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Research Article

Building Will and Capacity for Improvement in a Rural Research-Practice Partnership

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This study addresses two questions: (1) In what ways and to what extent does a research-practice partnership (RPP) using improvement-science (IS) based processes and tools impact educators' will and capacity to engage in improvement efforts? and (2) What effect does this RPP have on targeted student outcomes? The RPP highlighted in this research was comprised of university researchers, professional developers, and elementary and junior-senior high school improvement teams including school leaders, teachers, and support staff in the two component schools of a rural district. The study provides evidence that the RPP helped build a district-wide commitment to continuous improvement processes oriented to shared goals, mechanisms for teacher collaboration focused on school-wide improvement, and competence in using IS-based processes and tools. Variable needs for scaffolding of IS-based processes and tools were noted in the two schools with implications for future rural RPP implementation as well as educational improvement theory.

Building Will and Capacity for Improvement in a Rural Research-Practice Partnership

While rural students continue to achieve on par with their peers in suburban and urban contexts on a number of measures, achievement gaps and inequitable opportunities for learning are still the experience of too many of the nearly nine million of these students living in rural communities across the United States (Showalter, Klein, Johnson, & Hartman, 2016). This includes the students of rural Fort Plain Central School District (FPCSD) in New York State (NYS), the site of the current study. (Note: FPCSD participants provided Institutional Review Board approved consent for identification of the district and schools, and leaders provided consent for individual identification as well.) Elementary literacy performance, attendance at the junior-senior high school, and graduation rates surfaced as concerns that led district and school leaders to seek new alternatives to improve. Prior research suggests that rural districts like Fort Plain benefit from collaborative partnerships both within the school walls and beyond to improve both their improvement processes and their student outcomes (Harmon, 2017). This study builds from scholarship presented in this journal's 2017 special issue on the role of collaboration in rural schools and the growing body of literature on research-practice partnerships (RPPs) (Coburn & Penuel, 2016). It is framed by performance adaptation theory to take into account how a RPP might impact the affective/motivational, behavioral, and cognitive drivers related to rural district- and school-wide improvement (Baard, Rench, & Kozlowski, 2013; Zuckerman, Wilcox, Durand, Lawson, & Schiller, 2017).

This study specifically examines the effects of a rural RPP organized to build and sustain a collaborative partnership between university researchers, professional developers, school leaders, teachers, and support staff in district- and school-wide continuous improvement efforts. Coburn, Peneul, and Geil (2013), focusing specifically on district partnerships, define RPPs as "long-term, mutualistic collaborations between practitioners and researchers that are intentionally organized to investigate problems of practice and solutions for improving district outcomes" (p.2). This approach is promising since recent research indicates that RPPs hold the potential for building "improvement infrastructure" in schools (Peurach, 2016, p. 424) and they furthermore, facilitate two-way knowledge sharing channels (i.e. research-to-practice and practice-to-research) (Wilcox, Lawson & Angelis 2017). We suggest that rural RPPs, such as the one described here, offer to accelerate opportunities for inter-organizational learning from P-12 – post-secondary (Coburn & Penuel, 2016; Kochanek, Scholz, & Garcia, 2015). This particular model of a rural RPP uses improvement science (described

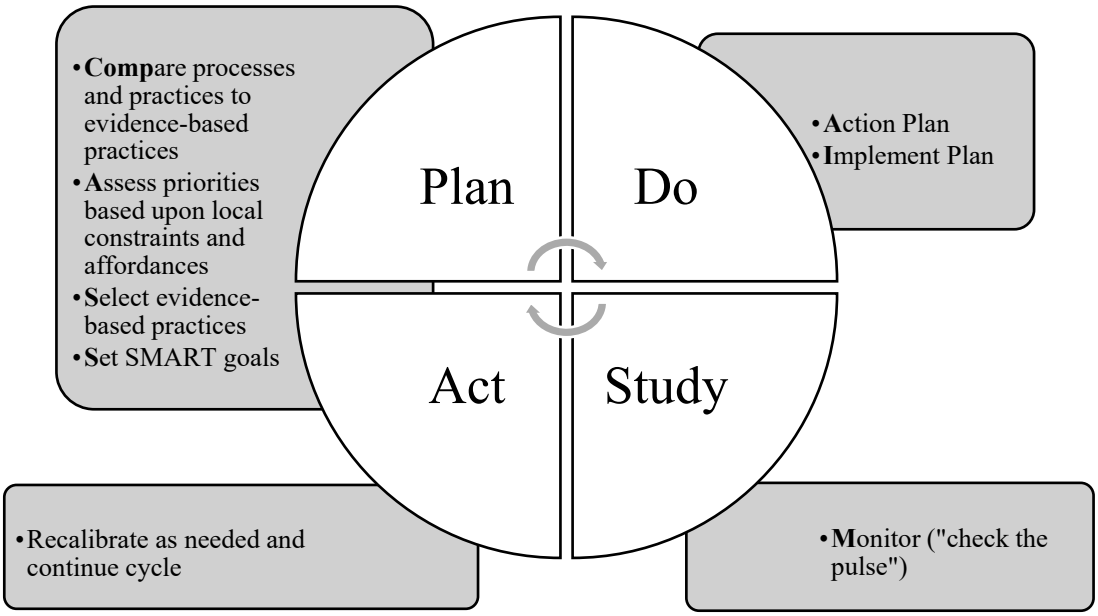

Figure 1. COMPASS-AIM PDSA Cycle, see Langley, Moen, Nolan, Nolan, Norman, & Provost, 2009, p. 123

next) as the foundation, making how participants frame their improvement efforts, utilize resources and expertise, and learn with and from each other distinguishable from other types of RPPs. Since improvement science naturally lends itself to addressing problems in ways that are "user-centered" (Bryk, Gomez, Grunow, & LeMahieu, 2015, p. 12), the work is "inherently rural" (Coladaraci, 2007, p.3) as researchers, professional developers, district and school leaders, and teachers and staff co-construct their improvement work taking into account the affordances and constraints of their own rural context.

Research-Practice Partnerships and Improvement Science

The RPP featured in this study developed from a multi-year university research project, known as NYKids, at the University at Albany. The University at Albany is a public research university situated in the capitol region of upstate NY. Its School of Education (SOE) offers a number of teacher and leader preparation programs. NYKids' mission is to "inform, inspire, and improve" schools by providing user-friendly databases of school performance trends, conducting research on odds-beating schools (i.e. schools achieving above-predicted student outcomes taking into account demographic factors), and disseminating that research on its website, in publications, and through presentations.

NYKids has been funded by New York State (NYS) since 2004 and has been guided by an advisory board of representatives from key public and private entities such as the New York State School Boards Association (NYSSBA), the New York State United Teachers (NYSUT), and the New York State Council of School Superintendents (NYSCOSS) among others. In 2010, members of this advisory board as well as representatives of the NYS Department of Budget, identified the need for NYKids to go beyond focusing on "informing" and "inspiring" in hopes that educators would use the research to improve their practices and instead redouble their efforts to facilitate educators' translation of research into practical improvements. In response, the university researchers (faculty of the SOE), in collaboration with advisory board members and professional developers (i.e. facilitators) from the SOE's study council (the Capital Area School Development Association [CASDA]) created a set of processes and tools known as COMPASS-AIM.

COMPASS-AIM is designed to be used in a RPP to develop P-12 schools' improvement infrastructure. Improvement science (IS) is one of several approaches to continuous quality improvement

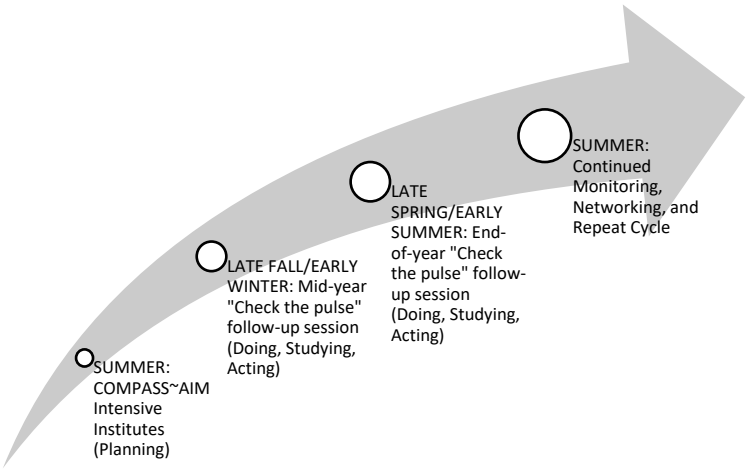

Figure 2. COMPASS-AIM phases

(LeMahieu, Bryk, Grunow, & Gomez, 2017) and is predicated on six principles: (1) making the work "problem-specific and user centered," (2) paying attention to "variation in performance," (3) "seeing the system that produces the current outcomes," (4) using "measures" to track the effectiveness of change, (5) anchoring improvement efforts in "disciplined inquiry," and (6) drawing upon the power of networks in "accelerating learning" (Bryk, et al. 2015, p. 12).

COMPASS-AIM prompts school improvement teams (i.e. "COMPASS teams" made up of up to eight staff members including the school principal, teachers in different grade levels, and specialists, such as special education teachers, counselors, or psychologists) to systematically engage in these principles. COMPASS teams 1) participate in and examine school-wide self-assessment surveys of current processes and practices as well as examine case studies of demographically-similar odds-beating schools (enacting IS principles two and three), 2) assess priorities in light of data, local resources, and values (enacting principle one), 3) select high leverage change ideas through jigsaw readings of demographically-similar odds-beating school case studies (enacting principals two and three), and 4) develop SMART goals in collaboration with their peers (enacting principle one).

Throughout this process, the RPP's university researcher and facilitators provide support in team-building. For example, they provide protocols to guide teams in how to communicate with each other and work with other staff productively all with a clear focus on student outcome-centered goals (emphasis on principles one, two, and three). Next, the researcher and facilitators are guided through a process of action planning, implementing their plans, and monitoring progress (emphasis on principles four, five, and six).

COMPASS-AIM occurs in phases and maps on the Plan-Do-Study-Act (PDSA) cycle articulated b Bryk and colleagues (2015) among others as displayed in Figure 1. COMPASS-AIM emphasizes the planning phase as to avoid the pitfalls of goal displacement, additive presentism, and solutionitis, all of which, we and others, have found to hold the potential to derail sustained improvement efforts (Bryk, et al., 2015; Zuckerman et al., 2017).

COMPASS-AIM unfolds over at least one school year (Figure 2). The RPP's university researcher and facilitators function to support the COMPASS team by beginning with an intensive on site two-day institute to introduce teams to NYKids web portal resources (e.g. school performance database and research reports including case studies) and the COMPASS-AIM process. They also facilitate two on site structured progress reviews (i.e. "check the pulse" meetings) in the fall/early winter and spring/early summer (every ~ 10-12 weeks) and areavailable for consultation throughout the school year by phone and through email. The researchers' roles include introducing and explaining IS tools and processes (e.g. driver diagramming) and providing feedback on the team's goals, plans, measures and progress throughout the school year mainly to provide feedback on measures and progress. Teams are encouraged to complete at least one school year of RPP involvement and ideally participate in a second and third school year with diminished involvement of the researcher and facilitators as they become more comfortable with using continuous improvement processes and tools. Throughout this

process, teams are encouraged to use technologies to track and share their progress. Google Docs, for example, were used for this purpose. Teams were also connected through the RPP to other researchers depending upon area of need. In the case of the elementary school, a literacy specialist was brought into the RPP to provide onsite coaching 10 times throughout the first year of RPP involvement.

At the time the RPP began work with Fort Plain (2015), it had utilized COMPASS-AIM with 40 other school teams in rural, suburban, and urban contexts in the region (Wilcox, Lawson, & Angelis, 2017,). Measurable improvements in capacities for evidence-based decision making were noted in the majority of these schools and a few of the schools that continued participation for more than one year also reported realizing some of their student outcome targets. However, most of the 40 schools using COMPASS-AIM functioned as stand-alone sites (i.e. one school from one district). At Fort Plain, in contrast, the superintendent, who had experienced success with COMPASS-AIM as a principal in one of those 40 previously participating districts, promoted the district-wide adoption of COMPASS-AIM at Fort Plain on his arrival. This networking of both the ES and Jr. Sr. HS in the RPP provided a special opportunity to examine the RPP's impacts across component schools in a rural district.

Framing Will and Capacity

COMPASS-AIM and the study of it is grounded in a set of propositions and assumptions derived from theoretical and empirical literature on organizational improvement. For example, Tichnor-Wagner and colleagues (2017) identify two aspects necessary to continuous improvement: will and capacity. Drawing on McLaughlin's (1990) work, they define will as the "motivation to embrace reform objectives" (p. 8). Building on school reform literature (e.g. Firestone, 1989; Spillane, Reiser & Reimer, 2002), they define capacity as the "knowledge, skills, organizational routines, resources, and personnel available to support implementation" (Tichnor-Wagner et al., 2017, p.8).

As Honig (2009) asserted, developing and sustaining will and capacity is not solely a technical endeavor; it is a human and contextual one wherein questions as to "what works for whom, where, when, and why?" are critical to achieving desired changes (p. 332). Prior research suggests that previous knowledge and experience (e.g. historical and cultural characteristics of schools and their communities) strongly shape educators' responses to improvement efforts, as do collaborative sense-making opportunities that specifically address the important why and how questions that contribute to district and school-wide change (Coburn, 2001; 2005; Cohen & Hill, 200; Coburn & Russell, 2008; Coburn & Wouflin, 2012; Maitlis & Christianson, 2015; Spillane et al., 2002).

Conceptually, will and capacity map onto the organizational improvement theory of performance adaptation. Performance adaptation theory, as explained by Baard, Rench, and Kozlowski (2013) propose three mechanisms that work in concert to assist adaptation: 1) affective/motivational mechanisms such as goal orientation states, self-efficacy, and anxiety (i.e. will); 2) behavioral mechanisms driven by knowledge, skills, and abilities (i.e. capacity); and 3) cognitive mechanisms such as attention, learning, knowledge and their use in decision-making/problem-solving and creativity (i.e. capacity). When teams use the COMPASS-AIM process and tools to drive improvement within a RPP, will (i.e. affective/motivational adaptations) and capacity (i.e. cognitive and behavioral adaptations) of schools is created to ultimately help educators achieve targeted student outcomes.

Partnerships, Collaboration, and Leadership for Improvement

While not a new idea in rural education research (Harmon, 2017), a growing body of literature indicates that partnerships and collaborative sense-making opportunities (e.g. professional learning communities [PLCs]) hold potential to build will and capacity for rural school improvement. Chance and Segura (2009) identified teacher collaboration as driving improvement in a rural high school by motivating teachers towards taking on change and by developing their capacities to do so. Such collaboration among teachers is sometimes supported by systematizing collaboration in the form of PLCs (DuFour, DuFour, Eaker, & Many, 2006). However, all PLCs are not created equal and some researchers have found that for PLCs to be effective they must achieve teacher buy-in of a vision around the "why?" questions Honig (2009) identified (Willis & Templeton, 2017).

Rural school leaders play important roles in communicating that vision, as well as a pivotal role in the development of people-centered relationships

in supporting collaboration (Preston & Barnes, 2017). Successful rural school leaders actively develop trust with staff and provide opportunities for teamwork and collaboration to happen among teachers in order to support capacity building around meeting shared goals (Chance & Segura, 2009; Preston & Barnes, 2017). As part of change-oriented leadership, rural leaders collaborate with teachers and community stakeholders (e.g. Board of Education members) in developing a vision (Preston & Barnes, 2017; Zuckerman, Wilcox, Schiller, & Durand, 2018) and then align plans to that vision (Zuckerman, et al., 2017). All the while, leaders in better performing schools negotiate a middle ground between wholesale adoption of and rejection of innovations, opting for context-sensitive adaptation when confronted with changes whether those initiated internally or imposed externally (Zuckerman et al, 2018; Eppley, 2009; Jennings, 1999, 2000; Kannapel, 2000; Kannapel, Aagaard, Coe & Reeves, 1999, Powell, Higgins, Aram, & Freed, 2009).

In addition to collaborations within schools, improvement can be accelerated by developing collaborations beyond the school walls. In one study, Hargreaves, Parsley, and Cox (2016) described developing networks of 'like' rural schools to accelerate learning and build social capital to amplify human capital. They suggest that university researchers as partners can function to provide critical and appreciative inquiry, new ideas and knowledge, evidence-informed practices, and exemplars within these network structures. Even though such rural school networks show promise for developing rural schools' capacities for improvement, such networks have been found to typically develop organically instead of in systematic and purposeful ways that are intended for two-way knowledge sharing from P-12 through post-secondary institutions (Muijs, 2015).

P-12 school-university partnerships not only encourage such two-way knowledge sharing, but also hold promise to improve the quality of teacher collaborations around the use of research (Blanton & Harmon, 2005; Harmon, 2017; Mariage & Garmon, 2003). For example, P-12 school-university partnerships have been found to provide support for the translation of research to practice for teachers in low performing rural elementary schools (Mariage & Garmon, 2003) and encouraged experimentation, reflective practices, and growth among teacher leaders while contributing to the development of cohesive teacher teams (Eargle, 2013). In a federally funded math and science partnership, facilitators supported the development of capacity and infrastructure for continuous improvement efforts in rural schools (Blanton & Harmon, 2005). Importantly, some studies have found that school leaders and teachers must develop ownership of their improvement plans and university partners best serve improvement efforts when they initially provide support for data analysis and facilitate conversations and then gradually release leadership for these tasks to school staff (Warren & Peel, 2005).

In sum, the theoretical and empirical literature indicates that research-practice partnerships, mechanisms to support collaboration within schools and districts, and trust-building facilitative leadership are likely to support rural school improvement efforts. However, for schools that do not enjoy these arrangements, the potentials of a rural RPP to develop will and capacity of educators to engage in sustained improvement initiatives remain under-theorized and under-investigated. Therefore, in this study we investigated: 1) In what ways and to what extent does a research-practice partnership (RPP) using improvement-science (IS) based processes and tools impact educators' will and capacity to engage in improvement efforts? and 2) What effect does this RPP have on targeted student outcomes?

Methods

This study utilized a case study design and drew from multiple sources of data gathered over a three-year period. FPCSD served as an instrumental case (Stake, 1995) as it is the only rural district to date in which the RPP utilized COMPASS-AIM district-wide. As mentioned earlier, the superintendent previously engaged in the RPP as a principal in a nearby district and reported this experience "resonated" with the FPCSD School Board. Therefore, he introduced the RPP and the COMPASS-AIM process and tools during his first in-service meeting in the fall of 2015.

Context

FPCSD is a rural fringe district situated in Fort Plain, a town of less than 2,500 residents in central upstate NY. FPCSD serves approximately 800 students from 10 surrounding villages in a pre-K-6th elementary school (Harry Hoag ES) and a 7th-12th Junior-Senior High School (FP Jr.-Sr. HS). The district is located just off the interstate, approximately 75 minutes from the University at

Table 1.
Student Demographics 2016-17 Harry Hoag ES and Fort Plain Jr.-Sr. HS

	ES	Jr.-Sr. HS	New York State
Grades Served	K-6	7-12	K-12
Total Enrollment	434	329	2,640,250
Free/Reduced Price Lunch	63%	60%	54%
Student Ethnic/Racial Distribution			
African-American	2%	1%	18%
Hispanic/Latino	5%	4%	26%
White	87%	89%	45%
Other	6%	6%	10%

Albany. Like many rural districts in NY, the student population is largely white. The median income in Fort Plain is roughly half the average for NY State with increased poverty in recent years, further complicated by flooding that had damaged housing stock in the district. FPCSD is categorized by the state as a high-needs rural district, based on the low population density, low enrollment, and limited resources. Similarly, FPCSD qualified for and received federal Rural Low Income funding for all years during this study. As COMPASS is offered through the university's study council (i.e. CASDA), which is a non-profit organization, the cost is in line with other professional development offerings thus not putting undue financial burden on the district.

In 2015 the district's graduation rate was 85% and above the NYS average (78%). Proficiency rates on the 2015 state assessments for grades 3-8 were comparable to the average for the state in math (36% vs 36%), but well below the state average in English language arts (18% vs 31%). Proficiency rates were notably lower among economically disadvantaged students. Table 1 shows key demographics for the ES and Jr.-Sr. HS.

Data Collection

Data collected from fall of 2015- spring of 2018 included four hour-long semi-structured interviews with the two principals and one semi-structured interview with the superintendent, documents (e.g. SMART goals, Board of Education presentations), and field notes. The interviews were conducted by the principal investigator using a semi-structured interview protocol with open-ended prompts in the first and second years of participation in the RPP's work. The interview questions pertained to how RPP experiences differed from other improvement efforts, the most memorable/impactful experiences in the RPP, and any changes as a result of RPP participation.

In addition, each COMPASS team member, including leaders, teachers, and staff, was invited to complete a post-intensive institute reflection survey. The nine questions on the reflection survey (Figure 3) included those related to COMPASS team members' abilities to work collaboratively on improvement efforts (2, 4, 5, 6, and 8) and those focused on abilities to use research and engage in evidence-based decision-making (1, 3, 7, and 9). These questions were field-tested with other schools prior to their use at FPCSD and were aligned to the principles of improvement science as well as the practical objectives of the COMPASS experience in team-building for instance. The reflection survey also offered a place for open-ended responses prompting "other comments or suggestions about the COMPASS institute or NYKids resources." A brief open-ended reflection survey about major take-aways and learnings was also distributed at each 'check the pulse' meeting.

The principal investigator also used an observation protocol to collect field notes. These included prompts to record how the COMPASS tools and resources as well as activities are working and what substantive discussions the group had about identifying priorities and designing their improvement project. After each observation, the researcher recorded interpretive memos to capture notes on the following: 1) What are educators' perceptions of the impacts of COMPASS on their research-based and evidence-guided decision-making structures and processes? 2) What are educators' perceptions of how COMPASS impacts their abilities to use research in the selection of tailored interventions that hold promise to achieve priority goals? 3) How does COMPASS relate to the development of organizational capacities and

individual competencies for organizational learning and improvement? 4) How do COMPASS teams with varying organizational capacities and individual competencies for organizational learning and improvement experience COMPASS~AIM? 5) What other sources of evidence need follow up?

Both the reflection surveys and the field notes included to both teachers' and leaders' perspectives. Finally, school leaders' reports and documents provided evidence regarding progress toward meeting targeted student outcomes.

Data Analysis

Analysis of interviews proceeded in phases beginning with inductive coding followed by axial coding (i.e. reorganizing data thematically) informed by our conceptual (i.e. will and capacity) and theoretical (i.e. performance adaptation) framing (Yin, 2014). As part of this process, we utilized a codebook that defined each code aligned to our framework and research questions (e.g. Capacity-internal expertise) with exemplar evidence (e.g. "We're working smarter not harder, and we're taking the advantage of the expertise of different people." We then utilized a matrix to compare themes across interviews to identify contrasts between them (Miles, Huberman, & Saldaña, 2013). To analyze the reflection surveys, we examined open-ended responses in a similar manner to the interview data explained above and entered Likert scale responses into a spreadsheet. With these data, we created charts to display patterns and contrasts across the two schools.

As recommended in case study research, source (e.g. interview, survey, document, and field note) and researcher triangulation (i.e. two researchers conferring on processes and interpretations using interpretive memoing throughout) as well as member checking with both principals and the superintendent were methods used to enhance the credibility of our findings (Miles et al., 2013; Stake, 1995; Yin, 2014).

Findings

We proposed at the outset of this article that a RPP utilizing IS-based processes and tools may have the potential to build and sustain will (an affective/motivational characteristic) and capacity (a cognitive and behavioral characteristic) for school improvement in a rural district and may also have impacts on targeted student outcomes. As a preview to our findings, we identified evidence that the RPP using COMPASS-AIM (an IS-based process and set of tools) helped build 1) a district-wide commitment to continuous improvement processes oriented to shared goals, 2) mechanisms for teacher collaboration focused on school-wide improvement, and 3) competence in using IS-based processes and tools. While these patterns were identified in both schools, the extent of these changes differed in the ES and Jr.-Sr. HS due to variability in leader tenure and staff preparation in collecting data and using evidence to inform improvement initiatives, as we will show in more detail below.

With regard to student outcomes, proximal targets, such as decreases in the use of Tier 2 literacy interventions and increases in on-grade level reading at the elementary school, were achieved within two years. In the junior-senior high school, proximal outcomes included student testimonials of their positive experiences using their new Academic Coaching Center (ACC) (an innovation directly related to their COMPASS work), increases in the numbers of students successfully completing credit recovery coursework, and decreases in the numbers of students needing to attend summer school were all achieved within two years.

District-wide Commitment to Continuous Improvement Processes and Shared Goals

Prior research has suggested that leaders who develop trusting relationships with staff, distribute leadership for improvement, and provide supports via organizational routines (e.g. scheduled time for team meetings) and resources (e.g. professional development) help develop capacity for improvement (Firestone, 1989; Spillane, Reiser & Reimer, 2002).

Building from capacity at the Jr. Sr. HS. In this study, the Jr. Sr. HS principal recounted that the RPP researcher's and facilitator's support of district-wide goal-setting was instrumental in bringing clarity and coherence to their work. Both principals reported that the Board of Education (BOE) and superintendent's backing of their improvement work aligned to those goals. They also noted that autonomy in action planning and implementing those plans at the building level served as strong motivators for their commitment. The Jr. Sr. HS principal said,

> The fact that our superintendent is asking us to do this [work in the RPP] and is on board with it. It's just not something that is going to go away. I think that's huge.

In addition, the Jr.-Sr. HS principal explained that the superintendent's willingness to work with the

COMPASS team at the beginning of the process and then know when to distribute leadership for the implementation of the work to the school-based teams built their sense of ownership over the process and the outcomes.

It [the COMPASS process] just jelled and I think a lot of it has to do with the way it was presented to us [principal and teachers, i.e. COMPASS team members]. The fact that Dave [superintendent] at the beginning thought he needed to be in there with us, and then he realized that we would probably be better with him not in the room with us and then just gave us the support that we needed helped.

The Jr.-Sr. HS principal also stated that the superintendents' offering of sufficient time for the COMPASS team to work with the RPP researcher and facilitators provided teachers and staff opportunities to think through their goals and how best they might roll out action plans to other staff.

In the Jr.-Sr. HS, where the principal had worked for several years and already had well-functioning committees, COMPASS team members provided a conduit for scaling COMPASS action plans across the school. The Jr. Sr. HS principal noted that disrupting the ways committees had always worked could have been unproductive, but by having COMPASS team members on existing committees allowed for scaling initiatives in ways that built from already-existing mechanisms and relationships. She reported,

> Transparency with the teams' work was crucial. We made sure staff understood the process and had opportunities to be involved with our work. For instance, each teacher was asked to serve on a committee that focused on one of the COMPASS goals. However, we did not disrupt existing committees.

Bringing coherence for a new principal at the ES. At the elementary school, their improvement work looked a bit different, in part because the principal began her position after the RPP had started work with the Jr.-Sr. HS. The ES principal reported that the COMPASS-AIM process, having been championed by the superintendent and backed by the BOE, generated buy-in among staff from the outset making leading improvement work generated from the process easier as a new principal.

She reported that the COMPASS self-assessment surveys taken prior to the first RPP institute that prompted staff to compare their practices with odds-beating schools' was pivotal in "taking a pulse of things" and provided "a really good mindset then to do the work."

Like the Jr.-Sr. HS principal, the elementary school principal was able to adjust schedules to facilitate teams working on improvement projects. With a nod from the Superintendent, she revised the schedule to provide grade level teams with two common prep periods a day and a common lunch period for collaboration. She reported that she observed teachers using this new time to lesson plan together with the aim to meet their COMPASS-team derived goal of improving literacy outcomes—specifically focusing on students' word attack skills.

Reinforcing Continuous Improvement and Resources for It across District

From the superintendent's perspective, the RPP helped accomplish a desired change in teacher mindsets across the district particularly around issues of student engagement and discipline. He explained,

> What it's come down to is they've focused on engagement and attendance and connecting with families. What they've done is shifted… now they're trying to figure out how to engage kids.

This, in part came about as the RPP researcher and facilitators, guided by the improvement-science principles of making the work "problem-specific and user-centered." It also came about by identifying the factors in the "system that produce the outcomes" (Bryk et al., 2015) and encouraging teams to draw from research of other odds-beating schools for change ideas as well as their own tacit knowledge of their community's needs and values. This process, while arduous, helped the teams arrive at a shared understanding of the "why" behind their improvement work, which in turn led them to investigating issues around trauma that were contributing to students' engagement and attendance behaviors at the Jr.-Sr. HS.

As we will describe in more detail in the student outcomes section, through the COMPASS process, the Jr.-Sr .HS COMPASS team identified students' mental health issues as one of the root causes for attendance and non-completion issues. A School Counselor who is also a COMPASS team member, along with the School Psychologist sought and received more professional development and visited mental health programs in the area. They also did book studies on trauma-sensitive schools. All of this information was brought to the COMPASS team, which then identified several "change ideas" and included those in their COMPASS action plans.

These included creating a space for students who had experienced some sort of trauma or struggled with mental health issues to engage in credit recovery and receive academic coaching, rather than being placed into special education classrooms or out of the building. At the ES, their plan included new approaches to dealing with student behavior, as well as other challenges that previously resulted in students being removed from mainstream classrooms for intervention services. Both of these changes, the superintendent identified were related to the RPP's reinforcement of organizing their improvement around the shared goal of doing "the best thing for kids."

Mechanisms for Teacher Collaboration Focused on School-wide Improvement

At both the Jr.-Sr. HS and the ES, the principals identified the RPP and COMPASS processes and tools specifically as leading to new teacher behaviors, but in different ways in each school. As prior research has indicated, leaders' vision and levels of trust developed with staff and already-established mechanisms (e.g. PLCs) for teachers to collaborate with each other, implicate the need for a contextually and developmentally-nuanced approach to improvement in different schools (Chance & Segura, 2009; Preston & Barnes, 2017). Such needs were evidenced in each of these schools and as indicated in their responses to the reflection survey.

As described in the methods section, to gather information about teachers' perspectives regarding their experiences with the COMPASS processes and tools, they were asked to respond to a number of questions on a reflection instrument administered after phase one of COMPASS (the initial intensive institute). On this reflection survey, the majority of the eight ES COMPASS team members, including the principal, indicated they had "very much" improved their abilities on all aspects queried that required collaboration (questions 2, 4, 5, 6, and 8) (see Figure 3). Only one participant indicated that she had "not at all" improved in her ability to s hare progress with others (question 6), which would be expected later as the team members shared their work with others in their buildings. We found similar patterns at the Jr.-Sr. HS on the seven COMPASS team members' abilities requiring collaboration (questions 2, 4, 5, 6, and 8)(see Figure 4) except no team members answered "not at all" to any question indicating a more advanced starting point to engage in improvement work collaboratively.

Capacities to use Improvement-Science-Based Processes and Tools

Likewise, we found that overall the COMPASS teams reported developing their capacities for using IS-based processes and tools (represented in Figures 3 and 4 by questions 1, 3, 7, and 9). However, each team differed in what they found most challenging suggesting the need for differentiated scaffolding, or work on what Honig (2009) calls the "how" of this work.

The ES principal reported that the research made available to her in the RPP was discussed in faculty meetings and while this was not a new practice for her as an instructional leader, it was new for Fort Plain teachers who had few opportunities previously to engage with research. She explained "I love that we're using research in this process and that we're looking at things that have been successful and why". Nonetheless, she said, "I think that accessibility to that research has to be scaffolded a little more because just not everyone comes having read research."

In the Jr.-Sr. HS, the principal explained that at the beginning of their COMPASS work "We didn't know what it [a SMART goal] was." She also reported that the team tended to think about "big" goals and that, "the hardest part for us was developing measurable goals." She explained that the facilitators were instrumental in ". . . reining us in and saying, 'Don't get as broad. Think this way and you know drill down.' And she [the facilitator] helped us see the holes. That was huge."

She continued, noting that as a result of the RPP, "We're working smarter, not harder." She reported the COMPASS-AIM processes helped her team understand how to "drill down and to "start small and chunk [goals]." As a result, she reported, "We sit down and plan and we look at what the goal is, what's our time-frame, who is responsible for it, and how we're going to do that and I'm not saying we didn't have conversations before, but I think they're more meaningful now because they go back to these goals."

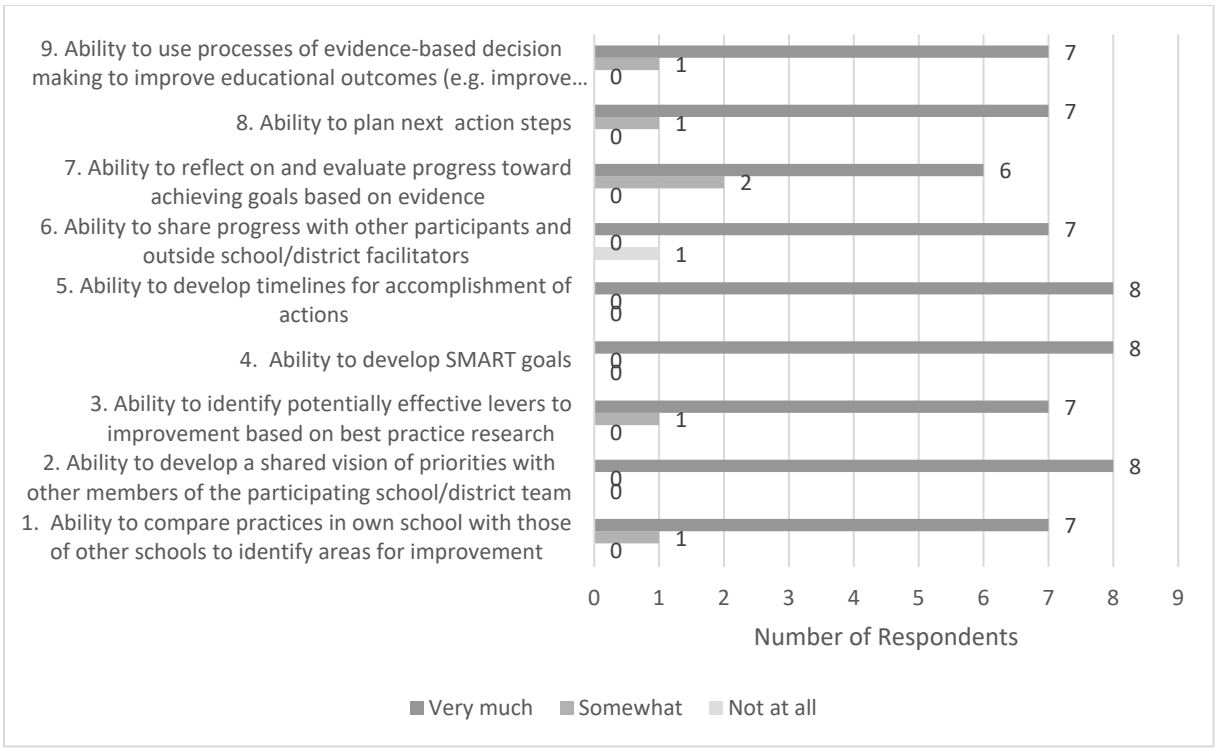

Figure 3. Elementary School post-COMPASS institute reflection

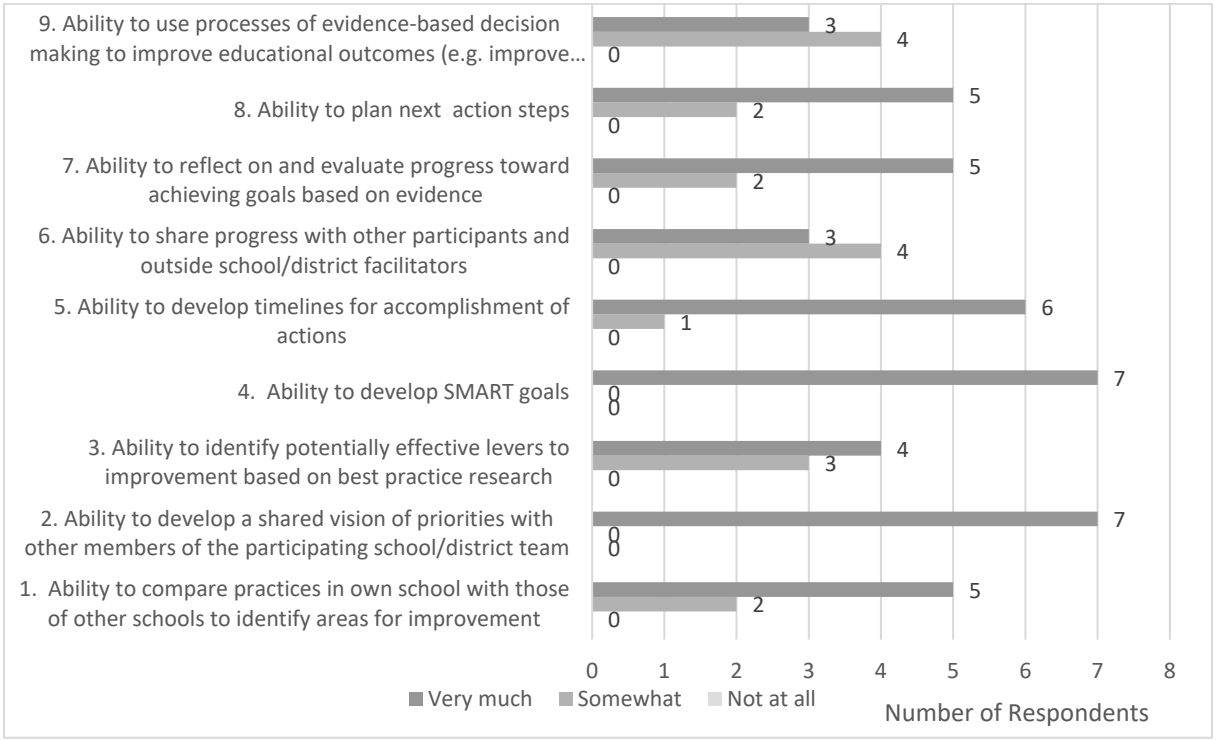

Figure 4. Junior-Senior High School post 1

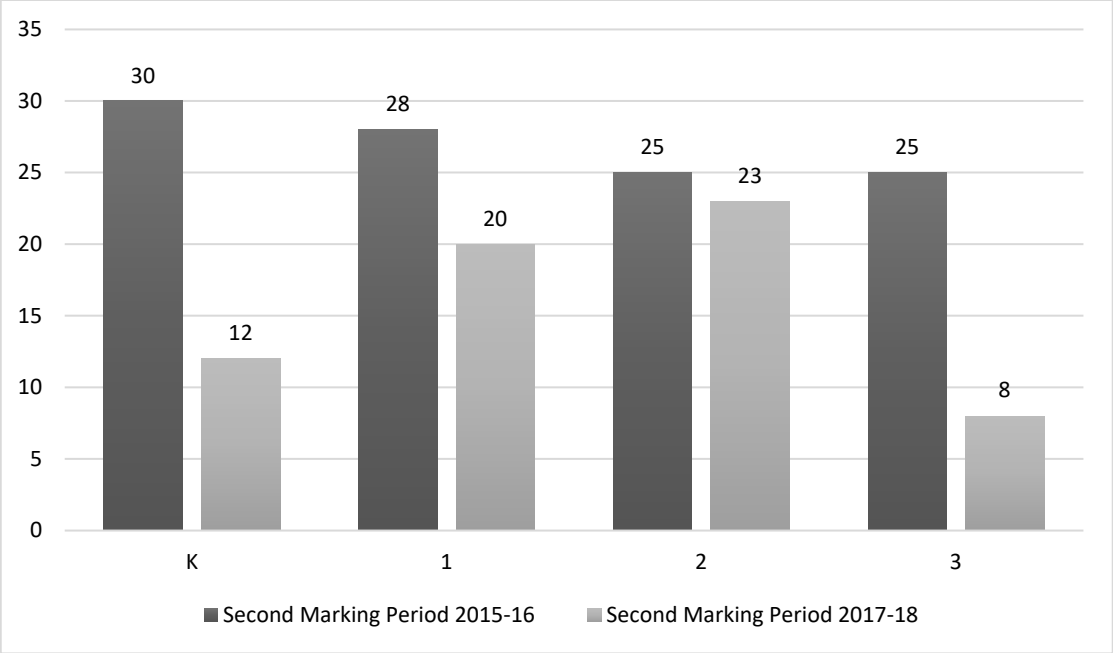

Figure 5. Percentage of students receiving Tier 2 interventions by grade level

In order to support monitoring of these goals, the Jr.-Sr. HS principal spoke about developing teachers' skills to look at data internally, as opposed to using the local intermediary educational organization to do their data analysis. She noted that the intermediary organization typically provided one-off data analysis sessions: "We had someone come in and they put us all in groups and they distributed data to each table and we would look through the data, and they charted everything, and then at 2:45 they rolled up their charts and they left and that was it."

In contrast, keeping data analysis in house, with resources from the district office to support coordinators, provided on-going data analysis opportunities. The Jr.-Sr. HS principal reported, "Digging into data is a big, big responsibility." Keeping it in house with the support within the RPP, in her view, has helped the team make sense of different types of data.

In reflections after the initial institute, the seven Jr.-Sr. HS COMPASS team members including the principal (Figure 4) reported enhanced capacities, as indicated by responses of 'somewhat' or 'very much' improvement on all prompts related to the use of IS processes and tools (1, 3, 7, and 9). Similar patterns were found at the ES on these questions.

In the open-ended reflection responses after the second year of RPP involvement, teachers and leaders reported that one of the most important facilitators for improvement was the enhanced abilityto develop a shared vision of priorities and goals. For instance, team members in response to a prompt on their learning and benefits from COMPASS work included: "We have implemented many successful programs because of the goals we have developed" and "Aligning what we do on all levels to our COMPASS goals. We plan our activities and PD to help accomplish these goals and help others realize how these successes help our students and our school."

Impacts on Student Outcomes

With regard to impacts on targeted student outcomes, we found that even in a relatively short period of time a number of targeted proximal outcomes were achieved in both of the schools. As mentioned earlier, in the ES, the principal had just started her position as the RPP began its work and she remarked that while the staff had little experience using research or their own locally-derived data to inform their work in the past, the RPP "allowed a non-threatening way to look at data" with her new staff.

She reflected in an interview in winter of 2018 (after almost two years of RPP involvement) that at the very beginnings of their COMPASS work, she "dove in" to the data on the school's literacy outcomes and programs and found that teachers

Table 2. *Number of Students Reading on Grade Level Harry Hoag ES*

	Grade	Number of Students on Grade Level	Percentage of Students on Grade Level
Class 1	2	16/17	94%
Class 2	2	15/16	94%
Class 3	2	15/16	80%
Class 4	3	15/20	75%
Class 5	3	19/20	95%
Class 6	3	19/19	100%

needed protocols for data reviews. She attributed identifying this driver to improvement directly to the school's involvement in the RPP and the COMPASS process. After she routinized data reviews in the first year of RPP involvement, she gradually handed over the leadership for these meetings to teachers. As teachers took responsibility and gained confidence in culling, presenting, and interpreting data, the principal felt she could reduce her participation in the meetings to just once a month check-ins to provide support and field any requests for resources.

After two years of RPP work, the ES principal pointed to several measurable outcomes related to their goal of improving literacy instruction and students' literacy performance included: 1) a reduction in the numbers of students receiving Tier 2 interventions by way of embedding reading teachers in literacy blocks and providing embedded PD in reading for all teachers; and 2) an increase in the numbers of students reading at age-appropriate levels. Figure 5 shows that the percentages of students in kindergarten through third grade who received Tier 2 interventions dropped in every grade level over the period of time that the school worked with. The data displayed in Table 2 shows the number of students reading at or above grade level by class in the 2017-18 school year (these data are not available prior to RPP/COMPASS participation). As the principal remarked "this is very encouraging since research shows that if a reader is not on level by grade three, typically they struggle to ever close the gap."

As noted earlier, for the ES, an important complement to the COMPASS work was the linking through the RPP with literacy research experts who provided coaching in specific areas such as word attack skills. This is one of the advantages of doing IS-based work in collaboration with a university-based RPP.

In the Jr.–Sr. HS, the COMPASS team arrived at a number of proximal goals with one of particular importance: To improve student attendance. Student attendance was seen as one driver for on-time graduation. Once this priority was determined, the COMPASS team identified a number of areas related to attendance as needing attention including (a) how they monitored student attendance, (b) how they supported students' social and emotional well-being, and (c) how they fostered parent communications. Before jumping into making changes, however, they initiated a school-wide book study on trauma-sensitive schools offered through the RPP and facilitated staff visiting nearby schools to get fresh ideas.

Once they developed their action plan in consultation with the RPP's COMPASS facilitators, they enacted changes involving, for instance, the creation of a "resource room for non-resource room students" (principal). This Academic Coaching Center (ACC), the principal, described as "very Zen" – "a safe, calming, and inviting learning environment" staffed by a teaching assistant with responsibility for advocating for students with teachers (i.e. bridging between students and teachers to help students make up missed work) and connecting with parents. While they sought increased attendance as a distal outcome measure, a more proximal measure they assessed was the quality of students' experiences in the ACC. The principal shared students' "testimonials" regarding their positive experiences in the ACC. One such example is below.

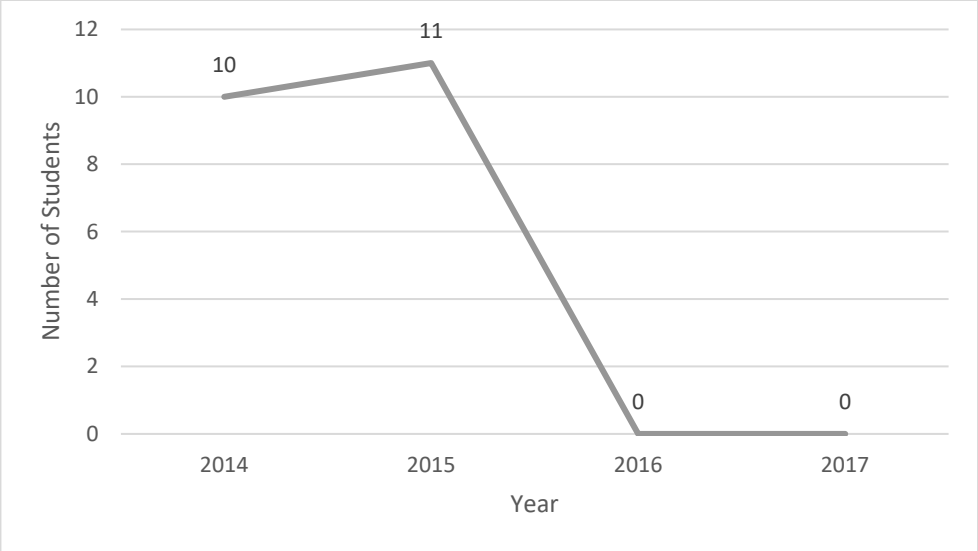

Figure 6. FP Jr.-Sr. HS numbers of students in summer school

> The ACC isn't just a room to me. Personally, it feels like home. It's a nice quiet place where you can come to when you're having a bad day. It's a room where you can just feel comfortable around everyone down here. Me being down here helps me focus a lot more, and with this help, I can do anything to succeed in school.

In order to increase graduation rates (their distal goal), the Jr.-Sr. HS staff also implemented a credit recovery program called APEX. Each of the 18 students in APEX during the 2016-17 school year successfully completed the program and another 22 students signed up for APEX in the 2017-18 school year. One of the measurable outcomes from these efforts was a decrease in the numbers of students needing to attend summer school (see Figure 6).

Monitoring absence and tardiness patterns was a targeted area of attention in their plans as well and Table 3 shows the patterns in 2016-17 and 2017-18 were on track for improved attendance at the time of this writing at least five (highlighted in the table), the principal pointed out, show promise of improvement.

According to the principal, "COMPASS formalized this [improving attendance] as a school-wide initiative." She continued,

> Through this practice, the team brainstormed ideas and practices and COMPASS acted like a funnel discarding some ideas and keeping others as we developed a cohesive plan. We have never had an all-encompassing process quite like this. It has provided a vehicle for getting things done. Prior to this type of strategic planning I felt like I was the captain of a ship that did not have any navigation; COMPASS has helped empower us to facilitate real change.

Table 3. *Number of Absences and Tardies of Students in the ACC*

Student	2016-17 Absences/Tardies	2017-18 (through end of Feb.)
1	38/63	24/14
2 (medical excuse 16-17)	18/71	26/0
3	7/11	2/0
4	4/2	2/0
5	31/24	31/31
6 (drop out and re-entry)	21/18	33/18
7	16/0	5/0
8	19/4	17/7
9	19/3	18/19

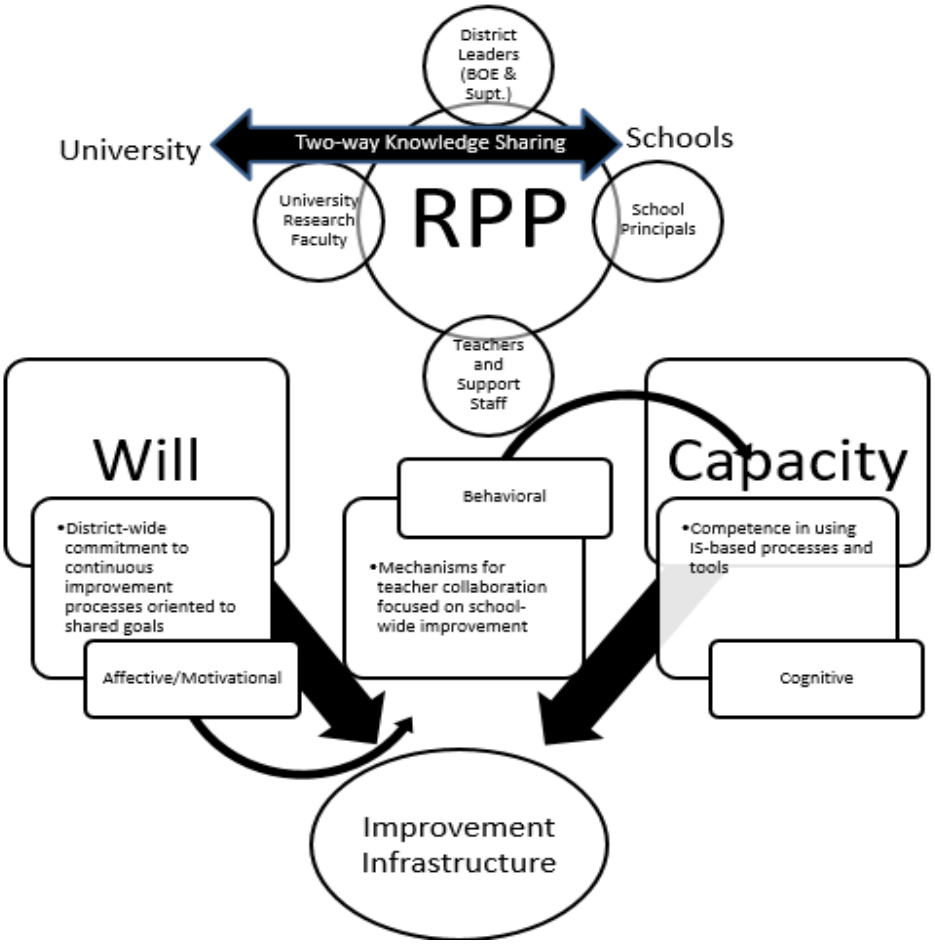

Figure 7. Will and capacity in a rural RPP

Conclusions and Implications

Tackling complex problems in schools such as literacy development in the elementary years and attendance and graduation rates in the secondary years requires educators' will and capacity to adapt processes and practices to improve. In rural schools where educators experience limited professional development options and scarce opportunities to participate in collaborative partnerships (Wallace, 2014), the role of a RPP in building and sustaining continuous improvement processes can help to foster a much needed improvement infrastructure.

In this study, we examined a RPP model that utilizes improvement-science based tools and processes that show promise for other rural schools and districts. In particular, we found that as a result of participation in the RPP, teachers and administrators in one rural district comprised of two schools, showed evidence of having developed will and capacity for improvement. We also identified improvement in achieving some targeted student outcomes. Specifically, we found the RPP helped build and sustain 1) a district-wide commitment to continuous improvement processes oriented to shared goals, 2) mechanisms for teacher collaboration focused on school-wide improvement, and 3) competencies in using IS-based processes and tools. The two schools also realized some of their proximal student outcome goals in literacy at the elementary level and student engagement and progress toward graduation at the Jr.-Sr. HS level.

Our study found that in terms of will, teachers and support staff all reported increased commitment to engage in district-wide and school-wide improvement efforts in part due to district and leader support of the RPP work. In terms of capacity, we identified new teacher team routines that provided opportunities for collaboration focused on school-wide goals as facilitators for staff's improvement efforts. We also found that teachers and support staff made gains in their understandings of how to use research and locally-derived data, particularly at the elementary school where this had been rarely done

due to their interactions with RPP researchers and facilitators. The Jr.-Sr. HS teachers and support staff also reported gains particularly with regard to setting measurable and achievable goals due to the scaffolded support from the RPP researchers and facilitators.

Through the lens of performance adaptation theory, the RPP mitigated potential negative affective/motivational, behavioral, and cognitive barriers to engaging in school-wide and district-wide improvement efforts as displayed in Figure 7. We see this figure as laying out how the COMPASS-AIM model for district and school-wide improvement aligns to the key drivers (affective/motivational, behavioral, and cognitive) for developing improvement infrastructure via a rural RPP comprised of university researchers, facilitators, and district and school leaders and staff. These findings are not dissimilar from those found in other schools that have participated in COMPASS (see Wilcox, Lawson, & Angelis, 2017), however, qualities of the FPCSD rural context as discussed previously helped amplify the traction COMPASS teams were able to generate and sustain. This study contributes to educational improvement theory by highlighting how changes in will (i.e. affective/motivational drivers for improvement) and capacity (i.e. behavioral and cognitive drivers for improvement) are impacted in a RPP using IS-based processes and tools.

Specifically, we found that researcher and facilitator support was necessary to bridge the cognitive demand of learning new processes of engaging in the six IS principles. This was particularly evident with regard to using research to identify appropriate "change ideas" or levers to improvement (in the ES in particular) and articulating then measuring progress toward shared goals (in the Jr.-Sr. HS in particular). The RPP also supported behavioral and affective/motivational changes by helping district leaders develop and communicate goals and guiding teams in how to make sense and share data collaboratively within the context of those goals.

This study contributes to the growing body of research on RPPs (Quartz, Weinstein, Kaufman, Levine. Mehan,,Pollock, Priselak, & Worrell, 2017) and the role of collaboration between educators and among educators, researchers, and professional development facilitators to develop the will and capacity of rural school educators to engage in continuous improvement efforts (Harmon, 2017). However, like many studies of rural schools, the implications for how other rural district and school staffs and university researchers might establish and maintain such a RPP are limited due to the unique particularities of rural contexts. In this case, an important contextual factor impacting the outcomes of the RPP's work included the relatively short distance between the Fort Plain community and the university, as well as the relatively high concentration of both public and private post-secondary institutions in New York State in general.

Another limitation to this study's generalizability to other rural contexts relates to the extent of data collected. While we gleaned teachers' insights through their responses to the open-ended survey as well as in field notes, teachers' perspectives were not gathered through one-on-one interviews as was done with district and school leaders, limiting what we know of their individual experiences. Despite these limitations, the RPP described here provides an example of how university researchers and professional developers can work with rural school educators to contribute to building their improvement infrastructure that in turn may contribute to achieving more equitable outcomes for children in rural communities. Recommendations in other rural settings include:

1. District leaders leverage, what the Superintendent of FPCSD, refers to as student, faculty, and staff "natural connections to the school" in a rural community to galvanize investment in the very collaborative nature of continuous improvement work.
2. District and school leaders actively seek relationships with university researchers and university researchers do likewise while utilizing professional development organizations or study councils as hubs for logistical and facilitator support.
3. School teachers and support staff actively seek to participate in RPP continuous improvement teams to bring coherence and effectiveness to their work within schools and across schools.

As we close, we note that the work is far from complete in FPCSD. Both the ES and Jr.-Sr. HS teams continue to seek alignment in their improvement work and develop their understandings of how to measure their progress. How the two schools might enhance their capacities to connect their improvement efforts more seamlessly is still on the horizon and the focus of the RPPs work in year four.

As a final note, and not of lesser importance, we as university partners have also benefitted from what we referred to earlier as two-way knowledge sharing channels. In particular, COMPASS processes have been adjusted to take into account the variable

scaffolding needed in different schools depending in part on the nature of existing mechanisms for staff collaboration and prior knowledge of how to use evidence to inform decision making (Quinn & Kim, 2017). We also have taken to our COMPASS redesign attention to the significance of the extent of affective/motivational, behavioral, and cognitive adaptation needed in different schools within same districts (Anderson, 2017). To reward and incentivize teachers to do this work, we have arranged continuing education credits to the COMPASS institutes, although none of the educators in FPCSD were able to take advantage of this at the time they participated. We also have developed a new improvement science course for improvement leaders that will be applicable to a graduate degree program; however, FPCSD participants have not yet participated in this coursework. We have also reached out to other organizations that serve on the NYKids advisory board as well as the state education department to continue to scale COMPASS across our state.

In conclusion, this study moves us forward in building on performance adaptation theory nuanced understandings of what a rural RPP needs to offer to develop within- and across-school improvement infrastructures. It also moves us forward in our understandings of what rural teachers, support staff, and school and district leaders need to know from university researchers and what university researchers need to know from them about using IS-based resources and tools in pre-service programs and in-service professional development.

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