Tensions in a Multi-Tiered Research-Practice Partnership

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Abstract: Bridging the research-practice gap remains an important focus of much learning research. An important challenge is for researchers to organize design to leverage both the expertise of practitioners and that of researchers in an equitable arrangement. This study examines such an arrangement by analyzing the joint work of a design-based research-practice partnership. It focuses on the *design tensions* (Tatar, 2007) associated with coordinating the needs of participants from three different tiers of design—involving teachers, researchers, and district administrators—related to the content of designs and to the mechanisms for bringing content to scale within the district. This study argues for the value of a common vision and design methodology to enable design tensions at multiple levels to become generative influences on design.

Major Issues Addressed

Given the seemingly intractable nature of some of the problems facing education today, it seems reasonable to approach these problems in a different manner in hopes of developing a novel solution. One such approach includes developing expertise horizontally across multiple dimensions rather than vertically within a single dimension for individuals and communities (Engeström, Engeström, & Karkkainen, 1995; Gutiérrez, Hunter, & Azurbiaga, 2009). In such an arrangement, those who possess the ability to leverage knowledge from different domains and viewpoints will more likely develop a novel solution than those who approach the problem with vertical or isolated expertise (Engeström et al., 1995).

Leveraging expertise is a central challenge in design. Design research is premised on the idea that multiple forms of expertise are needed to develop powerful, usable, and practical innovations to improve learning (Collins, Brown, & Bielaczyc, 2004). Teachers are often participants in design research, most often as implementers of designs (Ormel et al., 2012). Sometimes, their involvement is structured to be more equitable, as in co-design (Penuel, Roschelle, & Shechtman, 2007).

Research-practice partnerships (RPPs) are long-term, mutualistic collaborations between practitioners and researchers that are intentionally organized to investigate problems of practice and solutions for improving district outcomes (Coburn, Penuel, & Geil, 2013). RPPs are aimed at increasing the relevance and usefulness of research for practitioners to support instructional improvement at scale (National Research Council, 2003). Some RPPs are *design research partnerships,* that is, they are organized with the aim of designing innovations that can have an impact on entire educational systems, such as school districts.

This study uses a *design tensions framework* (Tatar, 2007) to analyze how the organization of a design research partnership successfully leverages horizontal arrangements of expertise in order to solve complex problems in a way that accounts for multiple perspectives. Studying RPPs can provide practical insights into how the research-practice gap between traditionally insular research universities and traditionally isolated school practitioners can be made narrower through joint activity. Such efforts, however, rarely unfold without complications. This study seeks to highlight the effect of tensions on the design process within the RPP, the benefit of a shared vision among participants, and routines for identifying alternate perspectives on design in partnership work. Specifically, this study examines how tensions of scaling can still become issues of productive design rather than disrupting design. As such, its primary aim is to contribute to our understanding of the practices of design in the learning sciences, particularly how these practices can be organized to effect improvement at scale.

Contextualization

During the past two years, researchers from the University of Colorado Boulder and a large research-non-profit in conjunction with leaders and teachers from a large urban school district in the northeastern United States have engaged in joint work as part of a RPP funded by the National Science Foundation through a multi-year grant. The overall aim of this partnership seeks to support the instructional goals of the district through the design and implementation of a digital platform called EdTrex. EdTrex will allow for the customization of the district's curriculum in 9th grade Algebra, enhancing it with high-quality mathematical tasks aligned to the Common Core State Standards for Mathematics (CCSS-M) while simultaneously increasing teachers' understanding of the CCSS-M through professional development as part of the co-design process.

The RPP under study here has an interwoven "multi-tiered" structure. Figure 1 presents a schematic of the overlapping organization of design activity within the RPP. One tier, dubbed the "leadership tier," involves regular meetings between district leaders, researchers, and designers to plan activities for the year in regards to the customization of the district's Algebra curriculum through the EdTrex platform as well as determine avenues for eventually bringing the EdTrex project to scale across the entire district. Another tier involves regular meetings between the project leadership tier and a Teacher Design Team (TDT) comprised of other practitioners in the district in order to engage them in co-design activities for EdTrex. Yet another group meets regularly to discuss the research and engineering aspects of the project. Researchers and designers from the university and research non-profit participate in these sessions.

Despite the potential affordances of direct collaboration between education researchers and education practitioners, productive and sustained examples of such deeply collaborative partnerships remain rare. RPPs provide a collaborative structure with which to implement in practice a means of addressing this lack of coordination of expertise between schools and academia. A need for understanding how such RPPs engage in joint work—notably the nature of breakdowns and tensions that arise and affect the efficacy of collaboration as well as possible avenues for their amelioration—still remains. For those in the learning sciences community pursuing similar collaborations around bridging the research-practice gap, this study offers fundamental issues of collaborative design research to consider. Specifically, this study seeks to add to our understanding of design tensions framework methodology through its analysis of tensions in a multi-tiered, tripartite RPP participating in joint design work.
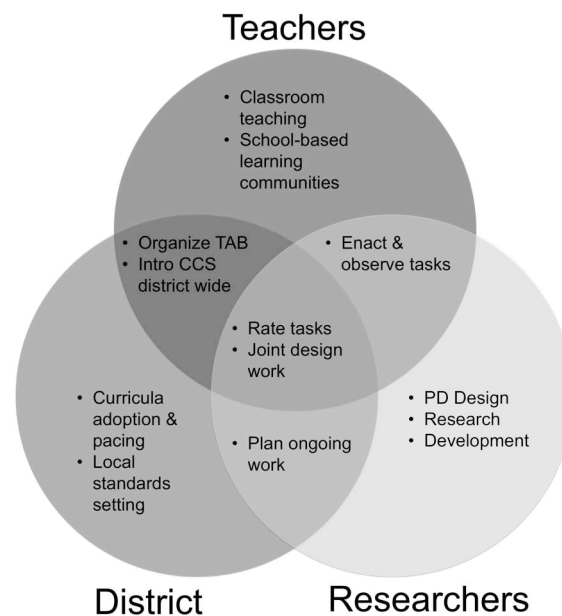

Figure 1. Overlapping activity structure of the multi-tiered EdTrex RPP.

Theoretical Framework

Focusing on the joint design work undertaken by the three tiers of the RPP, particularly the breakdowns and tensions that occur within the collaboration, this study utilized a *design tensions framework* (Tatar, 2007) to guide data analysis. A design tensions framework, fundamentally, posits that "design exists because of the tension between what *is* and what *ought to be*" (Tatar, 2007, p.415). Tensions become the source of design decisions or choice points; design becomes no longer about solving problems but about goal balancing and seeking optimal compromises within the system (Tatar, 2007). Such an approach allows for more design possibilities because it transcends the rigid solution choices that typify a design space and instead seeks unbounded, crosscutting design possibilities to create a solution space of greater flexibility (Tatar, 2007). Within this study, a design tensions framework affords maneuverability and guidance in understanding and addressing design tensions at multiple levels. In addition, making design tensions explicit facilitates conversations among participants about diverse perspectives on design and whether these different perspectives are being adequately taken up in deliberations.

Design tensions can occur at four different levels. The highest level of tension, *vision*, describes the state of an incongruity between "what is and what ought to be" (Tatar, 2007, p.417), which underscores the fact that design is a goal-driven, value-laden enterprise. The tension found on the next level, *approach*, centers on bringing the values that make up the vision of what "ought to be" into the current state of reality (Tatar, 2007).

Here, much recursive design work occurs since participants have the volition to choose and alter approaches to address design tensions (Tatar, 2007). Below *approach*, we find the *project tensions* associated with the actual decisions of implementation to enact the approach that either fall under the designers' influence or have become a point of contention between participants (Tatar, 2007). Finally, the last design tension, designated *"as created" situations* (Tatar, 2007 p.418), describes the fallout from any course of action taken. In other words, though an action may resolve one tension, new tensions will inevitably result from taking the aforementioned action.

Methodological Approaches

A descriptive case study of dynamics within a single RPP, this study applied an ethnographic approach to data collection and focused on the interactions among and between members of the research practice partnership. Participants included 11 TDT members, 3 district administrators, and 6 researchers. The authors of the study collected data from the vantage point of a participant observer during all collaborative design work. Sources of data for interactions between and among the groups include observations of 21 regular teleconference and face-to-face meetings, analysis of correspondence that spanned 10 months between groups via e-mail, analysis of 15 semi-structured interviews with TDT members, and analysis of various artifacts related to both the meetings themselves, such as handouts and agendas, and artifacts related to the district aims of the joint collaboration.

Substantiation

Throughout the joint work of the RPP, the participants engaged with all four levels of design tensions put forth by Tatar (2007). Table 1 provides a summary of the different levels of design tensions encountered. How the group engaged with these design tensions greatly determined the course and effectiveness of the design process. This study argues for the value of a common vision and design methodology in order to enable design tensions to become generative influences on design. Below, how each level of design tensions influenced the design process within the RPP is discussed.

Values

Within this collaborative endeavor, the vast majority of participants shared a common understanding of the design tension of *vision*, of "what is and what ought to be," in regards to the overall telos of the EdTrex project (Tatar, 2007). With few exceptions, participants from all levels of the multi-tier RPP felt a desire to revise the current 9th grade Algebra curriculum. As summarized by a researcher speaking at an early meeting to fellow participants, this task called on RPP members to "digitally enhance their curriculum," to "increase the richness of mathematical tasks" and "increase student engagement." A district administrator at the same meeting echoed this enthusiasm by referring to the EdTrex platform as "the place to go…not just for us but for all of the city." Generally, the 11 TDT members expressed enthusiasm with doing curricular work during interviews with only one practitioner remarking "to be completely honest the curriculum development type of thing is actually the aspect of teaching that I'm least interested in." This alignment of vision, a shared sense through all levels and groups in the RPP of what "ought to be," allowed increased cohesiveness in the direction of design and provided a common touchstone for participants.

Approach

In terms of the design tensions regarding *approach*, this area too saw much alignment. Though the leadership tier of the RPP, comprised of the district administrators and researchers, devised the overall framework of how participants went about co-design activities within meetings, etc., teachers nonetheless endorsed the general approach with one teacher even exclaiming during a meeting, "I'm technically a designer now too, aren't I?" As outlined in the theory of the design tensions framework, this alignment of approach should not prove surprising (Tatar, 2007). Since the values portion of the design tension *approach* matches with the "ought" portion of the higher-level *vision* design tension, and having already established a congruency amongst participants in the RPP in that regard, one would expect similar attitudes from participants regarding the approaches applied.

Project Tensions

Though numerous *project tensions* did arise, we will examine only one in detail here (see Table 1 for a list of other project tensions). Project tensions proved both the most problematic in terms of affecting the cohesiveness of the RPP but also the most useful in terms of framing design choices. With one of the agreed-upon goals of the project stipulating that the EdTrex platform scale across the district, much of the design attended to this effort. As mentioned previously, design is a value-laden enterprise and participants apply those values in conjunction with their expertise when making design choices.

Though participants seemingly all valued the idea of bringing the EdTrex to scale, the decisions of implementation to achieve this goal surfaced different, equally valid concerns. The district administrator group of the RPP adopted a more conservative approach to scaling by gating researcher access to teachers whereas

researchers desired a more aggressive approach of direct access to teachers at their school site to support scaling and EdTrex. The district administrators' reasoning seems to stem from their expertise of each school's unique situation, demonstrated through their impressive knowledge of the personnel at each site on more than one occasion, and a likely concern for teacher autonomy as reflected in their rebuffing of an offer from the researchers to assist with a new teacher training, saying in an e-mail the teachers "are fine with handling this introduction to EdTrex for the new Algebra 1 teachers themselves."

In keeping with the tenets of a design tensions framework, participants navigated this tension around scaling by attempting to balance the goals of participants to reach an optimal compromise (Tatar, 2007). Recognizing a need of teachers for supporting the implementation of tasks along certain dimensions, particularly language supports for emerging bilingual students, the leadership tier of the RPP realized that the EdTrex could be the "delivery vehicle" to provide teachers across the district with the instructional supports they need. Proposing that TDT teachers could broker the distribution of materials, one district administrator stated during a meeting, "[W]e'll focus on where we have a TDT member to do that and then where we don't have a TDT member…" "Try to get one," completed a researcher. Scaling the EdTrex more quickly now seemed more desirable. Even though researchers did not gain direct access to teachers, they still seemed agreeable to the compromise since in the words of one researcher during the same meeting, "More TDT teachers would help to spread the work load," and, according to another researcher "in some of these schools it's kind of fuzzy to see how things operate, but as we learn more about it then hopefully that will help our scaling issue." Current plans are for the RPP to co-design professional development task support modules that TDT members can share with their colleagues at their sites.

"As Created" Situations

As predicted by the theory of the design tensions framework, the enactment of approaches to alleviate design tensions in turn created new tensions falling into the category of *"as created" situations* (Tatar, 2007). Similar to the previous section regarding *project tensions*, numerous *"as created" situation* tensions surfaced in analysis of the data. The most prominent will receive discussion here (see Table 1 for a list of other "as created" situation design tensions). From interview and survey data, clearly, the approach conceived of by the leadership tier of the RPP placed a large time burden on members of the TDT. When asked, "What challenges did you face in participating in EdTrex?" fully seven of the nine teachers who answered this survey item referred to "time" being an issue. Specifically, one teacher responded, "Finding the time to analyze and go through the tasks on top of my current load of work." Undoubtedly, attempts to remedy this situation will lead to the creation of a new design tension. Perhaps, however, an optimal compromise agreeable to all participants of the RPP can be achieved (Tatar, 2007).

Table 1: Design tensions within the EdTrex RPP

Vision	Is: Current Algebra curriculum does not align to the CCSS-M and has tasks of low quality	Ought: Revised Algebra curriculum has high-quality mathematical tasks aligned to the CCSS-M; wide adoption; sustainable
Approach	Project Drivers: Co-design of digital platform, selection and rating of tasks, implementation of tasks in classroom	Values: Rigorous curriculum, equitable design partnership, high utility of tool
Project Tensions	Tension 1	Gated Access to Practitioners vs. Direct Access to Practitioners
	Tension 2	Practice Tasks vs. High Cognitive Demand Tasks
	Tension 3	Teacher Pace on Scope & Sequence vs. District Guidelines
"As created" Situations	High demands on teacher time; teachers disagreeing with EdTrex content and leaving RPP; too few tasks in some areas of EdTrex	

Conclusion

This study examined the design process of a multi-tiered, tripartite RPP by collecting data using a participant observer ethnographic approach and analyzing data through the theoretical lens of a design tensions framework (Tatar, 2007). Central to the contribution of this study is an enhanced understanding of the practice of design, particularly in relation to the unique multi-tiered structure of the RPP. This study highlighted the importance of

participants at all levels of a multi-tiered RPP sharing a common understanding of the *vision* design tension. As mentioned previously, a common *vision* within this framework posits that the *approach* design tension shall also demonstrate congruency amongst participants. Within this multi-tiered RPP, such alignment allowed participants to leverage their expertise synergistically in designing the EdTrex platform and avoided devolving into directionless design. Additionally, having a shared understanding amongst participants at the highest levels of the design tensions hierarchy supported the navigation of design tensions found at the *project tensions* level as participants engaged in balancing the goals of members of the RPP towards an optimal compromise.

Additionally, analysis in this study suggests potential mechanisms for learning scientists and design researchers to consider in terms of to how the structure of a multi-tiered, tripartite RPP can support effective co-design. In the interweaving multi-tiered participation model examined, the intentional allowance for interaction between different participant groups within different tiers in the RPP increased the likelihood of surfacing more design tensions and revealed areas for the RPP to jointly attend to across multiple participant groups. The design tensions served as opportunities for participants to make potentially productive design decisions since the tensions themselves represented needs to be addressed in the design of a co-designed object. In sum, this suggests that fostering interaction between participant groups within different tiers can lead to more unearthing of design tensions (particularly at the "as created" situations level), which in turn leads to more possible opportunities to engage in potentially productive design decisions across multiple levels. Therefore, the possibility that multi-tiered participation structures are more generative in terms of pushing design than other structures seems a plausible avenue worthy of further exploration.

Lastly, while bringing together groups of participants with differing expertise into a horizontal arrangement, as found in a multi-tiered RPP, may increase the likelihood of a lack of cohesiveness in shared understandings of design tensions, it can also allow for more maneuverability in reaching compromises amongst groups. As illustrated in the project tension around scaling in this study, with more participants—each with differing expertise, roles, and needs within a system—more capacity for negotiation of an optimal arrangement develops as particular groups' interests can overlap productively in a complementary manner with others' interests in ways they could not have with less varied participant groups.

Relevance to Conference Theme

In a fundamental manner, this study demonstrates the conference theme of "learning and becoming in practice." Indeed, a research practice partnership (RPP) epitomizes the notion of applying what is learned—either at the level of the learning researcher or at the level of the learning practitioner but more likely all of the above—towards the creation of a co-designed object, the express purpose of which is to positively impact the realm of practice at multiple levels. The inclusive nature of a multi-tiered RPP serves as an exemplar of how the practice of learning research can intersect with the practice of others, bettering all involved.

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