

Metaproblems about Techquity in a Research-Practice Partnership

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Abstract: Little is known about practices and supports needed for educators to broker student learning beyond the classroom and among their interests and everyday settings. This study examines an emergent research-practice partnership organized around the codesign and scale of *techquity*, or practices at the classroom, school, and district level that leverage technology for more equitable and culturally responsive education. The concept of *metaproblems* (Jonassen, 2000) is adopted to analyze the problems of practice that focused initial collaboration about the codesign of techquity practices and the positioning of educators as techquity brokers. Three metaproblems defined the initial partnership and joint work: Using tools for engagement, exploring culture and identity, and pursuing interest-driven learning. The importance of these metaproblems for continued collaboration in the research-practice partnership is discussed.

Diverse connections between school-based and out-of-school learning have motivated inquiry into youth and their pursuit of interests across settings, supports for lifewide learning pathways, and the roles of educators and schools in distributed learning ecologies (Banks et al., 2007; Bevan, Bell, Stevens, & Razfar, 2013). One model that has guided noteworthy research and programming is connected learning (Ito et al., 2013), an articulation of learning and design principles that advocates robust youth participation in peer-supported, networked, and interest-driven activity oriented toward academic, economic, and civic engagement. Notable connected learning features include brokers (i.e. individuals, organizations) and brokering practices that help youth develop interests, connect their interests with resources across settings, and propel participation among everyday academic, cultural, online, and civic realms (e.g. Barron, Martin, Takeuchi, & Fithian, 2009; Bell, Bricker, Reeve, Zimmerman, & Tzou 2013). Yet despite considerable interest in connected learning research and design, little is still known about educators as connected learning brokers. Garcia's (2014) volume *Teaching in the Connected Learning Classroom* is an introductory and compelling picture of educators – across grade levels and disciplines – who instantiate connected learning principles in practice. Yet these cases are primarily portraits of experienced educators who are comfortable with experimentation and are able to access and leverage supports to broker student learning across settings. While it is necessary to “shift” classroom teaching by “bring[ing] to life the rich ecosystem in which educators are enmeshed today” (p. 9), a complementary need entails designing supports for all educators – irrespective of skill or experience – to broker youth among rich learning ecologies.

This study describes a nascent research-practice partnership (or RPP; Coburn & Penuel, 2016) that seeks to catalyze ongoing, district-wide efforts to support K-12 educators in designing and brokering student learning among interests and across settings. By bringing

together K-12 practitioners and university researchers in long-term and mutualistic collaboration, RPPs are “intentionally organized to investigate problems of practice and solutions for improving district outcomes” (Coburn, Penuel, & Geil, 2013, p. 2). The RPP discussed here features design research whereby innovations are created and studied within real world contexts, often through codesign with multiple stakeholders. This “multi-tier” RPP (cf. Severance, Leary, & Johnson, 2014) includes K-12 classroom teachers, district administrators, and university researchers committed to synthesizing two ongoing equity reforms – blended learning with culturally responsive education. The RPP’s primary goal is to create and scale *techquity*, or practices at the classroom, school, and the district level that leverage learning technologies for more equitable and culturally responsive education. A related goal is for educators to serve as techquity brokers so that student learning spans academic disciplines, bridges school and community settings, and engages youth culture and interest. As an analysis of an emergent RPP, this study identifies and examines problems of practice that have focused the joint work of stakeholders committed to codesigning techquity practices and supporting educators as techquity brokers.

Theoretical Framework

A defining feature of RPPs is a focus on addressing problems of practice. As Coburn and colleagues (2013) specify, problems of practice are “issues and questions that districts find pressing and important. They can involve student learning, classroom instruction, or how to organize a district for improvement” (p. 3). This account of a nascent RPP adapts Jonassen’s (2000) design theory of *metaproblems* to describe initial collaboration about the codesign of techquity practices and the positioning of educators as techquity brokers. Problems, in this view, are characterized by two attributes: problems distinguish a current state from a goal state, and problems hold social, cultural, and intellectual value. Within RPPs, various types of problems – decisions, strategic challenges, dynamic situations grounded in real world constraints – are learning opportunities for partnership stakeholders (e.g. Johnson et al., 2014), span varied arrangements and contexts (Coburn & Penuel, 2016), and represent multiple levels of abstraction (e.g. Kwon, Wardrip, & Gomez, 2014). Jonassen’s (2000) theory helps highlight problems of practice that delineated joint work during foundational RPP stages concerned with envisioning codesigned techquity practices and considering plans to position educators as techquity brokers.

The dilemmas and challenges faced by researchers and practitioners in RPPs are, by definition, complex. It is therefore useful to consider how multiple problem types relate to and mutually inform RPP problems of practice. Jonassen (2000) further suggests: “Problems that are encountered in everyday and professional contexts often consist of combinations of problems. Activity systems in everyday and professional contexts engage people in solving complex combinations of well-structured and ill-structured problems” (p. 81). Such combinations of problems, or *clusters*, can be conceptualized as *metaproblems*. Metaproblems consist of clusters of interrelated problems associated with shared activity. This case identifies clustered problems that focused early joint work about techquity practices, and describes how specific metaproblems informed the ways in which RPP partners began to consider educators as techquity brokers.

RPP Context: LEADing Techquity

Learning, Enacting, and Designing Techquity (LEADing Techquity) is an emergent multi-tier RPP among Aurora Public Schools (APS) district leadership, classroom teachers, and researchers from the University of Colorado Denver. APS is an urban district in Metropolitan Denver, enrolling nearly 40,000 students in 61 PK-12 schools. Specifically, LEADing Techquity is a creative and collaborative response to two ongoing, district-wide, and equity-oriented reforms. First, APS has established an ongoing collaboration with New York University's Metropolitan Center for Research on Equity and the Transformation of Schools to bolster culturally responsive education (or CRE; e.g. Gay, 2010). APS educator professional development, focus schools with lab classrooms, and administrator training regularly emphasize six CRE themes – relationships, cultural identity, vulnerability, assets, rigor, and engagement. The intent of this capacity building and school improvement effort is improving mechanisms (i.e. curricula, policy, pedagogy, parent and community relations) to enhance student engagement and more equitable learning outcomes. The second APS reform concerns blended learning, or the combination of online and classroom learning within which students exercise greater control over content, pace, and pathway (e.g. Tucker, 2013). An APS team of seven educational technology leaders guides blended learning design, pedagogy, and coaching initiatives in approximately one sixth of the district's schools.

LEADing Techquity is motivated by a perceived disconnect between culturally responsive education and blended learning reforms. Yet CRE and blended learning share affinity with connected learning principles; both emphasize practices that honor student assets, engage social and cultural capital, and embolden connections with families and communities. Leveraging learning technologies and practices for culturally responsive education is one means of connecting students' school-based activity with out-of-school interests, settings, and opportunities. Accordingly, LEADing Techquity was established to synthesize aspects of CRE with blended learning by codesigning new practices that support educators as techquity brokers.

Methods

This descriptive case study utilizes an ethnographic approach to identify three metaproblems that prioritized initial collaboration about the practices and brokering of techquity during the partnership's first five months. During this time, LEADing Techquity participants included: Seven APS educational technology leaders, two school principals, two instructional specialists, nine classroom teachers (from one elementary and one middle school), and four members of the partnership design team (university researchers and district administrators). Other stakeholders, such as APS senior leadership and external consultants, participated on an ad hoc basis. A developing RPP typically includes stages whereby partners establish shared language, and then utilize this understanding to identify possible solutions and research agendas. These phases structured substantial joint work from December 2015 through early April 2016; moreover, it was during these stages that partners began to articulate and identify clusters of related problems.

During this period two design team members collected data about LEADing Techquity from the stance of participant observers. Data sources for this case include: eight meetings with APS educational technology leaders; two school-specific focus groups with principals and

educators; two professional development activities, including one day-long workshop; and six design team meetings. Interviews were also conducted with 16 participants, including school principals, instructional specialists, educational technology leaders, and classroom teachers. Design team members regularly recorded audio, captured media, and collected artifacts from meetings and workshops (i.e. agendas, coauthored documents), and also gathered qualitative and quantitative evaluation data from professional development activities. Given this case’s focus on examining problems of practice, data were analyzed in relation to Jonassen’s (2000) typology of problems to ascertain metaproblems – or clusters of problems – that defined initial collaboration.

LEADing Techquity Metaproblems

The impetus to create new technology practices for equitable and culturally responsive education – and for educators to subsequently broker techquity across settings and scale – surfaced three metaproblems that defined early partnering and discussions about codesign. Each metaproblem distinguishes a current state from a goal, and does so in reference to educator agency – and neither to place fault on nor exaggerate sweeping claims about educators, but rather to emphasize the central role that educators play as codesigners and brokers of techquity in this partnership. The three LEADing Techquity metaproblems discussed are: Using tools for engagement, exploring culture and identity, and pursuing interest-driven learning. Table 1 summarizes, as an example, how one metaproblem is comprised of clustered problems and the qualities of those problems in relation to potential techquity practices; descriptions of all metaproblems follow.

Table 1: Sample Metaproblem of LEADing Techquity RPP

Metaproblem	Clustered problem types	Problem qualities
Using tools for engagement	Decision-making problems (weighing options, justifying outcomes) Diagnosis-solution problems (implementing, evaluating solution) Strategic performance problems (engaging complex situation) Design problems (pursuing goals given constraints)	Defining appropriate technology use without punitive consequences Using technology to meet needs while managing contingent solution tradeoffs Considering technology use beyond curricular and spatial constraints Shifting status quo from tool as an end to technology as a means for equity

Using tools for engagement. While many educators create rules and consequences about acceptable technology use, educators ought to co-create with their students practices for relationship building and engagement. This metaproblem is, in part, about decision-making as indicated by one educator’s assessment of her colleagues: “Teachers just say, ‘If you [student] can’t be on the technology appropriately, I’m going to remove it from you...’ It’s a reward system, rather than seen as: ‘This is a tool, how am I going to adjust to meet the needs of every student with the tool?’” (*ELint020316*). Yet for other educators, there are also challenges when implementing contingent engagement solutions. One teacher’s use of a speech-to-text tool engaged a 4th-grade reluctant writer but also revealed tradeoffs: “Do I not make him write? Which, he needs to write in the world. Or do I, am I looking for his thinking?” (*PLfocus012616*). A third aspect of this metaproblem is educator curiosity about the design and facilitation of

learning across settings, as one group of educators asked during a professional learning activity: “How can we make use of technology to think beyond our classroom walls (connect to world, large scale)?” (*DDCMS022316*). Finally, educational technology leaders perceive engagement as a district-wide design opportunity – the need to transition from a status quo in which “our teachers get very tool focused,” to active codesign with educators who are capable of responding to the question, “What’s your equity vision for students in your classroom?” (*coachmtg012216*).

Exploring culture and identity. While many educators use technology to deliver direct instruction or for students to complete discrete tasks, educators ought to facilitate contextual learning so that students use technologies to explore their culture and identity. This second metaproblem reflects, in one respect, an algorithmic perception that technology – in and of itself – establishes beneficial, yet fixed, outcomes regardless of pedagogy: “Having the one-to-one device ratio in my classroom, it just makes it more equitable” (*CGint020316*). Other educators perceive a need for more complex pedagogical decision-making given student use of technology:

[I’m] seeing kids being able to bridge the gap between the academic and their social world in their own natural ways, because that’s the way the world is moving, where the school building isn’t viewed as a hub of academics... and because they have easy access to talk one way through a device while acting a different way in person, they’re experimenting a lot with what it means to be a person. (*CPint020316*)

For this educator, student use of technology to experiment “with what it means to be a person” motivates similar experimentation with pedagogy so that learning is relevant to students’ lives outside of school. This metaproblem also relates to district supports. The desire for classroom teachers to broker students’ technology-mediated exploration of culture and identity is refracted in approaches to professional development and coaching: “We can’t get them [educators] engaged if we’re not being culturally responsive to our teachers, too” (*coachmtg031116*).

Pursuing interest-driven learning. While many educators celebrate new technologies and potential student learning outcomes, educators ought to scaffold how students use technologies to pursue interest-driven learning. An example of this metaproblem is evident in the range of educator experience with – and opinion of – one device per learner initiatives. Three educators from the same middle school offer contrasting opinions about whether “one-to-one” affords students equitable opportunity to pursue their interests, and if this occurs across settings. According to one social studies teacher, “One-to-one has not made it equitable because there’s a gap that exists in their [students’] foundational educational understanding that hasn’t been reached early enough” (*ELint020316*). Alternatively, her literacy colleague contends: “They [students] have a few more open doors, or maybe they’re just learning how to be more willing; to use a tech metaphor, to open new tabs for themselves.” (*CPint020316*). As for the school’s mathematics coach, there is an urgent curiosity about connections among disciplinary inquiry, settings, and interest: “How can we use technology to think about math

beyond our four, beyond the walls of our classroom? And get out beyond, there's got to be some other contexts, some other learning that is happening out there for them" (PBint021716). With educators and district leaders "still trying to wrap our heads around what equity looks like in the classroom, especially with technology" (coachmtg012216), there exist clustered problems associated with envisioning, codesigning, and brokering interest-driven learning across school and community settings.

Significance

This study drew upon participant observation data analyzed in reference to Jonassen's (2000) design theory of metaproblems to identify clusters of problems that defined the initial joint work of an emerging RPP. The case is important for a number of reasons. First, while the role of brokers is well documented outside of school (e.g. Ching, Santo, Hoadley, & Pepler, 2014), limited research has identified how educators, school leaders, and district administration initiate multi-level visioning and codesign to support classroom teachers as brokers of student learning across settings. Second, in contrast to retrospective analyses of RPPs, a need exists to document partnering dynamics during project development (Coburn & Penuel, 2016). This analysis does so by detailing clustered problems that focused the partnership's early collaboration. Codesigning techquity practice – and simultaneously working to position educators as techquity brokers – will require joint work in reference to three complex metaproblems. Finally, LEADing Techquity is distinct given the district-wide adoption of connected learning principles to guide a synthesis of ongoing equity reforms – combining blended learning with culturally responsive education. This account describes complex and interrelated problems of practice associated with the creation and scale of new practices that aim to position educators as techquity designers and brokers.

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