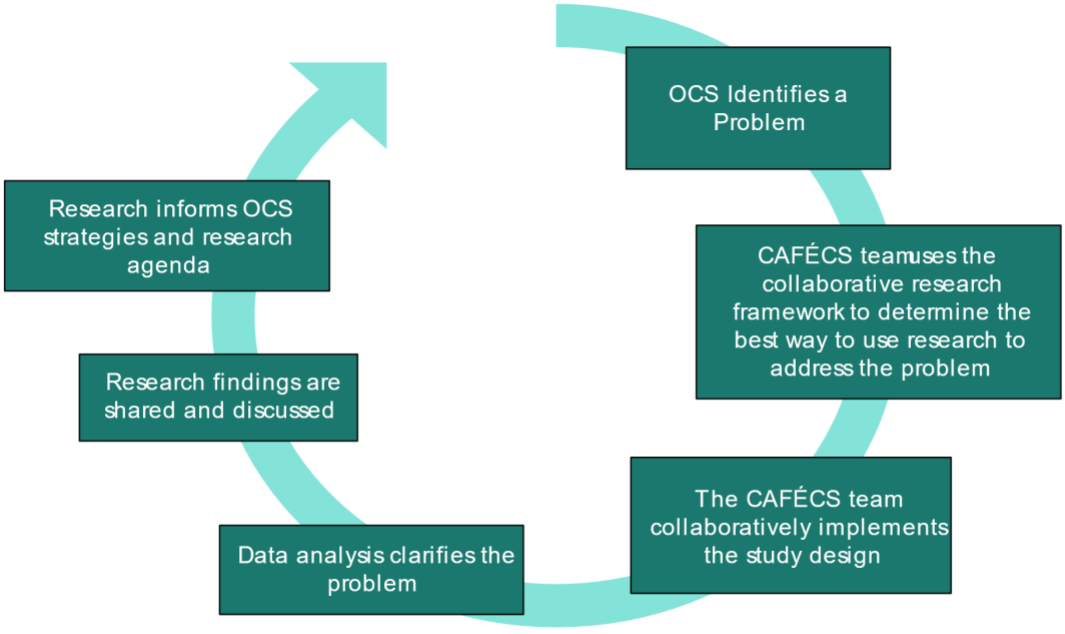
Types of Collaborative Research:	**When to Engage:**
Hypothesis Testing	Questions are focused on understanding factors that affect implementation.
Research and Development	Building on the results of hypothesis testing, CAFÉCS develops solutions and supports the pilot testing of the solutions to investigate the effectiveness of the solution.
Continuous Improvement	When solutions developed through R&D become operational, CPS uses implementation data to guide improvements.
Evaluation	CAFÉCS conducts analyses to determine the impact of CPS programs on students outcomes.

The collaborative research framework includes four types of research: hypothesis testing, research and development (R&D), continuous improvement, and evaluation. With hypothesis testing research, questions are focused on understanding factors that affect implementation. R&D research builds on the results of hypothesis testing to develop solutions and support the pilot testing of the solutions to investigate the effectiveness of the solution. Continuous improvement research follows — when the solutions developed through R&D become operational, CAFÉCS uses implementation data to guide improvements. Finally, using evaluation methods, CAFÉCS conducts analyses to determine the impact of CPS programs on students outcomes.

In addition to using the collaborative research framework as a guiding tool for partnership research, *CAFÉCS engages in a formalized problem-solving cycle to use research to address the needs of the Office of Computer Science.* The problem-solving cycle supports the collaborative research process. This process has been formalized and used to address several different problems of practice that emerged within the CAFÉCS RPP. The problem-solving cycle

includes the following steps: First, the Office of Computer Science identifies a problem. Next, the CAFÉCS team, which includes researchers, district leaders, and university partners, uses the collaborative research framework to determine the best way to use research to address the problem. Once the research mode is determined, the CAFÉCS team collaboratively implements the study design. Next, data analysis clarifies the problem and the research findings are shared and interpreted by the entire team. Finally, the findings are used to inform Office of Computer Science improvement strategies and next steps for the CAFÉCS research agenda.

Figure 3: CAFÉCS Problem-solving cycle



The level of collaboration needed to implement the study design varies by the research mode identified. For example, hypothesis testing research analyses can be conducted by the research team members of The Learning Partnership after the data is collaboratively gathered and cleaned with the data analyst from the Office of Computer Science. Research and Development research, on the other hand, requires much more ongoing collaboration, as solutions are designed and tested.

The problem-solving cycle helps the partnership characterize and understand the lifecycle of a "problem of practice," and communicate how research can support and inform practice in different phases. There are variations in the problem-solving cycle, depending on the stage of understanding of the problem, which has implications for the mode of research (e.g hypothesis testing, research and design, continuous improvement, or evaluation).

CAFÉCS uses structures and research connection activities that support the team to engage in the problem-solving cycle and foster collaboration and inclusivity across organizations.

The meeting structures include weekly leadership team meetings and quarterly retreats, as well as whole team meetings. The leadership team comprises three members from the Chicago Public Schools Office of Computer Science, one member of The Learning Partnership, and three university partners. The leadership team has had the same composition, with minor adjustments, for the duration of the CAFÉCS partnership, and members report long-established relationships with high levels of trust and respect for one another's expertise. Partners report valuing working together, and the leadership team meets weekly for 90 minutes to discuss CAFÉCS work. These meetings are used to monitor progress of CAFÉCS as a whole and prioritize day-to-day project activities.

All members of the leadership team report collaborative decision making as a hallmark of the weekly meeting with a shared commitment to focus on the needs of the Office of Computer Science. Leadership team meetings provide opportunities for members to offer expertise and professional knowledge to inform decision-making and provide guidance across all areas of CS implementation in CPS.

The CAFÉCS leadership team also holds quarterly retreats at which the leadership team takes a deep dive to examine the work and data from the previous quarter to collectively prioritize the specific problems of practice to focus on in the upcoming quarter. The leadership team further refines the strategy, designs success metrics, and identifies the necessary data to be collected.

The broader CAFÉCS team meetings, which includes university partners, the entire Office of Computer Science and entire The Learning Partnership team, provide the opportunity for partners across organizations to sit with one another and discuss computer science in CPS. The meetings are organized with the goal to develop a shared understanding of the work and offer learning opportunities for members. These meetings provide an opportunity to update the larger group on CAFÉCS research activities, disseminate interim results from the research, get joint feedback from researchers and practitioners, share what is being learned from the day-to-day work in the field, and brainstorm issues and problems of practice that the RPP could assist with. They are also a forum to develop joint research questions, identify problems of practice, and make joint meaning of research results.

The whole-team meeting structure was adjusted over the course of the project based on feedback from team members. For example, agendas were simplified so more time could be devoted to deeper discussions about individual items. Other meeting adjustments were made to

address the growing number of members in the CPS Office of Computer Science as well as The Learning Partnership.

Meeting activity structures foster and support research use. CAFÉCS has been very intentional to design meeting activities that support research use. Two recent "research connection activities" included 1) mapping partnership work to district office priorities and 2) mapping research findings to district priorities and relevant stakeholders.

Mapping partnership work to district office priorities. One very well-received structure used by CAFÉCS during a monthly whole-team online meeting was a small group breakout session organized around Office of Computer Science strategic priorities. The three strategic priorities are (1) supporting foundational computer science courses, (2) supporting early college credit and intermediate courses, and (3) supporting out of school time CS opportunities. Office of Computer Science staff has been divided into those three groups, and non-Office of Computer Science partners were strategically aligned so that each group had at least one university and two The Learning Partnership team members join for the small group priority meetings. The Learning Partnership discussed internally the three priority areas, and members were involved in selecting which priority team they would match with, based on what help they could offer.

The small group activity was deliberately structured to support the work of the Office of Computer Science priority teams, with breakout rooms ready to go and a powerpoint agenda to follow. The small group meeting began with an ice-breaker to build relationships and start conversations. Members used a jamboard during the meeting, which is like a message board with sticky notes that people can comment on (anonymously if desired). This was utilized to make sure everyone could participate and feel that their voices were valued. Each small team breakout had Office of Computer Science partners share what they were working on to address their

priorities. The small group then engaged in a discussion about how non-Office of Computer Science partners might be able to help Office of Computer Science members to meet their goals. The conversations centered on talking about what research could be co-designed and conducted to address Office of Computer Science priorities. The Learning Partnership members were invited to join the Office of Computer Science priority meetings that occur outside of the CAFÉCS leadership meeting time.

Partners across organizations, especially those from the Office of Computer Science, responded overwhelmingly positively to this structure. Because the groups were smaller, more people could participate in the discussion. This resulted in more voices being heard and helped cultivate relationships across organizations (something partners indicate was needed, given the expanding membership and large number of new Office of Computer Science staff in their positions). By organizing around the Office of Computer Science strategic priorities, this activity focused on a problem of practice in Office of Computer Science and gave the practice partners the opportunity to have specific discussions about the type of data that had been or could be collected to support those priorities. This helped more Office of Computer Science members have a more direct connection with CAFÉCS data and research and to understand how it could help their work.

Mapping research findings to district priority stakeholders. Another valuable activity that supported research use was employed during a CAFÉCS quarterly leadership retreat. The leadership team was divided into three small groups. Each group included at least one representative from the district, research, and university partners. Each team worked independently, using a Jamboard to identify stakeholders relevant to each priority. Then the teams examined recent CAFÉCS findings and determined how the findings related to the three

Office of Computer Science priorities. The findings were translated into bite-sized, easily understandable sentences. The three teams came back together and shared out their work, making connections with similarities and differences between the three groups. The whole group then engaged in a conversation related to developing a CAFÉCS strategy for communicating findings across a broad set of stakeholders.

IV. Discussion

Findings from this study bring clarity around ways partnerships can conduct and use research. The CAFÉCS Problem Solving Cycle, Collaborative Research Framework, and Research Connection Activities are three examples of ways of working in partnership that contribute to more productive collaboration. These tools and routines can be adapted and tailored for specific problems in order to meet the needs of the district and build capacity to engage in using research to address complex problems in education.

These tools and routines provided the time and space for CAFÉCS to engage in productive conversation and collaboration around how to best conduct and use research depending on the specific nature of the problem. The structures and routines level the playing field for all team members to be able to contribute, and provide opportunities for more productive discussions by helping members of CAFÉCS develop a shared understanding and trajectory of research aimed at solving a complex issue. These tools and routines can provide other RPPs with a structure and accompanying processes to productively engage in collective decision-making, and bring a diverse set of voices and expertise to address ongoing and persistent problems in education.

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References

Bevan, B., & Penuel, W. R. (2018). *Connecting research and practice for educational improvement: Ethical and equitable approaches*. Routledge.

Boda, P.A. & McGee, S. Broadening participation and success in AP CSA: Predictive modeling from three years of data. In *Proceedings of the 52nd SIGCSE Technical Symposium on Computer Science Education*, pages 626–632. Association for Computing Machinery, March 2021. Virtual Event. https://doi.org/10.1145/3408877.3432421 .

Chicago Alliance for Equity in Computer Science. (2021, March). www.cafecs.org

Coburn, C. E., & Penuel, W. R. (2016). Research–practice partnerships in education: Outcomes, dynamics, and open questions. *Educational Researcher*, *45*(1), 48-54.

Conaway, C. (2019). Maximizing Research Use in the World We Actually Live In: Relationships, Organizations, and Interpretation. (CALDER Policy Brief No. 14-0319-1). Washington, D.C.: National Center for Analysis of Longitudinal Data in Education Research.

Desimone, L. M., Wolford, T., & Hill, K. L. (2016). Research- practice: A practical conceptual framework. AERA Open, 2(4), 2332858416679599.

Farrell, C., & Coburn, C. (2016). Absorptive capacity: A conceptual framework for understanding district central office learning. *Journal of Educational Change*.

Farrell, C., Coburn, C., Daniel, D., & Steup, L. (under review). Research-practice partnerships today: the state of the field. New York, NY. William T. Grant Foundation.

Goode, J., Margolis, J. & Chapman, G. (2014). Curriculum is Not Enough: The Educational Theory and Research Foundation of the Exploring Computer Science Professional Development Model. In SIGCSE '14. Association for Computing Machinery, 493–498.

Henrick, E.C., Cobb, P., Penuel, W.R., Jackson, K., & Clark, T. (2017). Assessing Research-Practice Partnerships: Five Dimensions of Effectiveness. New York, NY. William T. Grant Foundation.

McGee, S. (2020, December 10). The Learning Partnership and CAFÉCS celebrate CPS. The Learning Partnership. https://www.jointhepartnership.net/2020/12/the-learning-partnership-and-cafecs-celebrate-cps/

McGee, S., Greenberg, R.I., Dettori, L., Rasmussen, A.M., McGee-Tekula, R., Duck, J., & Wheeler, E. An examination of factors correlating with course failure in a high school computer science course. Technical Report 5, The Learning Partnership, August 2018. https://www.jointhepartnership.net/publications/an-examination-of-factors-correlating-with-course-failure-in-a-high-school-computer-science-course

McGee, S., McGee-Tekula, R., Duck, J., Dettori, L., Yanek, D., Rasmussen, A., Greenberg, R.I., & Reed, D.F.. Does {Exploring} {Computer} {Science} increase computer science Enrollment? In *American Educational Research Association (AERA) Annual Meeting*, April 2018. New York, NY. https://www.academia.edu/36446926 .

McGee S., McGee-Tekula R., Duck J., McGee C., Dettori, L., Greenberg, R.I., Snow, E., Rutstein, D., Reed, D., Wilkerson, B., Yanek, D., Rasmussen, A.M., & Brylow, D. Equal outcomes 4 all: A study of student learning in ECS. In *Proceedings of the 49th SIGCSE Technical Symposium on Computer Science Education*, pages 50--55. Association for Computing Machinery, February 2018. Baltimore, MD. https://doi.org/10.1145/3159450.3159529 .

NNERPP: National Network of Education Research-Practice Partnerships. (2019). Retrieved September 26, 2019 from http://nnerpp.rice.edu .

Penuel, W. R., & Gallagher, D. J. (2017). *Creating Research-Practice Partnerships in Education*. Harvard Education Press. Cambridge, MA.

Tseng, V. (2017). The Next Big Leap for Research-Practice Partnerships: Building and Testing Theories to Improve Research Use. *William T. Grant Foundation*.