Collaborative Solution Discovery: A participatory improvement process

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Objectives or Purposes

Many practitioners and researchers view declining student education achievement across the United States as a complex problem. There have been different suggested school reform initiatives handed down from both government and higher education channels in response: find great principals and give them power; create competitive markets with charters, vouchers, and choice; establish small schools to ensure that students receive sufficient attention, etc. (Childress, Elmore, & Grossman, 2006). These one-size-fits-all type frameworks are intended to serve as a magic bullet that saves American education from decline. However, these processes are yielding few affordable, sustainable, and scalable results (Serdyukov, 2017).

The adoption and exploration of innovative ideas in education is often slow, as many educators still cling to old and increasingly ineffective methods of teaching (McKinney, 2017). Therefore, it is essential for both practitioners and researchers to use a new improvement strategy, and shift their way of thinking about problem solving.

The purpose of this paper is to examine the developmental evaluation of Collaborative Solution Discovery (CSD), a problem solving framework for finding sustainable solutions to local complex problems. CSD is currently being implemented to solve a complex problem in math education within a pilot district and the guidance of a support organization. The outcome of the CSD developmental evaluation is that it appears to offer a promising way to rethink improvement processes. A future traditional evaluation is planned to explore how educators leverage ownership and systems during real-time social interactions to deepen self- and collective efficacy as they take charge of their own improvement efforts.

Perspective(s) or Theoretical Framework

As a different approach to improvement, CSD integrates complex systems methodologies from aerospace engineering and ownership principles from business into a participatory problem solving framework.

From the engineering field, a complex system is composed of, “many elements that are interacting in a disordered way out of which is generated a robust order. There is nothing that centrally controls how things are supposed to behave” (Wiesner et al., 2019). Thus, elements, such as humans, are interacting without given direction or procedures (Nemeth et al., 2009 as cited in Gray & Motter, 2017). To understand a complex phenomena like human behavior, one examines emergent behavior “by an intricate interplay of their components” (Northwestern University, 2019). Consequently, real-time social interactions are at the core of CSD.

Ownership assumes the responsibility of an idea or action. By being an active participant in development, decisions are governed by personal choice and willingness (Group Jazz, 2010). Buy-in is the exact opposite. When interactions within a complex system reflect the tenets of buy-in, someone else has done the development. Buy-in creates uninspired implementation and mediocre results (Group Jazz, 2010). For the shift to occur from buy-in to ownership, participants must be involved and interacting from the onset, drive their own improvement efforts, and seek contribution instead of consensus. When everyone feels ownership, they naturally take responsibility and are thus more engaged and committed to the agreed course of

actions, which will result in individual and collective contribution (Vance, 2006). Consequently, CSD begins with individual passions identified from a set of research-based ideal real-time classroom interactions (City, Elmore, Fiarman, & Teitel, 2009; Wiliam, 2018).

This evaluation examines how educators use individual passions and experiences to own their improvement efforts, view interactions as a lever for finding solutions from a diverse collective, and how they embrace variability as a necessary part of the participatory process.

Methods, techniques, or modes of inquiry

A developmental and formative evaluation (Patton, 2011) was used to examine CSD. Of Patton's (2011) five purposes for developmental evaluation, the study aligns with: "adapting effective general principles to a new context, major systems change, and cross-scale developmental evaluation" (p. 21-22). Emerging from principles of aerospace engineering, CSD has been newly adapted to the context of education with a focus on major systems change. Participants shift their thinking for how to solve a complex problem in education, thereby simultaneously improving self- and collective efficacy in teaching practices.

Typically developmental evaluation uses "systems thinking to capture *complex systems dynamics* and interdependencies, and track emergent interconnections" (Patton, 2011, p. 24, emphasis in the original). For this evaluation, the evaluator observed at a broader scale, and gathered written data from a sample group of teachers and administrators. Thus, the evaluator gathered data from participants about interactions with their personal networks and sites within the larger district system. Developmental evaluation "methods are often derived from utility and pragmatic considerations" (Patton, 2011, p. 25). The evaluation plan considered the most appropriate times for data collection throughout the year—e.g., working around testing and holidays—and how quickly the data and feedback could be gathered, analyzed, and used to adapt the concept development of CSD. Ultimately, the process created feedback loops between the evaluator, support organization, and pilot district.

The developmental evaluation began in fall 2017 and ended in spring 2019. In fall 2019, evaluation will shift to "preformative development of a potentially scalable innovation" (Patton, 2011, p. 22). Completed data collection has provided preliminary analysis, and additional participants at new sites will be included next year when a more traditional formative and summative evaluation is conducted to determine scalability. Multiple forms of data will be collected and triangulated (Merriam & Tisdell, 2015) to determine how CSD can be rapidly scaled across any system.

Data sources, evidence, objects, or materials

One 25,000-student urban school district participated in piloting CSD to solve a complex math education problem in fall 2017. Participants for this evaluation include key stakeholders: 11 CSD Leadership Team members representing a cross section of teachers and site and district administrators across the district. All participants experienced CSD in one or more ways: they viewed the complex problem across the district system, facilitated CSD back to their site, or used CSD to understand the local complex problem. Participants volunteered.

Qualitative data sources included surveys, focus groups, and interviews. The evaluator observed the broader scale of CSD through observation rounds at four middle schools, four high schools, and four elementary schools. The evaluator conducted surveys, focus groups, and interviews of the leadership team from 2017-2018 and interviews of the leadership team and focus groups with teachers at two sites using CSD in 2018-2019. Survey, focus group and

interview questions were co-created by the evaluator, support organization, and participants to be "useful and match the innovation process philosophically and organizationally" (Patton, 2011, p. 25). Questions entailed: CSD experiences, the value of CSD, experiences implementing CSD, and changes since engaging in CSD. The evaluator took notes during focus groups and interviews; these were not audio- or video-recorded.

Findings

The following themes emerged from the data collection, informing concept development:

CSD is rooted in and realized through experiences. Recursively engaging in experiences results in participants' deeper and more meaningful transformation of their thinking around problem solving and improvement. Ten out of eleven participants used CSD within their context and found value in continuing to engage in collaborations, despite challenges. Some participants noted that they saw benefits to the unique observation rounds, reflecting that the real-time data analysis processes will yield sustainable improvement results.

Initial development of CSD involved explaining the concept to others to get their thoughts: this was ineffective. A shift to creating interactive experiences focused on real-time data collection and analysis by participants within their own local context worked. Because experiences are individual and variable as participants take their own individual paths to understanding and applying CSD in ways that align with their passions, experiences must allow participants to participate in their own way.

Variability is critical to CSD. This applies to all aspects of CSD: the rate of progression, how one experiences CSD, and how one implements the recursive pathway. By engaging in multiple CSD experiences, hearing different ways of thinking about and implementing CSD, and being reassured that variability is critical to implementing in one's own context, participants came to accept there is a framework for CSD but no fixed way of doing CSD. Embracing variability, participants take ownership of language and create their own ways of talking about CSD so that the concept made sense in their context. Initial evidence indicated that the CSD language impedes progress. By emphasizing that existing language can be used to name actions within CSD, participants began to own the process itself. Teachers at one site described CSD as "our thing" and a "collective agreement among teachers" when sharing that CSD was a teacher-driven process where teachers were encouraged to engage in their own approach within the CSD framework.

In developing CSD, the language adapted to better suit the problem solving actions with the pilot district. For example, feedback loops between participants were used as a way to build contribution. However, participants had traditional feedback in mind and became overwhelmed by the loops. A shift from feedback loops to unintended consequences resolved this barrier to implementation.

The collective is a critical cog of CSD. Instead of immediately bringing outside expertise to solve a system's problem, CSD values existing and diverse internal expertise. Participants' expertise is accessed and leveraged through the collective. CSD requires facilitators that guide a team of participants in how to use CSD to problem solve instead of training one person as the CSD expert. In this way, the team ultimately keeps itself accountable. In fall 2018, external "CSD Facilitators" were trained as the "keepers of CSD." However, this reinforced the idea that solutions come from a person of power. A shift to maximizing collective structures already in place reinforced the idea that the solution emerges internally. Teams engage in real-time interactions centered around ideal real-time student interactions in the classroom to co-

construct a measurement tool that informs individuals' solutions. As individuals work on their own classroom solutions, the collective offers support through unintended consequences and feedback.

These findings yield valuable insights into CSD's evolution and a need to share results with the field through a more traditional evaluation. Specifically, the proposed evaluation will include pre- and post-assessments of collective efficacy and ownership of individuals' solution (self-efficacy), with data collection throughout the year across several different systems within the district.

Scientific or scholarly significance of the study or work

CSD was originally created for solving aerospace engineering problems. Adapting CSD to the education context involved taking best practices from engineering, business, and education within a participatory framework. This approach to problem solving flourishes in a space of variability and encourages participants to set their own paths while leveraging a collective to improve upon results. By valuing participants' passions and ideal perspectives, the CSD process engages participants in an authentic participatory process that finds sustainable, local solutions that improve math achievement, K-12.

In connection to the annual meeting theme, we critically examine how an organization participates in a problem solving process where individuals lead their own improvement efforts. A focus on facilitating interactions that value existing expertise and diverse perspectives ensures solutions emerge from within and that the decision makers are the organizational stakeholders, not an outside expert or support organization. Participants' passions are used to define the system complex problem. Data collection is grounded in research-based student ideal real-time interactions in the classroom, and the collective is leveraged to find real-time classroom solutions. In this way, solutions are not imposed from experts outside of the system, but participants adapt local solutions that have a high probability of working year after year. Through CSD, participants build self- and collective efficacy.

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