RPPs: Love 'Em or Leave 'Em?

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For the last three years the CS for All initiative at the National Science Foundation has had a call for research-practice partnership (RPP) projects. The goal of the program is to advance both knowledge and practice in creating inclusive, responsive computer science/computational thinking programs for all K-12 youth. RPPs represent an approach to research that, by design, is both more equitable and more ethical because it leverages community stakeholder experiences and perspectives to inform research questions, methods, and meaning-making. RPPs are thus potentially powerful tools for equity-oriented initiatives such as CS for All. Beginning in December 2016, the Research + Practice Collaboratory, an NSF-funded initiative based at the University of Washington, has led ten RPP development workshops for CS for All, collectively serving over 700 members of the community. At these workshops we have collected data about how the community sees itself benefiting from the adoption of RPP approaches to the work. In this experience paper we describe what we have learned about the field's interests with respect to adopting RPP approaches to the work.

Keywords—RPP, equity, research approaches

I. Introduction

Research-practice partnerships (RPPs) represent an approach to educational improvement that can better support equity because they are premised on equity as a way of working—recognizing and leveraging the ideas, assets, and experiences of all involved (Bevan & Penuel, 2018). RPPs sit at the intersection of implementation and research; they are intended to generate knowledge that can immediately inform practice as well as build research-based knowledge that can guide the field (Coburn, Penuel & Geil, 2013). As such, they are positioned to produce results that are more relevant, salient, and sustainable in practice (Penuel et al., 2016; Thompson et al., 2015; Tseng et al., 2018).

In addition to directly engaging the perspectives, experiences, and professional practices of those charged with implementation efforts (e.g., teachers, staff leaders, building administrators), RPPs can be intentionally designed to include community stakeholders, such as parents, students, and others whose voices are often excluded in educational improvement efforts (Bang et al., 2010). When histories of systemic and structural racism and other forms of social injustice underlie the lack of access to or participation in educational opportunities (such as K-12 computer science; see Margolis et al., 2017), the involvement of community stakeholders as equal voices at the planning table can help tune improvement efforts to take into account specific and local histories of injustice and exclusion that may otherwise, if unaddressed, attenuate project progress or accomplishments (Calabrese Barton & Bevan, 2016). Relevance, salience, and sustainability of improvement results emerge from these two dimensions of equity: inclusion of practitioner voices and addressing histories and structures of injustice underlying the problem of practice.

II. Motivating Question: Introducing RPPs to the CS for All Community

In 2016, the National Science Foundation (NSF) *Computer Science for All* program announced a new initiative to fund RPPs. To date, two cohorts (63 projects) have been funded through this program, and a third is expected to be announced in the fall of 2019. The rationale for the NSF program, as described by program officers at a series of public workshops, described below, is to ensure that *CS for All* implementation projects build on and build up the research evidence base about K-12 computer science education, learning, and educational improvement.

The response to the NSF call has been robust. Dozens and dozens of proposals have been submitted to each round. With close to a hundred RPPs soon to be underway, the question arises: What value does the RPP approach bring to K12 *CS for All* community? Do RPPs represent a fad, a funding opportunity, or an approach that can lead to more relevant, salient, and sustainable improvement efforts that directly address equity in K-12 CS education?

Since October 2016, the Research+Practice Collaboratory, an NSF-funded program exploring new models for the relationship of research and practice, has led ten workshops for the *CS for All* community on how to design and develop RPPs.

Collectively these workshops have reached more than 700 individuals—district and state leaders, classroom educators, computer scientists, learning scientists and educational researchers, evaluators, and industry partners. In this paper we share views expressed by participants in these workshops when answering the question: *What value do you see RPPs bringing to the CS for All community?*

III. Analysis: Views from the Field

Participants attend the Collaboratory RPP development workshops in teams of 4-6 individuals, representing expertise in education research, practice and computer science. For one and a half days they participate in a range of activities that include: A brief introduction to RPPs; an overview of the NSF *CS for All* RPP solicitation; a panel of funded projects sharing their experiences launching RPPs; and focused time working in their teams to collectively: (a) define what equity means for their project; (b) identify and unpack the "problem of practice" in their community (i.e., the issue that limits quality, access to, or participation in K-12 CS education); (c) describe project aims and activities, aligned with the problem of practice; (d) identify research questions that could inform practice and build the knowledge base; and (e) map out possible project evaluation strategies. Workshop leaders, including NSF program officers, roam the room during team time to provide direct feedback and advice to teams as they debate and construct the frame for their RPP projects. Typically, teams are in very early stages of development and sometimes starting from scratch in terms of reaching a shared vision and plan. In the previous two rounds of funding, teams who attended the workshop were far more likely to receive funding from NSF—i.e., they produced more competitive proposals—than those that did not attend the workshops.

At the close of the second day, participants are asked to complete a four question open-ended survey. The survey includes the question about what value they see RPPs bringing to the field. Additionally, the survey asks participants to rate the workshop on a scale of 1 to 5, with 5 being high, and to describe what they valued most about the workshop and what suggestions they have for its improvement. The RPP Development workshop consistently ranks 4.6 or above, with respondents frequently stating that it was the best professional development workshop they have ever experienced. The aspects of the workshop they value most are time to work in their teams, feedback/guidance from workshop leaders, and detailed information about what distinguishes RPPs from other forms of research and practice. It is in this context—of people who are newly forming RPPs and who are happy with the recent workshop—that we share the results of responses to the first question about the value of RPPs to the field from 145 participants in three different workshops offered in the fall of 2018. Some 37 of the respondents did not address this question and instead made other comments. Below we analyze responses from the 108 that did answer the question.

A. Guiding a Nascent Field of Practice

A theme throughout many of the comments was the value of connecting implementation with knowledge development at this early stage of the K12 CS field's development. Comments referenced the "increasing expectations" for CS integration into K-8; the rapid pace and scale up of CS education, and the significant investment being made in its expansion. In this context, respondents noted that RPPs could provide important guidance to a field that was largely being bootstrapped by local educational leaders:

In a field that is still in its infancy, our RPP provides an opportunity to understand local context when designing projects (but also supports developing generalizable knowledge).[1]

I see RPPs as a great vehicle to ensure that equity is achieved between academe and K12 practitioners as each phase of the research and implementation process, which is crucial in a nascent, transformative field like CS education.

Part of the view of how a new field could benefit was a note from many respondents about the potential that RPPs had for ensuring sustainability of results, or as one noted "The ability to learn from each other (r and p) and work towards solutions that will stick." Another commented that RPPS added value by:

Ensuring quality of implementing of CS in districts/schools. Mindful and thoughtful growth and expansion is essential to keep this from becoming an implementation that is inherently set up for failure or only a short-term thing (lack of sustainability).

Thus many respondents appear to be aware of the need for more research-based knowledge to guide practice as the field begins to shape.

B. Building Committed Communities

About half of the respondents noted that the overriding value to the field involved inclusiveness—not just CS education researchers and practitioners (though this was crucial) but also community members. "I like the focus on relationship building and the focus on growing the community as a whole." As one respondent put it, RPPs ensured that projects had "all of the needed players on one team." Another noted:

RPPs are valuable for CS because they support sustainable and equitable learning at scale, bringing in multiple voices/stakeholders to the problem.

Many respondents noted the importance of inclusion for buy-in to the project's goals.

RPPs are excellent ways to do research and to get buy in from teachers and schools for improvement efforts.

Creating a strong community partnership promotes buy-in from the teachers and administrators and results in more relevant and sustainable solutions.

The concept of RPPs makes so much sense for CS education since they form a community working together toward a common goal... and gathering data and research along the way. This sets the stage for scalability, shareability and reflection/refinement. Many have tried to do this work

[1] All respondents are quoted only once. No respondent is quoted more than once.

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alone and have not been able to go as far as they could w/ an RPP.

But inclusivity was noted to be more than buy-in. Importantly about a third of respondents whose answers related to inclusion emphasized the ways in which RPPs shifted power dynamics in ways that valued the perspectives and experiences of teachers to strengthen the quality and possibilities of CS education. In this way several noted how RPPs could empower CS teachers.

I see the great value in building teacher capacity and empowering not only students but teachers to be excited and participate in CS opportunities.

I have always been concerned about the power imbalances of educational research (or social science research in general, for that matter). As a sociologist, I am committed to finding ways to mitigate or address the power differentials in research, and RPPs, if truly followed, answer that concern.

They are a "structure" (with flexibility) for addressing inequity (cultivating equity) in research and for building space for more perspectives or 1) they specifically address equity in team. 2) they specifically incorporate multiple perspectives.

Finally, inclusivity was not undertaken only for empowerment and sustainability, but also because it was seen as leading to more powerful knowledge development.

Seems like a great way to engage a much wide range of stakeholders, particularly giving ownership to teachers and admin as generators of knowledge and giving rich insight to researchers.

The insight and knowledge of practitioners is invaluable to CS education. RPPs provide the opportunity for practitioners to be part of CS education change.

RPPs for CS education help researchers find out what's going on in the classroom, but more importantly, learn to support the practitioner they are working with, making researchers place equal importance on the human element alongside the data element will give researchers better data and results.

Thus, respondents appeared to grasp that RPPs do not represent collaboration for collaborations sake, but collaboration and equal voice as a means to more relevant, salient, and sustainable impacts.

C. Engaging in Cycles of Continuous Improvement

Roughly half of the respondents noted how RPPs could support quality implementation and continuous improvement. Several noted that RPPs produced more relevant and usable results:

I love the idea of RPPs in CS because too often we spend a long time developing, but then find that too many components aren't practical. Helps avoid barriers to implementation. Practitioners help define realistic problems and questions along with other researchers that might have a lot of access to other ideas and data.

So research (of which we need SO much) is focused on serving needs of teachers and students in REAL classrooms and districts.

There seems to be high value in the promise of generating research than genuinely can improve practice and to connect researchers to actual practice.

Beyond relevance several highlighted the iterative cycles of design, implementation, and redesign that RPPs can afford.

I particularly like the back and forth between researchers and practitioners so as to ensure the solution will actually solve the challenges in practice.

The ability to create dynamic and responsive projects -- we know too little about CS education for more traditional approaches.

RPPs have the opportunity to surface creative and relevant problems/answers.

As noted in the quotes above, improvement was meant not only to inform practice but to build the research evidence base in ways that could guide others.

IV. Discussion

The views from the field described above came from CS educators who were interested enough in RPPs to attend a 2-day workshop to learn how to design an RPP. In general, participants highly valued the workshop so may have had a positive outlook on RPPs when they answered the question about what value they understood RPPs to bring to the field of K-12 CS education. In our analysis of the responses to the question, we note that roughly half addressed issues of inclusivity and the other half issues of the quality of implementation, including continuous improvement. Thus respondents saw the ways in which RPPs represented a more equitable (inclusive) approach to *CS for All* while also leading to more productive implementation efforts. Whether respondents focused on inclusivity or continuous improvement, RPPs were seen to produce insights and new knowledge that could inform immediate practice as well as build the research evidence base.

Themes that cut across these two sets of answers included the early stage of the field, the need to work towards sustainability, and the ways in which RPPs could productively shift power dynamics, and in particular empower teachers.

Less evident in responses was concern (or awareness) of the additional time, cost, and complexity of conducting robust RPPs. Scholars, including those who are proponents of RPPs, have noted the burden that this approach adds to the work, even if the pay-off is high (Cobb et al., 2018). The literature details the many dimensions that require attention to form and maintain productive RPPs (see Henrick et al., 2017). The question asked was about value and not about cost or trade-offs, so this omission is understandable.

In their responses, participants seem to voice a keen awareness of the need for the nascent field of K12 CS education to develop a shared vision, to hone realistic strategies, and to generate evidence of impact, as the

community works towards change, improvement, and sustainability. In this sense RPPs may indeed be well suited to the K12 CS field, as long as the additional costs (in time, attention, and money) are attended to so that they do not create a barrier to progress.

V. Conclusion

Our analysis of the responses to the question of what value RPPs bring to the *CS for All* community suggests a recognition in the field of a needto learn quickly while at the same time implementing and scaling quickly. The number of respondents to the survey is relatively small; yet, based on the total of 10 workshops we provided, we believe it is representative of the broad range of actors involved in *CS for All* – from industry, to computer scientists, and district, state and school personnel. It will be important to the field for studies of funded RPPs to document whether and how the value propositions described above come to fruition, and under what circumstances and at what costs.

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