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Title:

Continuous Improvement in Action: Educators' Evidence Use for School Improvement

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Background / Context:
Description of prior research and its intellectual context.

Recent scholarship on school reform has highlighted the need to use new approaches to enact change and recognize the critical interplay between reform practices, the process of implementation, and local context (Penuel, Fishman, Cheng, & Sabelli, 2011). One such approach, improvement science, focuses on using continuous improvement processes to address problems of practice in ways that contribute to organizational learning (Bryk, Gomez, Grunow, & LeMahieu, 2015). Key to improvement science is the creation of networked improvement communities that engage in disciplined cycles of inquiry where data is used to understand the problem and test potential solutions (Bryk, Gomez, Grunow, & Hallinan, 2011).

Using data for school improvement is not new. Indeed, data-driven decision-making has been a priority for 20 years (DeBray-Pelot & McGuinn, 2009). Yet, teacher data use is typically characterized as guiding teachers to make well-informed instructional decisions (Hamilton et al., 2009). Even when teachers are able to use data in ways that benefit their instruction, the data is usually comprised of data directly from the district's accountability systems. In other words, the data teachers are asked to draw on for improvement purposes may be used by administrators or central office staff to hold them accountable.

Improvement science notes a distinction between data for accountability and data for improvement, with different data needs and social conditions of use (Yeager, Bryk, Muhich, Hausman, & Morales, n.d.). While data for accountability focuses on outcomes to identify whether expectations are being met, data for improvement is more practical, providing evidence about the practice itself (Yeager et al., n.d.). This broader focus on evidence better captures the ways in which educator decision-making is not solely based on data, but a range of evidence.

Purpose / Objective / Research Question / Focus of Study:
Description of the focus of the research.

Our focus is on the process educators use to interpret data to turn it into usable knowledge (Honig & Coburn, 2008) while engaging in a continuous improvement process. We examine the types of evidence educators draw upon, its perceived relevance, and the social context in which the evidence is examined. Evidence includes data related to student or school outputs (e.g., passing rates), inputs (e.g., student demographic information), school processes (e.g., data on program implementation) and perceptions (e.g., surveys) (Marsh, 2012). Previous research also indicates that educators draw on evidence substitutes—anecdotal information, experience, intuition, ideological preference, and customary practice (Bryk & Gomez, 2008; Dorman & Binnewies, 2015; Ingram, Louis, & Schroeder, 2004). Considering this diversity of evidence enables us to examine how teacher-led implementation teams come to shared conclusions about what they are learning about their improvement efforts. We ask the following research questions:
  (1) How are educators learning about and using data for the improvement of a school-wide reform?
  (2) What types of evidence are they citing to make claims about what they are learning?

(3) What are the barriers educators face as they learn how to apply data to make claims about what they are learning?

Setting:
Description of the research location.

The data used in this paper were collected as part of a larger study to explore new approaches of scaling effective practices in high schools. At the time of the study, the district served approximately 80,000 students, the majority of whom are low-income or from traditionally underserved racial/ethnic groups. (Please see Table 1). Demographic characteristics are rounded to the nearest 20 percent to prevent the use of identifying school characteristics. Desert Grove, Forest Glen, and Valley High Schools all serve high concentrations of low-income students and students of color. Pseudonymous names are used for participant confidentiality.

Population / Participants / Subjects:
Description of the participants in the study: who, how many, key features, or characteristics.

The participants in this study are members of school development teams. The development team at each high school is comprised of seven to eight members. Teams are teacher-led, with two administrators participating on the team at Valley High School.

Intervention / Program / Practice:
Description of the intervention, program, or practice, including details of administration and duration.

This program is based on a continuous improvement approach to implementation. The school development teams were tasked with taking a set of practices designed to improve student ownership and responsibility (SOAR) and align them with their school context. The focus on student ownership and responsibility came our of a year-long mixed methods study of effective practices in higher value-added high schools in the district. To identify the specific practices to implement in their school, teams were trained in the use of Plan, Do, Study, Act (PDSA) as a tool to guide their improvement efforts. This process involved identifying an element of the design they wanted to implement, collecting data on the success of this component, reviewing this data on how to improve this component of the innovation design. Learning was then shared across schools at quarterly meetings, as an opportunity to learn from one another.

Although each school implemented practices in somewhat distinct ways, four central practices are common across schools to help schools reach their program goal of creating student ownership and responsibility (SOAR). These components were all taught during advisory periods. First, teachers taught students about growth mindsets. Second, teachers adopted practices that helped students monitor their grades. Third, students set goals of how they would reach academic goals. Finally, teachers worked with students to create problem-solving strategies for how they would reach these goals.

Research Design:
Description of the research design.

A qualitative case study design (Lincoln & Guba, 1985) allows us to probe how school stakeholders, particularly the teacher-led teams, used evidence in the ongoing development of the innovation. School development teams met regularly over two years in a networked fashion, with each school-based team having time to plan and engage in PDSA cycles, while also facilitating sharing across schools. In the second year, each school began full implementation, with the school development team leading efforts in their school. We observed and participated in meetings of the school development teams and conducted interviews with the team members and others in their schools at several points in the process.

Data Collection and Analysis:
Description of the methods for collecting and analyzing data.

The data used for this analysis come from two sources. We refer to the primary data source as the "process data" and it includes observational and artifact data from district-wide meetings of the school development teams, including observational fieldnotes and audio recordings of all design team meetings, artifacts distributed or produced at the meetings, and feedback forms completed by members after each meeting. Research team members collected these data sources by attending regular meetings with the school implementation teams (i.e., teacher-led teams) and program developers from Spring 2013 to Spring 2015. In addition to this process data, we also conducted fieldwork visits in each of the partner schools to monitor implementation. Teams of three researchers spent four days in each of the schools on each of these visits. We draw on data from 45 semi-structured interviews with implementation team members, where they were asked about their experiences with data use and the continuous improvement process (see Table 2).

The process data was analyzed for the design, development, and implementation phases, respectively, to produce summary memos that describe evidence from that phase according to a framework drawn from the project's framework for innovation design and development. This framework consisted of several *a priori* codes in addition to codes that emerged inductively from the data. Following each fieldwork visit, the research team coded transcripts based on a coding schema related to the project's framework for quality implementation. The coding process was iterative in nature with members of the research team comparing coding to ensure a consistent understanding and application of codes (Corbin & Strauss, 2008). The team then wrote a summary memo for each field visit, probing similarities and differences across the three partner schools. For this paper, we draw on analytic codes related to the implementation teams' use of evidence, specifically in the context of the continuous improvement of the innovation design. From the analysis of the school-based fieldwork, we draw on codes for continuous improvement, the capacity of implementation team members, and external support to the implementation team. From the process analysis, we draw on codes for piloting and PDSA, participant understanding of the continuous improvement process, and the integration of the research team into the process.

Findings / Results:
Description of the main findings with specific details.

At the conclusion of the design process, participants were tasked with co-creating measures related to intermediary and proximal outcomes of the SOAR innovation with the research team and program developers. Participants resisted this task, expressing concern that the innovation

was being measured by a data point rather than trying to understand meaningful changes to teacher practice. Following the suggestion that they could monitor the progress of implementation with the use of non-punitive checklists and learning walks, most implementation team members were concerned that their district had the tendency to misuse such data. Participants associated data as being used for accountability purposes, and that to quantify outcomes of the innovation would cause their work to fall into the same trap.

It was not until late in the development process that school implementation teams' resistance to data began to subside, and they identified measures that they felt were appropriate. These data were quantitative data that was already available within the district and included failure rates, attendance and tardy rates, school infraction rates, the number of incomplete assignments, student use of credit recovery programs, and continuation rates. In the process, they often diminished the role that perceptual data could play in informing their collective learning.

Yet, team members were most likely to draw on perceptual data and other evidence substitutes to understand the extent to which the SOAR innovation was having an impact on students in their schools. School teams often had perceptual evidence from surveys or discussions they had with colleagues in professional development that formed the basis of their collective learning. Still, when sharing evidence of learning across schools, teams focused on evidence from the district's administrative data, often not sharing other evidence that they had actually drawn upon to inform their learning. For instance, teachers at Forest Glen collected student survey data, but they did not frame it as data. This shift reflects how the teams came to learn to value and use evidence for improving the innovation, but still felt constrained by the context of the district when sharing with those outside their team. The result was that implementation team members drew on different sets of evidence to inform their internal learning (perceptual evidence) and the types of evidence that they shared when they presented their learning to other stakeholders in the district.

Conclusions:
Description of conclusions, recommendations, and limitations based on findings.

Teacher evidence use is often portrayed as drawing on a mix of evidence as well as "gut feelings" about what would work best for one's students. In this paper, we describe how teachers use data for school improvement and how this changed through the development of an innovation to increase student ownership and responsibility. We find evidence that teachers are likely to draw on a mix of evidence as well as evidence substitutes when refining the innovation at the school-level. While implementation teams considered outcome data, they gravitated towards perceptual data. They used this data to make small improvements to the innovation but also to gauge the level of teacher buy-in and make modifications that would better meet teachers' needs. As continuous improvement continues to expand as an approach to reform within schools, it is important for scholars to understand the particular contexts in which practitioners are asked to consider evidence. Though resistance to data use and evidence-driven practices amongst teachers decreased over time, and they even came to value data use to inform and drive improvement efforts, they continued to struggle as they had to straddle the overarching context of accountability, despite their willingness to see data use through the lens of continuous improvement. The context of accountability is ubiquitous and its impact on continuous improvement efforts is one that must be better understood so that the tension between two differing ways of considering data can be mitigated.

Appendices
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Appendix A. References
References are to be in APA version 6 format.

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Appendix B. Tables and Figures
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Table 1. Demographic Profile of Partner District and Schools

	All high schools	Desert Grove High School	Forest Glen High School	Valley High School
Student enrollment	20,504	>1500	700-1200	>1500
Student race/ethnicity				
Percent Hispanic	59%	40-60%	>80%	>80%
Percent African American	25%	20-40%	<20%	<20%
Percent White	8%	20-40%	<20%	<20%
Percent economically disadvantaged	70%	40-60%	>80%	>80%
Percent LEP	6%	<5%	>5%	>5%
Teacher race/ethnicity				
Percent Hispanic	17%	<20%	20-40%	20-40%
Percent African American	29%	<20%	<20%	<20%
Yrs. teaching experience	10.9	10-12	10-12	8-10

Source. District administrative data, 2012-2013 school year.

Table 2. Data Sources

Data Sources	Phase 1- Design	Phase 2- Development	Phase 3- Implementation		Total
Data collection dates	January 2013 – June 2014	August 2013 – June 2014	August 2014 – June 2015		34 months
Audio Files	62 h 22 m	66 h 21 m	61 h 50 m		186 h 33 m
Field Note Logs	28	24	19		71
Distributed Artifacts	147	236	74		457
Research Reflection Forms	6	5	5		16
Participant Feedback Forms	97	141	82		320
Interview Transcripts	24	23	0		47
Fieldwork Visit			October 2014	April 2015	
Implementation team members			24	21	45