Using Mediating Artifacts to Push for Greater Equity in Research Practice Partnerships

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Abstract

Strong research-practice partnership (RPP) relationships are defined in part by having routines and norms that support equitable participation of each partner, but exactly how those routines and norms are achieved is unclear. Utilizing cultural historical activity theory (CHAT), we examine two RPPs who shifted their mediating artifacts – the tools, rules, and division of labor that structure joint work – to move toward more equitable partnership. These narrative accounts provide insight into how RPP participants – researchers, practitioners, and graduate students – can leverage moments of change to maintain or regain equitable power distribution.

Keywords: Research Practice Partnerships, cultural-historical activity theory (**CHAT**), power

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Research-practice partnerships (RPPs) are an approach to community engaged research (CER) that bridges researcher and practitioner knowledge to develop solutions to problems of practice (Farrell et al., 2021; Penuel et al., 2015). Such approaches to RPPs may include Research Alliances (Roderick, Easton, & Sebring, 2009), Networked Improvement Communities (NIC) (Bryk et al., 2011), and Participatory Action Research (Whyte, 1991), each representing a different general structure for partnership work. Previous research on how RPPs begin and function has demonstrated the necessity of relationship development and maintenance for productive joint work (Booker, Conaway, & Schwartz, 2019; Henrick et al., 2017). Henrick et al. (2017) identify strong partner relationships via five indicators, two of these indicators include: establishing routines that guard against power imbalances and interaction norms that support equitable participation. Yet, equitable power distribution in partnership is an achievement, not a guarantee (Coburn, Penuel, & Farrell, 2021; Coburn, Bae, & Turner, 2008). RPPs have unique approaches, goals, and contexts, so clear-cut procedures for achieving equitable partnerships have proved elusive for researchers (Coburn & Penuel, 2016). In this paper, we ask: how can an RPP – and the individuals taking part – identify and improve routines and norms related to power and equity in their partnership?

To explore answers to that question, we employ Cultural Historical Activity Theory (CHAT) (Engeström, 2001) as a theoretical framework for analyzing two RPPs that experienced major disruptions due to the COVID-19 pandemic. CHAT is a theoretical framework designed to describe how people engage in activities, and in our analysis, we use it to understand how power shifted before and after the disruption. As such, CHAT provides us an analytical structure to describe how power dynamics can be actively rebalanced to allow for greater equity between partners. Specifically, we analyze partnership norms, or the mediating artifacts, that structure how we worked with our partners to articulate where shifts occurred when we worked towards more equitable power distribution in our joint work. We argue that even small shifts in the ways that partners work together within RPPs can impact power distribution.

Theoretical Framing

Historically, CHAT developed from two separate strands of Soviet psychology, both introduced to Western psychological circles in the 1970s. First, Vygotsky's (1978) sociocultural theory highlighted how individual human activity was connected to or "mediated" by the cultural environment around them. Second, Leontiev (1975/1978) and colleagues' (Chaiklin, 2019) activity theory described how individual actions contribute to collective activities. In the 1980s, Engeström (1987/2015) built upon both theories, bridging the idea of cultural mediation to collective activity to form Cultural-Historical Activity Theory (CHAT). Engeström conceptualized CHAT as a means to analyze the various ways organizations operated, attending to the micro-and macro-interactions of organizational contexts.

RPPs are collective activities taking place in contexts constituted by their own cultures and historical lineages. As such, we argue that CHAT is a useful framework for understanding

their structure. The CHAT conceptual framework considers the participants within an activity, the community, and the outcomes of interactions, as well as the mediating artifacts.[1] CHAT is a vast framework; however, for the purposes of our analysis, we focus on mediating artifacts, the non-human supports that shape the work of an organization or partnership (see Table 1 for terms used in this paper). In our case, mediating artifacts are the ways that partners work together and the systems partners use to maximize workflow. These include, the methods of communications (tools), institutional norms that dictate the behavior of those within the partnership and surrounding communities (rules), and the division of labor between participants within the activity (division of labor) (Engeström, 1987/2015). The interactions between these different components are important because both people and mediating artifacts play a role in determining the outcome of an activity (Roth & Lee, 2007). Importantly, the historical lens in CHAT emphasizes that activities, which include the people, mediating artifacts, and interactions between the two, are not static. Activities change in reaction to internal and external tensions, and CHAT is a powerful tool for describing how activities shift over time. For the sake of clarity and to reflect the language used in actual RPP work, we will use the phrase "partnership norms" instead of "mediating artifacts" in this paper (see Table 1).

RPPs are not isolated from events outside of the partnership that may lead to instability within existing work structures. These outside events are called disruptions and often reveal tensions (known as contradictions in CHAT) within existing partnership norms. Tensions are not the same as conflicts or problems within a partnership, but rather they are sources of potential change within a system (Engeström, 2001). Tensions present in fully functioning partnerships and may include disagreements amongst partners around the best approach to achieving project goals in light of disruptions. The fluid nature of RPPs, which includes researcher turnover, changes in sources of funding, quick moving timelines, and evolving partner needs, often leads to openings for tensions within RPPs. These tensions rarely result in the dismantling of a partnership, but act as opportunities for reflection and resituating power distribution within RPPs. We are interested in tensions because they are areas within an activity system that point to potential areas of growth and improvement within a partnership.

Our partnerships experienced disruptions like the COVID-19 pandemic and the social justice movement ignited by the murder of George Floyd. When we turned to RPP joint work in light of these disruptions, we realized our partnership norms previously viewed as sufficient generated tensions. For the sake of analysis, we needed to focus on a shared disruption between our two cases. Because the COVID-19 and the social justice movement sparked by the murder of George Floyd are deeply intertwined temporally and in the case of one focal RPP, geographically, it is impossible to know how our RPPs would have changed if one disruption occurred without the other. However, recognizing that the COVID-19 disruptions were experienced most similarly in our two cases, we are using the beginning of COVID-19 related shut downs in the United States in March 2020 as the core timestamp for analysis.

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[1] For readers interested in learning more about the CHAT heuristic and how to develop their own, we recommend reading Roth & Lee (2007) for a historical overview of the heuristic, and Fletcher (2021) for a breakdown of the different components of the heuristic for practical use.

Table 1. Definitions of key terms and their connection to the CHAT framework

Term within this paper	CHAT terminology	Definition	Example
Partnership Norms	Mediating Artifacts	These are the non-human aspects of a partnership that shape the way a partnership works. These can be grouped into three categories: Methods of communication, institutional norms, and division of labor.	Totality of systems that guide partnership work
Methods of Communication	Tools	These are the objects that partners use to maintain the work within a partnership and keep all partners informed on ongoing efforts.	Memos or email communications
Rules	Rules	These are the spoken and unspoken rules that guide the behavior of members within the partnership. This can include how meetings are run, the proper channels key decisions must be cleared through, or how communication between partners occurs.	Guidelines for acquiring and spending funding
Division of Labor	Division of Labor	Tasks within a partnership are divided between the various stakeholders.	Researchers are responsible for
Disruption	Disruption	Events from outside of the partnership that puts pressure on a partnership. Disruptions lead to tensions within the partnership.	COVID-19
Partnerships	Activity System	In our paper, the systems we are looking at are the RPPs which include both the people involved in the partnership work and the guiding supports that help make the work possible.	Cardboard Engineering project
Tension	Contradiction	Tensions are areas within a partnership that lead to instability in the partnership. These are the results of disruptions and are viewed as opportunities for growth within the partnership.	The need to renegotiate work flow as a result of a new staff member being hired.

CHAT is useful in analyzing partnerships before and after disruptions to systematically understand how partnerships shift their ways of working together in response. This analysis reveals power structures in relation to partnership norms and the ways in which tensions can be opportunities for greater equity between partners. We define equitable RPPs as partnerships that "are intentionally organized to...shift power relations in the research endeavor to ensure that all partners have a say in the joint work" (Farrell et al., 2021, p. 5). Shifts in power relations look different depending on the partnership, but in pursuit of equity, any shifts in partnership norms should prioritize both sides of the partnership possessing equitable say in how the outcomes of joint work are achieved. This does not necessarily equate to equal workloads or distribution of resources, but rather that each side of the partnership has influence over how the workload and resources are distributed across stakeholders. For example, in a partnership with four researchers and two practitioners, an equal distribution of labor may look like half of the labor on the research team and half of the labor on the research team. An alternative approach may be equal distribution across the six team members, resulting in a 2:1 balance of labor between the research and practice teams. In either case, we cannot say if the partnership is equitable unless we understand how they came to that distribution of labor, specifically if each side of the partnership had equal voice in creating the distribution.

In this paper, we illuminate how disruptions and tensions acted as opportunities for growth to move two RPPs towards greater equity between partners. We explore these shifts across two temporal moments – before and after the disruption, and in our two case RPPs, we consider the distribution of power and responses to system tensions to advance the following claims. First, it is the responsibility of the partnership teams to consider how larger structures of power influence their decision making and internally adjust to ensure equal control within the partnership. Attending to the partnership norms of an RPP provides a tangible starting place for partnerships to work toward greater equity. Second, we argue that an equitable partnership involves equal partner control over partnership norms and the ways of working together, but not necessarily equal distribution of labor. Third, equitable partnerships are achieved when partners have equal decision making power over the partnership norms – specifically methods of communication, division of labor, and rules.

Methods

Context and Participants

This paper emerged from conversations started at the 2021 Rising Education Scholars Helping to Advance Partnerships and Equity conference. At this conference, the first three authors, all graduate students, came together in a structured writing group guided by Van Steenis to consider how we could incorporate our discussions from the conference into work we could share with other early career scholars who may contemplate or do RPP work. We collaboratively recognized similarities between our efforts to reflect on and address (in)equitable power distributions within partnerships, particularly in relation to COVID-19 as an opportunity and challenge for partnership work. Our conversations led us to analyze two cases of joint work, a museum-based RPP which Goeke currently works in and a funder-researcher relationship for a project that Alvarez-Vargas currently works on. Analysis of these RPPs is not born from interpersonal tension or partnership break downs, but from the common influences outside the

immediate partnership that result in tensions. In this paper, we explore how intentional changes in the ways we work together provide insight into how partnerships shift to maintain or regain equitable power distribution.

Data Collection

Our data consists of project documents including grant proposals, work plans, meeting notes, and project reports (see Figure 2). These documents represent joint agreements and capture relevant moments of activity. Recognizing that COVID-19 was a central disruption in our work, we divided the data sources into sources concerning joint work before and after the COVID-19 disruption.

Table 2.
Summary of project artifacts used as data sources

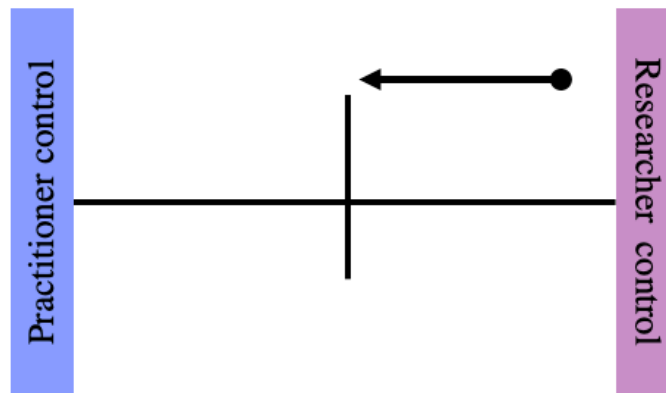| RPP	Time Point	Data Source	Size (pages)	Creator
Case 1: Cardboard Engineering	Before Disruption	2018 grant proposal (narrative section)	21	Joint Research and Practice Teams
		2019 project structure overview	3	Principal Investigator with Research and Practice Teams
		2019 project meeting notes	12	Joint Research and Practice Teams
	After Disruption	2020 project work plan	20 (slides)	Principal Investigation with Research and Practice Teams
		2021 research work plan	8	Research Team
		2021 data session memos	8	Joint Research and Practice Teams
Case 2: Math Basketball	Before Disruption	2019 grant proposal (narrative section)	12	Research Team
		2020 payment timeline	7	Funder and Research Team
	After Disruption	2020 project meeting notes	8	Funder created the template document. Funders and researchers edit this document as both prepare for monthly meetings.
		2021 project meeting notes	13	

Analytical Approach

We analyzed our data using the analytical lens of mediating artifacts or partnership norms, specifically focusing on how we organized labor across methods of communication, rules, and division of labor before and after disruptions impacted our partnerships. We term these two temporal snapshots "Before Disruption" -- focusing on partnership norms as of Fall 2019 -- and "After Disruption" -- focusing on partnership norms as of Fall 2021, when the tensions directly related to COVID-19 had been addressed. We triangulated partnership norms across separate data sources within each case to ensure accuracy. These descriptions – one representing the initial RPP structure and one reflecting the totality of shifts resulting from re-negotiation

based on COVID-19 – served as temporal snapshots of the partnership norms. We recognize that new tensions will arise in these RPPs, and thus, we did not see the After Disruption snapshot as a final or concluding activity frame.

Furthermore, to understand the origin and implications of the changes in partnership norms, we then applied the analytical lenses of disruptions, tensions, and power to the temporal snapshots. First, we compared the temporal snapshots, noting what changed in partnership norms between the two time points. We then captured how shifts in the partnerships related to power and equity, and we developed a visual representation of relative control over partnership norms held by different partner teams, specifically between researchers and practitioners. Analytically we understand power as the ability to influence – or control – the ways of working together. Of course, other axes of power are present in partnerships including racism, ablism, sexism, and the historical imbalance between research and practice, to name a few, but by attending to control over partnership norms, we aim to keep analysis at an actionable level. Visually, we represent power on a spectrum from complete practitioner control to complete researcher control, with the center point reflecting equal influence and thus an equitable partnership. We compiled our data into visual representations reflecting what changed, who drove these changes, and who gained more decision-making power over the partnership norms. For example, the power spectrum in Figure 1 shows a Before Disruption snapshot where the partnership norms are skewed toward researcher control. The After Disruption shift is indicated by the arrow plotted directly on top of the midline. This shift towards the midline indicates a more equitable partnership. We do not claim any partnership is perfectly equitable, but by plotting partner control with the temporal snapshots, we aim to provide a view of how our partnerships' activity system shifted to pursue a more equitable partnership.

Figure 1.
Visual representation of power spectrum demonstrating the distribution of control over how practitioners and researchers work together, referred to as Power Distribution. This visual is meant to represent a shift from researcher control towards equal control by the researchers and the practitioners.

Throughout analysis, all the authors met and reviewed the final coded examples and addressed discrepancies together until we were all in agreement about specific changes reflecting new modes of communications, rules, and divisions of labor. To ensure accuracy of temporal snapshots of partnership norms and narrative of change (Lincoln & Guba, 1985) and to honor the joint-work and ethical obligation to all of our partners, we brought our analysis to individual and

team meetings with our partners for member checking. Member checking meetings took two forms – meeting with individuals in the RPP and group meetings with partnership teams - and in both cases, participants were presented with current drafts of the partnership norms before and after disruption, power distribution scales for each of the three areas of partnership norms, and at later meetings, the draft of this paper. In these meetings, we asked the following questions:

1. Does this representation of how our ways of working together changed after the disruption reflect your perception of our joint work?
2. What was missed or misinterpreted?
3. How do you feel about this story being shared?

We made updates as individuals and partner teams noted inaccuracies, and we revised to ensure accuracy and transparency across stakeholders. We conducted this process until no additional changes were suggested. We also shared the final draft of this paper with all the partners involved as a final member check.

  We, as graduate student and early career researchers, cannot fully divorce our interpretation of power dynamics in RPP work from our consistent roles as researchers in our RPPs. However, we approach our collective analysis as individuals and members of teams who are deeply committed to equity, both in terms of educational outcomes of RPP work and in the day-to-day functioning of our RPPs. To temper the influence of our researcher perspective, we consistently engaged our practitioner partners throughout the writing process and relied on previous RPP documentation for all claims.

<div align="center">Shifting Power in Two RPPs</div>

Author 1's Work with Cardboard Engineering

  Cardboard Engineering is a grant-funded RPP focused on the development and dissemination of a makerspace designed to work best for BIPOC families in the Twin Cities. I began with the Cardboard Engineering in 2018 during the grant writing phase, joining a team of museum researchers and practitioners that worked on various previous makerspace and equity focused projects. Project work began in Fall 2019, with the intention of collecting our first round of data in the Summer of 2020. When COVID-19 hit the U.S. in March 2020, we placed the project placed on complete hold for 9 months. During those months, Minneapolis police officers murdered an unarmed Black man named George Floyd, sparking renewed calls for justice and reform. When the Cardboard Engineering Group came back together after the dual disruptions of pandemic and protest, we saw our partnership norms through new lenses, now seeing tension between our objective—to include many and diverse voices in each part of the project—and who was actively invited to contribute to different areas of work.

Before Disruption

  The Cardboard Engineering Group is embedded in a single science museum organization, and all researchers and practitioners collaborate on multiple projects simultaneously. This situational context means the Cardboard Engineering researchers and practitioners 1) have worked together in different combinations on previous projects, and 2) that beyond the immediate project at hand, the individuals will likely work together in the future. I joined the makerspace team as the partnership evolved to focus on iterative design for BIPOC family inclusion and on supporting other museums to implement inclusive makerspaces. The Cardboard Engineering Group benefited from long standing relationships of trust and consistency in

collaboration, and they developed settled routines and practices that became the basis for partnership norms for the new project.

Initially, and as reflected in the grant proposal, the settled expectations of the Cardboard Engineering RPP reflected a Research Alliance partnership. Research Alliances tend to involve researchers working largely independent of practitioners, reflecting traditional research and practice boundaries (Penuel & Gallagher, 2017). This structure protects the objectivity of research processes and allows practitioners to make data-informed decisions based on robust and finalized research outcomes. We solidified our commitment to traditional boundaries with two co-PIs, one representing the practice team and the other the research team. In our description of a dual team structure in Cardboard Engineering grant proposal: "Work will be carried out by two teams...The Practice Team has principle responsibility for running the galleries and documenting their practice in order to support other sites. The Research Team will conduct the ongoing evaluation, as well as the research studies." The researchers and practitioners (exhibition designers and maker educators) structured day-to-day work and decisions as largely independent entities with some structures that supported joint work. For instance, the team intentionally divided labor responsibilities with the practitioners in complete control of practice and researchers in control of the data collection and analysis processes. Members of the separate teams were allowed to attend each other's meetings "to enhance collaboration and communication", but it was not required. In reality, before the COVID-19 disruption, a researcher joining the practice team for the purpose of note taking and responding to research-related questions was the only consistent cross over between team meetings. Methods for communication focused on finalized documents (research reports, exhibition plans) shared via a Google Drive folder and monthly full team meetings structured around individual partner team updates. This structure, stabilized by a particular set of methods of communication, rules, and division of labor, had developed through the course of many previous successful RPP projects, and thus reflected the settled expectations and practices of RPP work at our institution.

After Disruption

In 2020, COVID-19 disrupted our settled routines and practices, unearthing contradictions in our RPP's previously imagined division of labor, rules, and tools. Our partnership felt the COVID-19 disruption in two ways. First, the 9-month closure of the museum delayed the makerspace implementation, and the institution could not reschedule, resulting in severe reduction of data collection opportunities. The time between makerspace iterations would no longer allow for finalized research products to be produced before practitioners needed to begin planning changes to the design. Second, the closure coincided with the murder of George Floyd and subsequent institutional reckoning with systemic violence, events which shifted RPP members' perceptions of power within the existing partnership structure. The Cardboard Engineering team and I returned to RPP work in late 2020 with a sense that tension existed between norms and desired outcomes as a partnership. More specifically the tension of how traditional research-practice boundaries embedded in our norms did not reflect values of power sharing and inviting diverse voices into decision making. This change in perception sparked a re-imagining of the relationship between the research team and the practice team. We decided to focus on data sharing and collaborative sensemaking as avenues to address both changes in project timeline and the pursuit of a more equitable voice in the project's research process and outcomes.

To achieve this re-imagined relationship, the research process required direct changes to routines and practices that had been established. The data itself became the item around which

the partnership established new ways of working for greater equity between researchers and practitioners. We adopted a new method of communication (see Figure 2), specifically data sessions where researchers and practitioners jointly looked at de-identified, but not extensively processed data, to invite practitioners into the research process. Outside of data session meetings, we used additional new methods of communication including guiding questions, previously examined de-identified data, and reflective memos to continue open communication beyond the meeting room.

We realized that for the new methods of communication to be effective, we had to similarly adjust the division of labor and rules (see Figure 3). In terms of division of labor, practitioners had to make time to attend these sessions and to engage in the new cognitive task of looking at messy data instead of clean findings. In preparation for these sessions, researchers needed to do more work to process data, including deidentification of video data, a further shift in division of labor. Recognizing that some practitioners may not have the bandwidth to participate, the Cardboard Engineering Group scheduled all data session meetings during working hours and made them optional for practitioners to attend based on topic interest. Each of these changes in division of labor resulted in additional labor for each partner team, but also was attuned to the priorities (research required deidentified data and different practitioners had priority topics of interest) and needs (greater timing constraints for practitioners) of the team members, reflecting shared control over the finalized distribution.

Finally, meaningful participation in data sessions required a shift in rules concerning who could contribute to data sensemaking (see Figure 4). In successful data sessions, practitioners voiced their insights regarding the data and contributed their ideas to address in the analysis. Researchers adopted the rule of stepping back in data sessions, letting practitioner ideas be central. However, the process of shifting our ways of working uncovered new tensions in the RPP structure. While our initial understanding of the tension focuses on practitioner voice during the research process, when considering changes to the partnership norms, a tension arose when deciding who was included on the practice team and the wide variety of people who actually served as practitioners in the makerspace. We specifically realized that visitor-facing staff -- who served as facilitators in the makerspace -- were not included. We had limited it to the practitioners in charge of designing the space. These lower hierarchical power staff members possessed direct and unique insights concerning the makerspace as the practitioners who spend the most time informally observing learners in this space. We then invited visitor-facing staff into our data sessions, requiring additional tweaks to our definition of practitioner and who was participating in the meetings. The process of re-imagining and re-negotiating our structures for joint work revealed additional tensions and power imbalances that required further shifts.

Figure 2.
Cardboard Engineering Groups' changes in methods of communication. Power shifted toward more equal partner control because practitioners and researchers were brought into more active communication, both contributing to the generation of the data session and documentation of insights.

Partnership Norm	Time Point	Description of Norm	Primary Control	Data Used	Shift in Power
Methods of Communication	Before Disruption	Researcher's hold monthly team meetings, attend practitioner meetings.	Researchers	2019 Project meeting notes 2018 Grant proposal	
		Practitioners have mutual access to planning documents and bring in prior contextual knowledge.	Practitioners		
	After Disruption	Data session as method for joint sensemaking. Thoughts were formally shared in the meeting. Outside of meetings, insights were shared via the production of and commenting on powerpoint slides and post-meeting memos. All de-identified data used in data sessions were made available for cross-team review.	Practitioners and Researchers	2021 Work plan	

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Figure 3.

Cardboard Engineering Groups' changes in division of labor. Power shifted toward more equal partner control because while labor increased for all partners, the type of labor was specialized to the individual partner's priorities and needs.

Partnership Norm	Time Point	Description of Norm	Primary Control	Data Used	Shift in Power
Division of Labor	Before Disruption	Researchers engage in research planning, instrument development, data collection, processing, analysis, and dissemination.	Researchers	2019 Project meeting notes	
		Practitioners engage in exhibition planning, dissemination of practical learnings, and collaboration with community groups.	Practitioners		
	After Disruption	Labor requirements increase for all partners, but increases are in relation to partner priorities, such as deidentification or topics of interest. Meeting times were set based on the needs of the practitioner team.	Practitioners and Researchers	2021 Work plan 2021 Report to external advisors	

Figure 4.

Cardboard Engineering Groups' changes in rules. Power shifted toward more equal partner control because of the joint decision-making concerning integration of practitioner voice into the research process and secondary redefinition of practitioner to include visitor-facing staff.

Partnership Norm	Time Point	Description of Norm	Primary Control	Data Sources	Shift in Power
Rules	Before Disruption	Written norms for interaction between everyone in the partnership (I.e., bring your authentic self), guidelines for responsibilities, and meeting grant stipulations.	Researchers	2018 Grant proposal 2019 Project meeting notes	
		Practitioners were not involved in research and data meetings.	Practitioners		
	After Disruption	Practice team allowed and encouraged to ask their own questions, investigation extends beyond the original grant to give practitioners power in production of research findings. "Practitioner" for the purposes of sensemaking is expanded to include visitor-facing staff.	Practitioners and Researchers	2021 Report to external advisors	

Overall, the Cardboard Engineering case study demonstrates how one RPP worked to disrupt their settled partnership power dynamics by specifically shifting the ways in which they engaged in research activities. Our shifts began immediately upon receiving grant funds and took place multiple times across the last 3 years, each time prompted by a small or large tension our partnership. The most recent shifts where we actively attended to power distribution were the most meaningful in terms of moving toward equitable partnership. We do not claim to have achieved an equitable partnership at this point, tensions continue to arise and further changes in our ways of working together become necessary. However, we do claim that by focusing on continual changes to the structural aspects of our partnership - the norms created throughout our collaboration - allow for intentional calibration and ultimately a more equitable partnership than initially envisioned.

Alvarez-Vargas' Work with Math Basketball

In this case we reflect on a disruption that affected our RPP but specifically created tensions in our relationship with our grant funder. The disruption of COVID-19 resulted in a research delays that created tensions between the division of labor and rules that the researchers and funders had agreed upon to receive the grant funding. Math Basketball is a grant-funded partnership focused on the development and evaluation of an intervention called Math Basketball – a suite of games designed to provide a predominantly low-income population Latinx students with greater opportunities to learn rational number reasoning through fun and socially engaging activities. The work originally emerged from a small group of researchers and teachers from a local charter school serving predominantly low-income Latinx students with a joint focus on improving instructional approaches to learning fractions and decimals. Together, we designed a basketball court with arches reflecting fractions and decimals and a life size number line to support students' rational number learning. Then we complemented the court with a set of scripted games. From 2018 to 2019, a series of pilot studies revealed that the games designed and implemented by researchers and the teachers at the school increased children's rational number reasoning (Alvarez-Vargas et al., 2021). Students enjoyed the activity, and the teachers saw the value and potential of the games (Alvarez-Vargas et al., 2021). Inspired by the potential of this suite of games, the researchers applied to and were awarded a large grant to continue to build and refine the games through iterative prototyping with teachers and students.

Before Disruption

Our grant funder contract was set to begin in August of 2020, and the grant budget was set to disburse periodically contingent on the completion of specific research goals (such as revising the games with teachers or developing tech supports), which were written by the researchers and funders. In contrast to traditional philanthropic management models, our grant funder established an active management model. In this model the funder actively provided coaching and guidance to the research teams during monthly meetings to ensure that funded teams met their specific project goals and the funder goals. The funder facilitated monthly check-in meetings identifying any challenges of the research, providing support, and maintaining clear communication and expectations of learning and progress. The funder brought expert support including an educator advisory council, measurement experts, and product design experts. This expertise helped our research team to overcome challenges like designing prototypes that could be implemented in real-world classrooms, identifying the best ways to measure math knowledge, and ensuring that throughout the whole process our work was rooted in social justice and racial equity.

After Disruption

In 2020, COVID-19 disrupted our plans of visiting schools in person and our vision to facilitate iterative co-design sessions to evaluate our prototype. COVID-19 impacted our funder-researcher relationship. Tensions arose around achieving the original iteration plans and the payment timeline. Originally, the objective was to iterate and redesign the prototype games with teachers and students to improve connections between the games and the classroom, and to develop additional tools and supports for the games. COVID-19 and the resulting safety measures prevented prototyping and direct engagement with schools. This meant that our original plans were no longer feasible, creating a tension between the division of labor –

researchers needed to design and iteratively improve upon the prototype -- and the rules – pay disbursement based on iteration cycles -- because the rules were not originally written with the flexibility to support a re-design of the research plan. In response the funder worked collaboratively with our research team to resolve these tensions. The funder and our research team developed new rules and methods of communication to support more flexibility with each other and to develop new norms of engagement with our local schools who were struggling to adapt to the new health guidelines and restrictions.

Our shifts in methods of communication included greater resource sharing between funder and researchers, streamlining of the reporting process, and shifting the milestones structure (see Figure 5). First, the funder took the lead in developing new community learning routines through Slack channels, sharing resources, and hosting learning events where the all the different funded research teams could share new ways of conducting research during a pandemic. The funder asked one of the funded research teams to share a brief descriptive report of a visit with their school partners to detail their approach to conducting co-design sessions under the new COVID-19 restrictions. Additionally, the funder streamlined the milestones so that instead of various milestones spread throughout the year, there are quarterly milestones, each composed of various deliverables. The funder made this change to create a regular and predictable schedule of work and payment for project teams. This new compliance allowed the researcher team to spend more time on designing meetings with the school partners to begin to co-design different games and activities that best suited students' needs. Finally, the funder continues to take the time to understand our teams' position from monthly conversations in active management meetings and bi-annual surveys that the funder used to check-in with all the funded teams. These ways of working together served to ensure transparency and collegiality between all funded teams and mutual agreement on research directions between the funders and the researchers.

Figure 5.

Math Basketball's changes in methods of communication. Power shifted toward more equal decision making because the funder used the researchers feedback to develop more flexible methods of communication.

Partnership Norm	Time Point	Description of Norm	Primary Control	Data used	Shift in Power
Methods of Communication	Before Disruption	Funder and researchers have mutual access to planning documents like meeting agendas and payment timeline.	Funders	2019 project meeting notes	
	After Disruption	Researchers conduct monthly consultations with educator leadership council and equity research advisory board to receive feedback. Funders establish community learning routines through a shared Slack channel, community learning events, and descriptive process reports for funded teams to share approaches to resolving new challenges.	Researchers and Funders	2020 Project meeting notes 2021 Project meeting notes 2022 Project meeting notes 2021-2022 Emails	

Lastly, addressing delays in the payment timeline required a change to the rules that the research teams and the funder established in the original contract. The funders shared power over these contract changes by renegotiating the structure with the research team (see Figure 6). We agreed on an additional three months to meet the deadlines, which permitted that the first prototype of games to be designed through virtual zoom sessions with our school partners. The funder also relaxed the requirement to gather student feedback on the new Math Basketball games prototypes in year 1 by deciding to focus more on the classroom and curricular connections, as opposed to playing games on the court with students because we could not yet attend the school in person. These changes reflected the importance of renegotiating the rules by sharing power over defining the expectations of the research.

Figure 6.

Math Basketball's changes in rules. Power shifted towards more equal decision making where the researchers and funders changed the rules around how often payment would be made and when deliverables had to be submitted.

Partnership Norm	Time Point	Description of Norm	Primary Control	Data Used	Shift in Power
Rules	Before Disruption	Submit overall plan in research grant proposal	Researchers	2019 Grant proposal	
		Establish payment timeline and year 1 goals based on research proposal.	Funders	2019 Payment timeline	
	After Disruption	Researchers and funders renegotiate measures of success and collaboratively make changes to the payment timeline. Monthly meetings are converted to quarterly active management meetings. Develop a survey to facilitate process of milestone renegotiation.	Researchers and Funders	2020 Project meeting notes 2021 Project meeting notes	

Funders hold considerable amounts of power over how research and community partnership efforts form because they often determine the distribution of resources. However, when school closures and limited teacher availability delayed deliverable production, the funders and researchers re-negotiated the expectations around the deliverables and increased flexibility in the lines of communication to allow for flexibility and increased support for research-practitioner efforts. The funder explicitly discussed their active management approach and involved the researchers in the decision-making process by coaching the research team in the direction of success rather than engaging in punitive and evaluative routines upheld in some other research funding agencies. By addressing the rules and methods of communication that guided the funder-researcher interactions, the funders permitted more flexibility for researchers working in RPPs while still meeting the needs of the funders. Researchers reclaimed power over the direction of the research and its timeline by being allowed to re-negotiate the rules and methods of communication for reporting and disseminating findings.

Discussion

In our case studies of RPP partnerships, we illuminated how attention to partnership norms in light of disruptions and tensions allowed us to work towards greater equity across partners. In the Carboard Engineering case, we see a lateral power relationship that spanned multiple departments within the same institution, while in the Math Basketball] RPP, we saw a hierarchical power relationship between practitioners, researchers, and funders. In both cases, COVID-19 revealed underlying tensions within the partnerships, and as a result, both RPPs re-negotiated the distribution of labor, rules dictating roles within the partnerships, and developed additional methods of communication in order to both address the tensions and established more equal power over the partnership norms. From these two case studies, four overarching considerations for emerging scholars interested in engaging in RPP work arose:

Consideration 1: When and how will tensions arise?

Tensions are a constant part of activity systems that can and will result in instability. They can arise from small changes within a partnership like resource availability or in response to major disruptions such as the COVID-19 pandemic. Particularly when an RPP has thoughtfully established their partnership norms, experiencing a tension in the partnership may be discouraging. Instead of ignoring or fearing tensions, researchers and practitioners can see these moments of instability as opportunities for positive transformation. We specifically encourage researchers and practitioners to embrace the process of addressing tensions as a moment for greater equity, specifically by attuning to power distribution over decision making on partnership norms. By doing so, they can maintain or establish equitable distribution of power in the process of re-establishing stable partnership norms. As noted in the case of Carboard Engineering, shifting partnership norms related to methods of communication produced awareness of a new tension related rules about who is considered a practitioner. The realization of additional tensions does not render the initial changes meaningless. Instead, additional tensions are opportunities for new insights about power distribution and opportunities to pursue further equity. Since writing this paper, the RPPs described have continued to shift the established partnership norms towards more equitable partnerships, reflecting the reality that tensions will always arise in RPP work.

Consideration 2: How can tensions be leveraged to continually push for equitable RPPs?

Tensions are opportunities for growth in partnership work (Engeström, 1987/2015). The growth that occurs lies in the hands of the RPP participants. Importantly, it is up to the partners to attune to how tensions provide insight into how power is distributed and leverage that awareness to produce more equitable partnership norms. This work to shift partnership norms can take place as thoughtful and intentional discussions across partners to address the tension and reorganize modes of communication, rules, and routines. We believe that small, rather than large or drastic, intentional shifts between partners can shift RPPs towards more equitable power distribution. As we see in the case of Math Basketball, the process of addressing tensions around administrative hurdles did not change the entire power structure between funders and RPPs; the funder still had considerably more power than the funded research teams. However, the changes in norms caused by the pandemic reflected the needs and priorities of both parties. Those particular changes allowed more research team control over the norms toward equity.

We advocate as researchers that we see partnerships in constant flux and always having the potential to be made more equitable. This work is achieved by recognizing the individually or

jointly controlled partnership norms and by embracing tensions as opportunities for improvement.

Consideration 3: What is the role of emerging scholars such as graduate students?

Graduate students tend to hold lower hierarchical power in RPPs. Writing as emerging scholars ourselves, we recognize that graduate students and other emerging scholars may feel that they spend more time enacting partnership norms, not influencing the decision making around them. However, the insights from the enactment of partnership norms is invaluable for generating prospective changes. As such, we can influence the power dynamics of the RPP and shape RPPs towards greater equity through small choices in the creation of those norms. By having a seat at the RPP table and taking on a role of advocate for both practitioner and researcher needs (Wegemer & Resnick, 2021), graduate students can ignite conversations around equitable practices and distribution of power within their RPP. In considering our roles as graduate students within our respective RPPs, we have come to realize that while we do not hold the greatest power over the partnerships, our position grants us power in elevating practitioner voices within research meetings and encouraging attention towards equitable practice – a necessary and important role in pushing RPPs towards greater equity. We would like to recognize that the power given to graduate students to contradict PIs, raise practitioner voices, or advocate for equity work within their partnerships is not equal between graduate students, and students of color or non-dominant genders within their field may face retaliation for raising their voices. As such, it is also a responsibility of those in leadership positions within the partnerships to listen and act upon what graduate students or other individuals in lower power positions highlight and advocate for equal control over norms across the partnership.

Consideration 4: Using CHAT as a Tool for Reorganizing Partnership Norms

RPPs vary considerably and thus the equity work each partnership undergoes will look different to address the specific areas of growth existing within the partnership. CHAT is one possible framework to ignite discussions amongst stakeholders about equity work and to shift decision-making power towards a more equal balance between practitioners and researchers. These conversations may start with discussing the various ways of working together within the three work facets—methods of communication, rules, and divisions of labor—and using the power spectrum to identify current and desired power distributions. These discussions can be used to inform the development of strategic plans, partnership goals, or development of new partnership norms to shift the partnership towards greater equity. Based on our discussions with our partnerships during this study and our methods of analysis, we created a worksheet (see Appendix A) that partners may use to guide these conversations as well as some reflection questions that partners should consider as they engage with the framework. Equity work is not a quick process, nor does one shift guarantee equitable power distribution. Thus, we encourage partnerships to continually revisit their power distributions and consider how they shift over time to actively work to ensure equity.

Conclusion

CHAT may not be the perfect theoretical framework for operationalizing your RPP, but we encourage you to consider how power is distributed within your RPP in relation to partnership norms -- mediating artifacts in CHAT terms -- that anchor the work of the RPP. By exploring existing power dynamics within your RPP and how that power distribution came to be,

we can all gain a clearer understanding of the direction that our respective RPPs can shift to become more equitable.

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Appendix A.

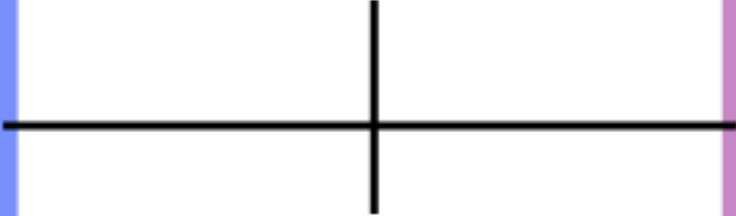**RPP Power Distribution Reflection Worksheet**

This worksheet is a guide to assist in starting conversations within your Research-Practice Partnership about equity, power distributions, and joint work. Feel free to adapt this worksheet to meet your partnership's needs.

Directions: First, brainstorm concrete examples of each of the three work facets – methods of communication, rules, and division of labor - in your partnership and write them in the "Examples from Partnership" column. Afterwards, ask various stakeholders within your partnership to mark on a scale of practitioner controlled (far left) to researcher controlled (far right) who holds the power in decision-making for each of your examples. A mark in the middle of the diagram indicates equal decision-making power over that aspect of the partnership. Afterward, look at the power distribution scales collectively, potentially responding to the following reflection questions.
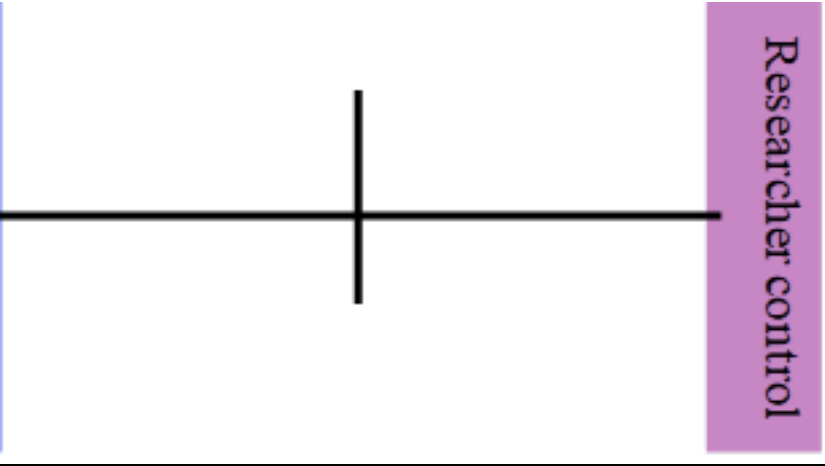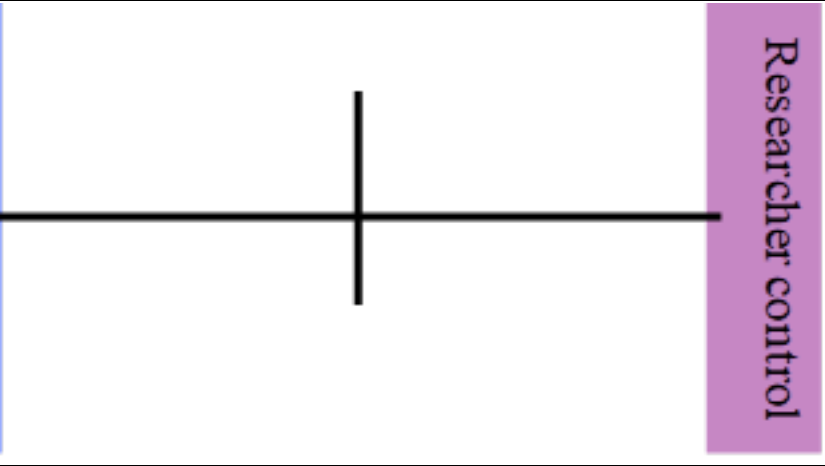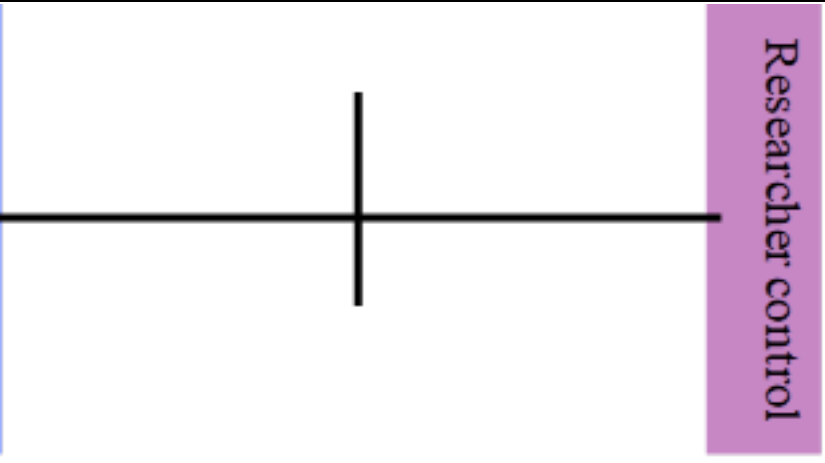

Reflection Questions:
    1. What is going on – internally, locally, nationally, globally? In what ways do those events affect our partnership? What tensions have arisen as a result?
    2. Which of our norms – methods of communication, rules, and division of labor - might we want to pay attention to / shift?
    3. What are the affordances and limitations of how things are working now? What could be gained or lost by doing things differently?
    4. How might we do things differently? What do we want to commit to try?
    5. If we did this again in [6 weeks, 6 months, 1 year, etc.], how would we like these power distributions to have shifted?
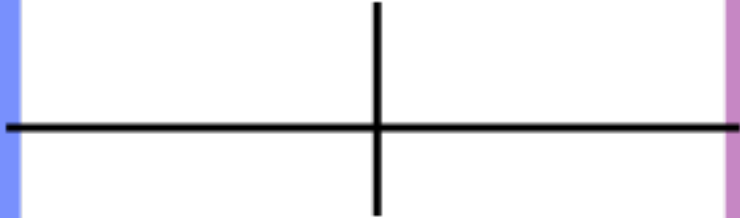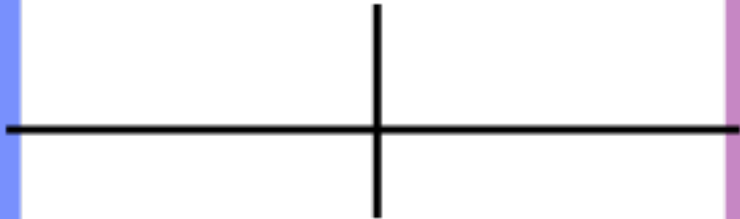
Methods of Communication: These are the objects partners use to maintain work within a partnership and keep all partners informed on ongoing efforts (Ex: memos or emails)	
Examples from Partnership	**Power Distribution**
	Practitioner control ———————+——————— Researcher control
	Practitioner control ———————+——————— Researcher control
	Practitioner control ———————+——————— Researcher control

Rules: These are the spoken and unspoken rules that guide the behavior of members within the partnership (Ex: how meetings are run, procedures for spending funds).	
Examples from Partnership	**Power Distribution**
	Practitioner control — Researcher control
	Practitioner control — Researcher control
	Practitioner control — Researcher control

Division of Labor: How tasks within a partnership are divided up (Ex: assignment of data collection or writing tasks).

Examples from Partnership	Power Distribution		
	Practitioner control		Researcher control
	Practitioner control		Researcher control
	Practitioner control		Researcher control