

## **Fam Jam STEM & Bridging Practices: Fostering Rightful Familial Presence in Middle School STEM**

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### **Objectives or purposes**

This study investigates instructional practices that support *rightful familial presence* in STEM as a mechanism to address the continued racial/class gap in STEM achievement for historically marginalized students. We define rightful familial presence as a form of authentic family engagement that 1) legitimizes families' community cultural capital, and 2) fosters capital movement between families and schools, especially when these forms of capital have historically been marginalized within STEM learning. We ask: *What practices grounded in research-practice-partnerships support rightful familial presence, and how do these practices facilitate capital movement between families and schools for STEM teaching and learning?*

### **Background & framework**

A key macro-structural inequality in STEM education for youth of Color is in how parents/families are valued in school settings. While the positive impact of parental involvement in school on children's learning has been documented (Boonk et al., 2018), most models of parental involvement are rooted in White, middle-class power structures that reproduce racial and class inequalities (Paredes-Scribner & Fernández, 2017), and obscure how parents' social and cultural contexts influence their interactions with schools and teachers (Delale-O'Connor, 2019). There remains a dearth of knowledge on how parents are rightfully invited to contribute knowledge, wisdom and expertise to learning STEM, especially regarding how teachers connect school-based knowledge to familial funds of knowledge (Stoehr & Civil, 2019).

Our work is grounded the Rightful Presence Framework for guiding justice-oriented teaching and learning (Calabrese Barton & Tan, 2020). We also draw upon Yosso's (2005) community cultural wealth framework to explicitly identify the kinds of community cultural capital parents might be drawing from. Thus, we refer to rightful familial presence as a form of parental engagement that legitimizes families' community cultural wisdom and fosters capital/resource movement between families and schools, especially when these forms of capital have heretofore been marginalized within STEM learning.

### **Methods**

We draw upon participatory Design Based Implementation Research involving university researchers, teachers, parents, and youth in two urban school districts. Over a semester, we collaboratively enacted the Rightful Familial Presence in STEM project, through a sequential process of four collaborative research-practice-partnership activities: exploring familial capital for STEM learning (X hours), Curricular & Instructional Explorations and Adaptations through

Parental Capital (X hours), Enactments and Experiences (X hours), and Reflective Dialogues (X hours).

We conducted studies of 4 classrooms with teachers in two settings. In addition to participating in the pre-enactment sessions, focal classrooms were visited daily for the 6-week enactments of two units: Stress & Sustainable Classrooms. Data Sources include Student practical measures; b) classroom observations, c) teacher reflections on sample study work, d) student work, e) teacher, parent and student interviews. Analysis involved multiple stages and levels of coding based on open-coding and constant comparison procedures.

## **Findings**

We focus on two practices that cross cut both sites and created spaces for authoring new forms of familial presence in STEM, even when parents could not be physically present in the science classroom.

### *1) Rooting and tending to emergent STEM epistemologies in familial values and wisdom*

Youth and families centered their everyday experiences, expectations and aspirations during curricular design. For example, they expanded the definition of sustainable communities, thereby applying new understandings to the classroom engineering challenge focus, and design processes that students eventually undertook. Parents and youth challenged us to consider the “happy healthy and just” framing of sustainable communities to also include loving and respecting. We spent time in classroom talking about what this means, what this looked like in their electric art projects, and how we could apply this expanded definition to the sustainable classrooms engineering challenge – in terms of challenge framing, and in how students took up each aspect of the design process (defining problems, designing solutions, testing and refining prototypes).

### *2) Mapping/storying myself into STEM*

Parents unanimously noted and described how their children were exhibiting stressful behavior related to school. In the Stress unit, youth and families centered the youths’ embodied experiences into the STEM classroom in ways that are consequential to their learning and well-being by mapping youths’ stress experiences. Students produced a school-stress map where students, using a blue-print of the school building, designed a key to indicate where, how, when they experienced or witnessed what kinds of stressful interactions. This focus on the social environment is then connected to students creating long-term stress models on the body. In addition, youth designed and conducted a community survey in their school to find out the key stressors in their community in order to further map their stress school-scape.

## **Significance**

Parents of color have historically been marginalized in school-parent interactions generally and especially in disciplinary-consequential ways. This study provides insights into how rightful familial presence in STEM might be supported and the potential of such presence to youths' STEM experiences.

## References

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