

Applying the Five Dimensions of Effectiveness Framework to Evaluate the Effectiveness of a Research Practice Partnership Aimed at Increasing Equity in Computer Science Education

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Applying the Five Dimensions of Effectiveness to Evaluate a Research Practice Partnership Aimed at Increasing Equity in K-12 Computer Science Education

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Abstract

In this evidence-based practice paper, we explore a method for evaluating the effectiveness of Research Practice Partnerships (RPPs), which are an expanding way for computer science (CS) education researchers and practitioners to work together to address problems of practice. RPPs in CS education are relatively new, and there are few methods to measure equity-focused, collaborative work. As the internal evaluators on an RPP, we used a qualitative design approach to measure effective partnership collaborations against the Five Dimensions of Effectiveness [1]. We developed an equity-focused codebook and then a corresponding semi-structured interview protocol. We piloted the codebook with team members of our RPP. Upon analysis of two rounds of interviews conducted 6 months apart, meeting videos, and surveys, the evidence indicates that the codebook may be a useful tool for evaluating the effectiveness of equitable practices within the internal activities and operations of RPPs. In this paper, we share details about the equity-focused, collaborative codebook, the use of the codebook in our current RPP project, lessons learned, and recommendations for improving the process in the future.

Keywords: Research practice partnership, program evaluation, team dynamics, computer science education, qualitative

1 Introduction

There are many models for partnership collaborations focused on systems change. One such model is known as Research Practice Partnerships (RPPs). RPPs have been used in several fields, including education, with the goal of working collaboratively towards implementing solutions to directly address problems of practice [2]. In the context of K-12 computer science (CS) education, problems of practice often focus on Capacity, Access, Participation, and/or Experience, as based on the CAPE Framework [3]. Overall, models focused on partnership

collaborations, including RPPs, are designed to enable a more balanced power structure between researchers and practitioners to create an asset-based approach to research [4].

Recently, three organizations, all of which focus on CS education implementation, formed an RPP to identify problems of practice and develop an intervention to address them. Since this work focuses on the collaborative partnership model of an RPP, a clear definition is needed. RPPs are defined as “...long-term collaborations between practitioners and researchers that are organized to investigate problems of practice and solutions for improving schools and districts” [4, p.48]. Our role in the recently formed RPP is both as a thought-partner and internal evaluator. Our goals are to measure the effectiveness of the RPP through the context of equitable collaborative work as we address the agreed upon problems of practice. The two problems of practice in this RPP are: 1) school leaders in Tennessee need broad buy-in to bring CS to all their students and 2) leaders in Tennessee want clear definitions of what high quality CS K-12 pathways look like.

As the evaluator for this RPP, we centered our work on the *Five Dimensions of Effectiveness* [1]. Each dimension of the framework includes “a set of indicators for each dimension that describes where to look for evidence that an RPP is making progress on a particular dimension of effectiveness.” [1, p. 2]. The five indicators were selected to align with grounding principles in RPPs, including measures of equitable practices.

The *Five Dimensions of Effectiveness* are outlined in Table 1.

Table 1: Five Dimensions of Effectiveness [1].

	Definition
1	Building trust and cultivating partnership. Inherent in this dimension is, “supporting the development of equitable relationships that directly address the longstanding inequities that have persisted between researchers and those being researched . . .” [5][p.3].
2	Conducting rigorous research to inform action. This dimension supports the development of equitable relationships by integrating both researchers and practitioners in a collaborative research approach since practitioners have routinely been left out of the research process itself [5].
3	Supporting the partner practice organization in achieving its goals. The partner practice organization likely has equity-specific goals, such as achieving equitable outcomes for students. Therefore, researchers that are a part of the RPP should provide additional research capacity, including evaluating local policies and programs and developing indicators to predict success.
4	Producing knowledge that can inform educational improvement efforts more broadly. By making evidence-based information available to all, “working towards this dimension inherently supports the development of equitable systems” [5][p.4].
5	Building the capacity of participating researchers, practitioners, practice organizations, and research organizations to engage in partnership work. Henrick et al. asserts that this dimension can, “support the development of equitable systems by orienting RPPs towards building equity-specific capacities at both the individual and system levels” [p.5].

Our overarching research question for this study was: *What types of equitable-practice codes can be derived from the Five Dimensions of Effectiveness framework to assess an RPPs inclusion of*

shared decision making and perspectives? By using this framework for evaluating the effectiveness of RPPs, we aim to fill the gap in tools used to gather evidence to determine an RPP's progress across equitable practices, or similar collaborative partnerships. Our process including creating and using a codebook that identifies equity-focused variables, relationships, and contexts for partners. Finally, our codebook has an embedded equity lens and pays close attention to historical imbalances of power [5].

This work is important for educators, researchers, practitioners, and other stakeholders within the RPP and CS education community who want to understand how effective their RPP, or other collaborative partnership, is operating with respect to mutualism, trust, and power dynamics as they relate to equitable practices. Having another tool for evaluating collaborative partnership, regardless of the model, particularly with a lens of equity, may be beneficial to the others as well.

2 Background

2.1 Research Practice Partnerships

There is often a gap between practitioners and researchers, despite their ultimate desire to improve outcomes for learners [6]. Typically, research is often conducted in silos with sharing of findings provided to practitioners at the end of the studies—and oftentimes the research did not address practitioners needs [7, 8]. However, having teachers fully participate in the research process can help address this challenge, ensuring that practitioners' problems of practice, their context, and their experience are also considered. RPPs are designed to build a bridge between researchers and practitioners [9, 10]. Ghiso et al. points out nuances in the formation of RPPs, noting:

Research-practice partnerships (RPPs) call on forms of professional knowledge that may have traditionally been less visible or valued in the academy. Collaborative research teams are engaged in deeply relational intellectual and emotional labor: They have to develop methodological sensibilities and skills that are attentive to issues of power and have to negotiate social and institutional boundaries. ([11, p. 1])

RPPs are intentionally designed to have three basic pillars: be long-term collaborations, be mutualistic in nature, and build and maintain trust among participants [12]. Mutualism is critical to equalize power structures between researchers and practitioners, so that researchers and practitioners work together in all aspects of the research design and implementation process as well as sharing findings that are centered on practitioners [13, 14]. A key feature of RPPs includes original collection of analysis of data to support the research study [4] and may include the leadership as well.

As applied to educators, Coburn et al. formally defined RPPs as "...long-term collaborations between practitioners and researchers that are organized to investigate problems of practice and solutions for improving schools and districts" ([4, p. 48]). RPPs can be used to address critical and long-term problems of practice within districts and schools [1, 4]. RPPs are can focus on a single school, multiple schools, a single school district, multiple school districts as well as other organizations at various levels. They also can include partners from distributed networks (e.g., new subject areas or methods being studied across an entire state or regions) [4, 15].

2.2 Five Dimensions of Effectiveness

The theoretical basis for this work is the *Five Dimensions of Effectiveness* framework (see Table 1). Henrick et al. published this framework to understand what qualities makes an RPP effective. However, Henrick et al. acknowledged that equity was not initially introduced as a component of the *Five Dimensions*. Therefore, equity and effectiveness were added to the framework in 2019. Henrick et al. note that RPPs can support:

- The development of equitable relationships between researchers and practitioners by explicitly addressing historical imbalances of power between the two communities and focusing on problems faced by practice organizations.
- Equitable outcomes (e.g., instruction and opportunities) for students by engaging in research that specifically investigates and addresses inequities faced by schools, districts, and states.
- The development of equitable systems by reconceptualizing how research institutions, practice institutions, and communities work together for shared goals, removing barriers that limit progress, and building capacities for individuals and organizations to better collaborate.

Henrick et al. state that this framework is “...intended to guide the development of more specific quantitative measures and qualitative protocols” [1, p. 21]. Indeed, the *Five Dimensions* framework appears to be the gold standard for evaluating RPP effectiveness that other researchers use as a building block for the development of more tools to measure RPP effectiveness [16–18].

3 Methodology

There is currently a gap in literature that outlines how to evaluate equitable practices across collaborative partnerships, including RPPs. Since RPPs generally have a low number of team members, qualitative evidence may be a more practical way to capture evidence and share stories of progress. Focusing on qualitative research requires researchers to develop codes, themes, and a process to analyze progress along the *Five Dimensions* or other established priorities [19]. Since our RPP has a small number of team members (n=8), we embarked on creating a qualitative study with a deductive code processing. We created a codebook *a priori* to conduct qualitative evaluations throughout the span of the partnership, then created a semi-structured interview protocol that aligned with the codebook.

3.1 Codebook Development

Overall, we used a qualitative design approach, first creating an equity-focused codebook, derived from the *Five Dimensions*, for each dimension and their corresponding indicators. To develop the codebook, we first identified equity-focused variables, relationships, and contexts for partners. We particularly focused on how the RPP can and will support the development of equitable relationships, paying close attention to historical imbalances of power [5, 20]. Since RPPs are “...designed to advance equity goals by addressing historical imbalances of power between researchers, educators, and community members” [20, p.14], we paid particular attention to power dynamics. Once the codebook was created, we disaggregated it by dimension, indicator, and specific code ensuring equity concepts were fully embedded.

Dimension 1 is *building trust and cultivating partnership*. Inherent in this dimension is, “supporting the development of equitable relationships that directly address the longstanding inequities that have persisted between researchers and those being researched” [1, p.3]. An example of embedded equity in the codes relates to the indicator “Researchers and practitioners routinely work together”. We defined this code as “Inclusive Collaboration (IC), with key evidence to look for. Working together in an equitable manner requires more than just sitting in meetings. When we created the code, then, we included two critical pieces of evidence to uncover: 1) researchers and practitioners work together and that 2) partners feel as if they are a valued member of the team. The indicators (as defined by the *Five Dimensions* framework), codes that we established based on the indicators, and corresponding questions are outlined in Table 2.

Table 2: Dimension 1: Codes for Building trust and cultivating partnerships.

Indicator	Code	Corresponding Questions
Researchers and practitioners routinely work together	Inclusive Collaboration (IC): Researchers and practitioners routinely work together and all feel as if they are a valued member of the team.	How often do you collaborate with the other partner(s)?
The RPP establishes routines that promote collaborative decision making and guard against power imbalances	Siloed Decision Making (SD): Leadership (PI/Co-PIs) making decisions about planning and implementation without soliciting input or feedback from wider team.	What team norms, if any, were developed? Are they followed? How? Are all team voices included in collaborative decision making? If yes, how? If no, please describe your perception of why not?
RPP members establish norms of interaction that support collaborative decision making and equitable participation in all phases of the work.	Recommended RPP Improvements (RR): recommendations from either partner on ideas to improve the partnership process.	
RPP members recognize and respect one another’s perspectives and diverse forms of expertise	Relationship Building (RB): Collaboration, building trusting relationships, clear roles, responsibilities, and accountability.	Do you feel as if your perspective, expertise and role demands are taken into consideration during team collaborations and decisions? How or how not?
Partnership goals take into account team members’ work demands and roles in their respective organizations	Standardizing Procedures (SP): established and follow group norms, shared agenda and calendar, protocols, notes, assigning roles during meetings, follow up with meeting overview, etc.	

Dimension 2 is *conducting rigorous research to inform action*. This dimension supports the development of equitable relationships by integrating both researchers and practitioners in a collaborative research approach since practitioners have routinely been left out of the research process itself [1]. An example of embedded equity in the codes relates to the indicator that begins

Table 3: Dimension 2: Codes for Conducting rigorous research to inform action. Three indicators are combined.

Indicator	Code	Corresponding Questions
The RPP has developed systematic processes for collecting, organizing, analyzing, and synthesizing data.	Data Collection (DC): The collection of data during implementation of the intervention.	How did you go through the process as a team to identify problems of practice? How are the recognized problems of practice being addressed through the RPP?
Decisions about research methods and designs balance rigor and feasibility.	Research Methods (RM): Research design specified and people on the team know their roles within the research design	What is the developed process for collecting, analyzing, and synthesizing data through this project? Are there any areas you would/have change from initial conception? If so, what? How are the findings being shared?
The RPP conducts research to clarify and further specify problems of practice prior to identifying and assessing strategies for addressing those problems. The RPP conducts research that addresses problems of practice facing the practice organization. Findings are shared in ways that take into account the needs of the practice organization.	Dissemination (D): sharing knowledge within the partnership and outside of the partnership regarding the implementation and outcomes.	

“The RPP conducts research to clarify and further specify...”. In reference to the dissemination, we defined and coded the data regarding the act of sharing knowledge equitably between and among team members. The indicators, codes, and corresponding questions are outlined in Table 3.

Dimension 3 is *supporting the partner practice organization in achieving its goals*. The partner practice organization likely has equity-specific goals. Therefore, researchers that are a part of the RPP should provide additional research capacity, including evaluating local policies and programs and developing indicators to predict success. The indicators, codes, and corresponding questions are outlined in Table 4.

Dimension 4 is *producing knowledge that can inform educational improvement efforts more broadly*. By making evidence-based information available to all, “...working towards this dimension inherently supports the development of equitable systems” [1, p.4]. An example of embedded equity in the codes relates to the indicator “Researchers and practitioners routinely work together”. We focused on questions such as, *What has the RPP developed and/or shared with other organizations focused on tools and/or routines from this work?*. The indicators, codes, and corresponding questions are outlined in Table 5.

Table 4: Dimension 3: Codes for supporting the partner practice organization in achieving its goals. Two indicators are combined.

Indicator	Code	Corresponding Questions
The RPP provides research and evidence to support improvements in the partner organization. The RPP informs the practice organization's implementation and ongoing adjustments of improvement strategies.	Recommended Improvements (RIV): The RPP provides research and evidence to support improvements in the partner organization.	Have you provided recommendations for improvements to the other partners? If so, what are the recommendations? How have they been implemented?
The RPP helps the practice organization identify productive strategies for addressing problems of practice. The RPP informs the practice organization's implementation and ongoing adjustments of improvement strategies	Recommendation Implemented (RIM): The RPP informs the practice organization's implementation & ongoing adjustments of improvement strategies.	Have you received recommendations from the research organization for improvements? If so, what were those suggestions? How have they been implemented?

Table 5: Dimension 4: Producing knowledge that can inform educational improvement efforts more broadly. All of the indicators are combined.

Indicator	Code	Corresponding Questions
The RPP develops and shares knowledge and theory that contributes to the research base. The RPP develops and shares new tools and/or routines that can be adapted to support improvement work in other settings. The RPP develops two dissemination plans, one that supports partnership goals (e.g., sharing findings with community members) and a second for broader dissemination. The RPP implements the two dissemination plans.	Dissemination (D): sharing knowledge within the partnership and outside of the partnership regarding the implementation and outcomes.	What has the RPP developed and/or shared with other organizations focused on tools and/or routines from this work? What are the two dissemination plans for the project?

Dimension 5 is *building the capacity of participating researchers, practitioners, practice organizations, and research organizations to engage in partnership work*. Henrick et al. asserts that this dimension can “...support the development of equitable systems by orienting RPPs towards building equity-specific capacities at both the individual and system levels” [1, p.5]. An example of embedded equity in the codes relates to the indicator that begins “Team members develop professional identities that value engaging in sustained collaborative inquiry...”. We defined the code of PC (see Table 6) through an equity-lens of ensuring all members, regardless of their identity, feel capable and knowledgeable as a member of the RPP. The indicators, codes, and corresponding questions are outlined in 6.

3.2 Data Collection

We conducted and recorded one-on-one interviews with team members (n=8) two times in the first year (months 2 and 8) using the Zoom platform. In total, there were 15 interviews, 28 meetings, and 113 surveys completed for this phase of the project. The interviews lasted an average of 42:28 minutes each, with a range of 21 to 62 minutes. The interviews were semi-structured, therefore the questions outlined for each dimension were included; however, we also embedded clarifying questions dependent on the team member’s position and experiences in the RPP. Additionally, we recorded all RPP team meetings and collected a five question end-of-meeting survey that focused on team members’ sense of belonging and perception of the RPP’s health.

3.3 Data Analysis

Two evaluators on the team qualitatively coded asynchronously, with interrater reliability between 80-85% [21]. Our coding process followed the Framework Method [22], starting with familiarization with the data. Next, we deductively coded the interviews using codes that were developed as part of the codebook, which were directly related to the indicators of the *Five Dimensions* framework. We then developed an analytical framework. Finally, we synthesized this data through research discussions and connections to the codes in the codebook.

3.4 Data Dissemination

Once we analyzed the data, we shared the information with the wider team in the form of a memo. We divided the memo into sections specific to each of the five indicators. We entered in unidentifiable direct quotes from team members to support areas of strengths and areas of growth within the internal work of the RPP. We used this process as the dissemination tool to report about the information gathered in the interviews and to provide a shared document for discussion regarding positives and areas of needed change within the RPP.

4 Results: Implementing the Codebook

In this first year we were able to fully vet four of the five set of codes related to the *Five Dimensions*. Since Dimension Four is related to dissemination practices, we were unable to fully vet this set in the first year of the RPP due to limited dissemination of the work. Additionally, through the coding process, we added a comprehensive code based on evident outliers in the interview transcripts. This code was used as a catch-all for text that did not fit neatly into the codebook, but that we found important to the overall evaluation and qualitative story of the RPP.

After coding, we continued to follow the steps of the Framework Method, which resulted in the

Table 6: Dimension 5: Building capacity of participating researchers, practitioners, practice organizations, and research organizations to engage in partnership work. Two indicators are combined. Two indicators (shifts in professional expectations of team members and resources allocated for this work) were deemed not relevant to our RPP, since sufficient funds exist and all team members are engaged in the same roles that they previously had to support their organization's work.

Indicator	Code	Corresponding Questions
Team members develop professional identities that value engaging in sustained collaborative inquiry with one another to address persistent problems of practice. Team members assume new roles and develop the capacity to conduct partnership activities.	Professional Capacity [Self] (PC): Individuals identify with being an active member of the partnership. They feel capable in their individual roles and knowledgeable of others' roles.	As a professional, what values have you developed or sustained while engaged in the collaborative RPP process? What are the roles/role you play in the RPP? Have there been additions to this team through this process? What are their roles?
Participating research and educational organizations provide capacity-building opportunities to team members.	Professional Development (PD): Individuals feel supported and have the opportunities to grow within their organization and partnership.	
The work of the RPP contributes to a change in the practice organization's norms, culture, and routines around the use of research and other evidence.	Change related to the Organizational Practices Based on Knowledge Gained (CiP): The work of the RPP contributes to a change in the practice organization's norms, culture, and routines around the use of research and other evidence.	How has the RPP contributed to a change in organizational norms, culture, and routines based in the research at each RPP organization?
The RPP establishes conditions in the practice organization that lead to sustained impact beyond the life of the partnership.	Sustainability (S): The RPP establishes conditions in the practice organization that lead to sustained impact beyond the life of the partnership.	What are the sustainable practices developed and/or implemented within the practice partner's organization to continue the work established through the RPP?

data interpretation. The interpreted data was provided to all RPP team members in memos. The memos, in both months 2 and 8, included areas of strength for the RPP and recommendations for areas of growth. In each sections below, the findings in the first year of the RPP support the created codes for each dimension (with the exception of Dimension 4).

4.1 Dimension 1

Analysis of the data indicates the team members felt that their voices were heard, they were beginning to develop positive relationships as a newly formed group, and there was strong inclusive collaboration. For example, one participant stated, "I'm feeling respected. I'm feeling heard."

We also identified areas of growth, including the lack of consistent communication. One quote that depicts the view of several team members was, "I think it is filtered communication (that often needs to be) relayed back to us (the whole group)." This concept is supported through research by Farrell et al. who describe the disconnect between teachers and academic or research focused professionals.

4.2 Dimension 2

We found that the RPP's strengths were that team members viewed their partnership as including experienced personnel, leading to effective implementation and data processes. We also identified areas of growth specific to the data collection and research piece of the RPP. One comment, "(data collection) is a bit haphazard right now" summarizes this view. However, as noted in the interviews in month 8, there was a lack of shared knowledge regarding the problems of practice which impacted this area of strength.

4.3 Dimension 3

An area of strength outlined by the RPP team members in Dimension 3 were the lessons learned within the first year. The strategy to address the problems of practice hit many road bumps creating, as one team member stated, a "false start." However, from this false start, many ideas were learned and strategies developed to address the barriers faced in the first few months of addressing the problems of practice in the context of the RPP. As with other dimensions, there were also areas of growth. RPP members identified the need to develop strategies for increasing capacity to deliver the intervention at the center of the RPP. One participant stated, "I need a guide, even if it changes, I need to know when things are due." Several RPP members echoed the lack of clarity around specific tasks and due dates in the first year.

4.4 Dimension 5

Analysis of the data indicates the RPP team members were prepared to complete the work and understood the importance of the RPP. From the interviews, we identified an area of growth focused on capacity building in the context of financial support provided by the RPP to practitioners and gaining traction on the solution presented as part of the RPP.

We observed and documented other codes directly related to Dimension 5, such as participants felt, "pretty prepared and [that they are] getting access to the resources to be prepared." Further, many participants expressed their need to learn more about the intervention being implemented and partner organizations, such as "I have zero experience with [intervention]."

4.5 Limitations

With respect to limitations, we tested the codebook against one RPP which is only one form of collaborative partnership. Vetting the codebook against other RPPs and collaborative partnerships will add to the evidence of its reliability across other projects.

We used the codebook in this project twice during months 2 and 8 of the first year. However, as we continue into years 2 and 3, we will continue to vet the codebook, paying close attention to Dimension 4. We hypothesize that with more use, both within the current RPP and outside of the current RPP, the codebook will be seen as an informative way to evaluate RPPs.

In coding responses to the interviews in month 2, we found a number of instances where a predicted code did not fit, therefore resulting in a outlier code identifier. However, in month 8, participant responses were more consistent and we were able to identify appropriate codes that encompassed all responses.

Finally, the survey completion rate of the RPP team members varied. Almost all members completed the surveys for some meetings, while less than one quarter completed the surveys for others. This is likely due to interest in a given meeting and members' desires to share their thoughts. However, after we provided the memo in month 2, more RPP members completed the after meeting surveys.

5 Lessons Learned

Based on our work, developing and using a specified codebook grounded in a framework is a productive and beneficial process to provide guidance and support to an entire RPP team. We learned several lessons throughout the development and initial implementation of the qualitative process with the goal of providing in the moment and actionable feedback.

One lesson focused on the after meeting surveys, which we was outlined as a limitation. We learned that constant reminders at the end of meetings increased the response rate, as well as sending follow up emails to individuals who did not complete the survey after the meetings. In our communication with team members around the after meeting surveys, we consistently stated that the surveys were a way for their voice to be heard and increased the overall health of the collaborative relationship.

Another lesson learned, which is also a recommendation, is one-on-one interviews and evaluation protocols may need to be added throughout the process. However, this does not erase the need for the structured biannual internal evaluation process. For example, when we experienced the "false start" 4 months into the first year of our work, we engaged in immediate one-on-one interviews to understand the group perspective of the situation.

Arguably, the most important lesson we learned was that the RPP team members truly felt as if their voice was heard, reflected in our memos, and kept confidential. As we wrote the memos, we were careful not to share who was quoted and the videos of the interviews were not shared widely. Developing this sense of anonymity created an environment where barriers were dismantled and the historical imbalances of power could be directly addressed.

6 Recommendations

Reflecting on our lessons learned and the literature about equity-focused collaborative partnerships, we have a list of recommendations for individuals who are currently engaging in collaborative partnerships, such as a RPP, or are planning to engage in collaborative partnerships. Overall, the recommendations are geared towards developing and implementing an internal evaluation process within a RPP.

- Use a systematic way to internally evaluate the work and relationships of an RPP.
- Before beginning the one-on-one interviews, get to know the RPP members through relationship building. This will create team members who are more open to sharing their experiences and thoughts.
- When convening a group of partners in a collaborative partnership, especially when there is a specific problem of practice to address, ensure that all members of the team have a clear understanding of the problem and the shared goal of effectively addressing the problem of practice.
- Be open to in-the-moment evaluation interviews when there are major changes in the life of the RPP.
- Have a tight timeline between interviews and sharing the memo as things are constantly changing in collaborative partnerships.
- Make sure to share areas of strength and recommendations for improvements so as to not focus only on areas of growth.
- Review the internal evaluation process frequently with the wider RPP team, especially immediately prior to conduct the one-on-one interviews.
- Be open to codes outside of the codebook that will inform the wider work of the RPP.
- Review the memo with the PI or leader prior to disseminating to the group.
- Build the memo around direct quotes from the RPP team members, including areas of strength, areas of growth, and suggested recommendations

7 Conclusion

We developed an equity-focused codebook based on the indicators in the *Five Dimensions* framework. Based on our analysis, the evidence indicates that the codebook may be a useful tool for evaluating the effectiveness of the internal RPP activities and providing iterative feedback to RPP team members. By using pre-established themes that are implicitly connected to the goal of equitable practices, the RPP team members can adjust to embrace more equitable practices and mitigate the power dynamics in the RPP. We will conduct further data collection and analysis of the codebook to validate and improve where warranted.

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References

- [1] Erin C Henrick, Paul Cobb, William R Penuel, Kara Jackson, and Tiffany Clark. Assessing research-practice partnerships: Five dimensions of effectiveness. *William T. Grant Foundation*, 2017.
- [2] Henning Fjørtoft and Lise Vikan Sandvik. Leveraging situated strategies in research–practice partnerships: Participatory dialogue in a norwegian school. *Studies in Educational Evaluation*, 70:101063, 2021.
- [3] Jayce R Warner, Carol L Fletcher, Nicole D Martin, and Stephanie N Baker. Applying the cape framework to measure equity and inform policy in computer science education. *Policy Futures in Education*, page 14782103221074467, 2021.
- [4] Cynthia E Coburn, William R Penuel, and Kimberly E Geil. Practice partnerships: A strategy for leveraging research for educational improvement in school districts. *William T. Grant Foundation*, 2013.
- [5] E Henrick, S McGee, and W Penuel. Attending to issues of equity in evaluating research-practice partnership outcomes. *NNERPP Extra*, 1(3):8–13, 2019.
- [6] Dana Linnell Wanzer. *Improving Evidence Use: The Importance of Relationship Quality in Research-Practice Partnerships*. PhD thesis, The Claremont Graduate University, 2019.
- [7] Yotam Hod, Ornit Sagy, Yael Kali, et al. The opportunities of networks of research-practice partnerships and why cscl should not give up on large-scale educational change. *International Journal of Computer-Supported Collaborative Learning*, 13(4):457–466, 2018.
- [8] William R Penuel and Caitlin C Farrell. Practice partnerships and essa: A learning agenda for the coming decade, 2017. URL <http://learndbir.org/resources/160812-RPP-chapter.pdf>.
- [9] Ulrich Boser and Abel McDaniels. Addressing the gap between education research and practice: The need for state education capacity centers. *Center for American Progress*, 2018.
- [10] Monica M McGill, Alan Peterfreund, Stacey Sexton, Rebecca Zarch, and Maral Kargarmoakhar. Exploring research practice partnerships for use in k–12 computer science education. *ACM Inroads*, 12(3):24–31, 2021.
- [11] María Paula Ghiso, Gerald Campano, Emily R Schwab, Dee Asaah, and Alicia Rusoja. Mentoring in research-practice partnerships: Toward democratizing expertise. *AERA Open*, 5(4):2332858419879448, 2019.
- [12] Erin C. Henrick, Marco A Munoz, and Paul Cobb. A better research-practice partnership. *Phi Delta Kappan*, 98(3):23–27, 2016.
- [13] William R Penuel, Anna-Ruth Allen, Cynthia E Coburn, and Caitlin Farrell. Conceptualizing research–practice partnerships as joint work at boundaries. *Journal of Education for Students Placed at Risk (JESPAR)*, 20(1-2): 182–197, 2015.
- [14] Bronwyn Bevan. Research and practice: One way, two way, no way, or new way? *Curator: The Museum Journal*, 60(2):133–141, 2017.
- [15] Cynthia E Coburn and William R Penuel. Research–practice partnerships in education: Outcomes, dynamics, and open questions. *Educational Researcher*, 45(1):48–54, 2016.
- [16] Carrie Scholz, Jason LaTurner, and Elizabeth Barkowski. Tool for assessing the health of research-practice partnerships. rel 2021-057. *Regional Educational Laboratory Southwest*, 2021.
- [17] Rebecca Zarch and Stacey Sexton. Research practice brief: The health assessment tool, 2019.
- [18] Monica M. McGill, Amanda Menier, Stacey Sexton, Rebecca Zarch, Alan Peterfreund, and Maral Kargar-moakhar. A framework for examining research practice partnerships for k-12 computer science education, 2022.
- [19] Michael Quinn Patton. Two decades of developments in qualitative inquiry: A personal, experiential perspective. *Qualitative social work*, 1(3):261–283, 2002.

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- [20] Caitlin C Farrell, William R Penuel, Cynthia E Coburn, Julia Daniel, and Louisa Steup. Practice partnerships in education: The state of the field. *William T. Grant Foundation*, 2021.
- [21] Juan Wang, Changcheng Chen, Mengsi Peng, Yizu Wang, Bao Wu, Yili Zheng, and Xueqiang Wang. Intra-and inter-rater reliability of three measurements for assessing tactile acuity in individuals with chronic low back pain. *Evidence-Based Complementary and Alternative Medicine*, 2020, 2020.
- [22] Nicola K Gale, Gemma Heath, Elaine Cameron, Sabina Rashid, and Sabi Redwood. Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC medical research methodology*, 13(1):1–8, 2013.