ACT Research Report Series 2011-2

Lessons Learned Implementing Online Teacher Professional Development within a School Improvement Initiative

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December 2011

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ACT Research Report Series
P.O. Box 168
Iowa City, Iowa 52243-0168

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Abstract

This study examined teacher perceptions of online and face-to-face professional development (PD) in four large school districts implementing an integrated school improvement initiative. The online PD component of this study was designed to support core 9th grade mathematics curriculum, and aligned safety net programs in literacy and mathematics. Study groups, a training format that provides materials to facilitate face-to-face teacher team meetings, supported collaboration within teacher teams in middle and high schools. Survey and interview data on 101 individuals—including 51 teachers who participated in online PD or study groups—are used in this report. The study guided recommendations for practitioners implementing blended PD models tied to a conceptual map of factors affecting successful delivery of the PD. Lessons learned from the study include lessons relating specifically to online PD and others related to PD in general.

Acknowledgements

The research study described in this report was funded by a grant from the Bill & Melinda Gates Foundation. The views expressed are those of ACT, Inc. We thank the Bill & Melinda Gates Foundation for their support—both for making the study possible and for providing guidance and encouragement throughout the project. We also acknowledge the great work of numerous staff at ACT and America's Choice who designed and delivered the professional development or helped with the research. We would especially like to thank the staff who had the arduous task of transcribing the interview recordings: Tara Acton, Cathy Lacina, Katie Pauls, Emily Uhl, and Karen Zimmerman. Finally, we thank Larry Molinaro of America's Choice for his leadership in designing and delivering the professional development, and for helping guide the research towards issues faced by practitioners.

Lessons Learned Implementing Online Teacher Professional Development within a School Improvement Initiative

Introduction

Raising teacher effectiveness is central to school improvement initiatives and educational reforms. Current policy initiatives, including Race to the Top, are focused on teacher effectiveness as one of the levers promoting effective school improvement and the larger system goal of ensuring college and career readiness for all students. School improvement often entails significant professional development (PD) for teachers tailored to standards, curriculum, and assessments. Ongoing PD is important for exposing teachers to new teaching strategies and providing opportunities to share effective teaching practices. Teachers agree that PD is vital to school improvement; a large-scale, nationally representative survey of over 40,000 teachers conducted found that 85% of the teachers viewed PD as "absolutely essential" or "very important" to retaining good teachers (by comparison, 81% of teachers viewed higher salaries as "absolutely essential" or "very important") (The Bill and Melinda Gates Foundation, 2010a).

The traditional model of PD is based on face-to-face delivery. The number and complexity of learning objectives needing to be addressed with PD, combined with the number of teachers in training, lead to substantial costs for PD. These costs present a significant barrier for school systems, impeding their ability to raise teaching quality. This barrier is particularly formidable in today's climate of school budget cuts, which have led to fewer funds for PD, travel, and substitute teacher pay.

In order to take quality teaching programs to scale, we need to reduce the cost and increase the efficacy of PD. Online delivery offers a means of reducing costs substantially; recent work points to the potential of online delivery of PD to yield cost efficiencies and produce results that are comparable if not better than face-to-face PD methods (U. S. Department of

Education, 2010). Moreover, it is possible that large-scale online PD may introduce efficiencies that make the training more focused, achieve a more job-embedded approach, and increase ongoing collaboration among participants and facilitators, thereby strengthening the support for professional learning communities and the benefits that accrue from them (Lord, 1994). Recent studies have touted the benefits of blended PD solutions that combined traditional face-to-face methods with online delivery. As Hidalgo (2010) states in *Face-to-Face vs. Online Professional Development? Do Both! The Power of the Blended Model*, "Blended models can combine face-to-face sessions with several online follow-ups that give teachers opportunities to get expert and peer advice on current instructional issues, when they need it, in small increments, and connected to what they are teaching." In its meta-analysis of evidence-based practices in online learning, the U.S. Department of Education (2010) also found that instruction combining online and face-to-face elements was advantageous to purely face-to-face instruction or purely online instruction.

ACT and America's Choice, with funding from the Bill & Melinda Gates Foundation, joined forces to deliver blended models of PD and to identify practical suggestions for removing barriers to successful delivery. A qualitative evaluation of the project used teacher surveys and interviews to measure perceptions of both online and face-to-face offerings within blended models of PD. The PD was delivered during the 2009–2010 school year, with evaluation from fall 2009 to fall 2010.

An Integrated School Improvement Initiative

Rigor & Readiness was a school improvement partnership among ACT, America's Choice, and school districts designed to increase the number of students graduating high school who are college and career ready. ACT and America's Choice supported partner districts' implementation of a rigorous and coherent college and career readiness system that is consistent

with the educational systems of the highest performing countries. The initiative's design stressed comprehensiveness and close alignment of system components. Its cornerstone was ACT's research-based College Readiness System, which defines the performance levels and standards needed for college and career readiness, as measured by a sequence of assessments from grades 7 through 12. Aligned with these assessments was a rigorous core curriculum with end-of-course examinations aligned to college and career readiness standards, safety net programs for students who need help accessing the core curriculum, and support for students' psychosocial development.

In the design of Rigor & Readiness, PD was seen as a crucial lever for raising college and career readiness. The initiative stressed the critical role of teachers, administrators, and coaches in raising student achievement—and the belief that teachers' skills are enhanced by continuing PD throughout their careers. PD supporting the core curriculum, safety net programs, and students' psychosocial development was central to the initiative.

Description of Programs Supported with Online PD

The online PD supported implementation of key components of Rigor & Readiness, including the core mathematics curriculum for 9th grade (QualityCore Algebra 1), a safety net English language arts program for 6th- and 9th-grade students who were two or more years behind grade level in reading comprehension (Ramp-Up Literacy), a program for students in grades 6–9 who need help accessing the core mathematics curriculum (Mathematics Navigator), and a system for monitoring students' psychosocial development in support of 9th grade teacher teams and other small learning communities. To enable better understanding of the context of the study, we first describe these programs in greater detail.

QualityCore Algebra 1 is an instructional improvement program designed to raise the rigor and quality of Algebra 1 courses. Instead of a specialized curriculum, QualityCore offers supports for curriculum and instruction, including instructional resources (course standards, test blueprints, and model instructional units), a formative item pool and test builder linked to course standards, and an end-of-course assessment. Model use of QualityCore would include a collaborative "gap" analysis by teachers and instructional coaches to compare existing course standards to QualityCore standards (course objectives) to identify areas that need more attention or could otherwise be strengthened by utilizing QualityCore's resources. A key feature of QualityCore is that formative items are offered at varying *depth of knowledge* levels, allowing educators to assess—and then target instruction towards—students' higher-order thinking skills that are critical for future success.

The Ramp-Up Literacy program is a full English language arts (ELA) replacement curriculum, integrating reading comprehension and writing instruction across narrative, explanatory, and persuasive genres. The curriculum typically is delivered in double-period courses that seek to accelerate the learning of students who are two or more years behind grade level in English language arts. Ramp-Up Literacy courses follow a workshop model of instruction in which teachers provide a cycle of behavioral monitoring and guided practice using instructional routines and classroom rituals. Routines are the components of the course that determine what happens, in what order, and for how long for each day of instruction. An example routine is the *work period*—during which time students work apart from the teacher, either in pairs, small groups, or independently. Routines help the teacher to focus instruction through whole-group lessons, small-group reading instruction, small-group strategy lessons, or individual and small-group reading and writing conferences. Classroom rituals are prescribed

ways of supporting Ramp-Up's routines and provide consistency and reliability for the students and teacher; they help teachers manage transitions among routines with efficiency and they help students build independence as learners. Ramp-Up Literacy is designed to offer students an open and non-threatening learning atmosphere. The routines and rituals promote organization and good habits, productive use of time, and student responsibility for learning.

Mathematics Navigator works by correcting student misconceptions, using formative assessment strategies designed to continually monitor student work and identify misconceptions. It is offered to students who are enrolled in on-grade level math courses, but who struggle with specific math concepts. Mathematics Navigator targets specific content gaps that students need to master to be successful moving forward. It is intended to augment the school math curriculum, and can be delivered during school hours, tutoring, after-school, weekend, or summer programs. Mathematics Navigator is offered in a series of discrete modules. Students enter Mathematics Navigator on an as-needed basis and exit after demonstrating mastery, as measured by growth on embedded pre- and post-tests, of the targeted concepts.

In addition to its academic supports, Rigor & Readiness also provides a system of psychosocial supports, featuring behavioral monitoring systems and interventions designed to help educators respond to students' identified psychosocial needs. As part of this study, school-based teacher teams for 9th grade students were trained to use a system of assessments**,** including the ENGAGE Grades 6-9™ (formerly known as the Student Readiness Inventory), a student self-report inventory; and the ENGAGE Teacher Edition ™ (formerly known as the Behavioral Monitoring Scales), an instrument teachers use to rate student behavior. Both assessments measure academic behaviors in three broad domains: motivation, self-regulation, and social engagement. The training was developed with the belief that correctly interpreting and using

assessment results is a key step towards responding to students' needs—and developing or directing interventions to meet those needs.

Description of Online PD Models Implemented

The online PD was delivered using a variety of methods that can be categorized as online seminar, online tutorial, online collaboration, or online libraries.

Online seminars were designed for small- to medium-size groups and maintained the key elements of face-to-face workshop-style seminars. They featured a blend of pre-work (reading and viewing selected videos prior to the seminar), direct instruction using collaborative whiteboards for webinars, modeling through the delivery of streaming video, checkpoints for knowledge, and small-group collaboration around student work (using the collaborative whiteboards). In general, online seminars were used to replace specific onsite training days that would normally have been scheduled during the academic year as follow-ups to an initial summer seminar. In this way, online seminars were linked to a larger blended "course" model that occurred over the year.

Online tutorials offered targeted coaching and one-to-one interactions using the collaborative whiteboards[1]. The interactions included real time discussion between an experienced tutor and the teacher, and tools that allowed the teacher and tutor to share their writing and electronic files. This model included an introductory session in which the online tutor reviewed elements of the program and answered questions. After a short interval, during which the teacher began implementing the program, there was another session in which the tutor

[1] A whiteboard is a web-based collaboration environment that allows multiple users to view and edit the same screen at the same time. In this study, the primary collaboration environment used was Adobe ConnectPro, although the principal features used are available in almost all such competitive products.

answered questions and guided the teacher in a reflection on progress to date. A third session involved analyzing student work generated from implementation of the program.

Online collaboration tools and protocols that support professional learning communities as a professional development opportunity were also introduced. These collaboration tools included social networking features (blogs, shared commentary), threaded discussion boards, and online journals where participants could reflect on what they learned in training—and on what they implemented with their students.

Teachers also had access to online libraries including videos of instruction, student work with commentary, a research library with relevant whitepapers, and other tools for implementing the supported programs. The online libraries were indexed and sequenced to imply a learning path that builds knowledge through the user's independent, self-paced use of the materials. Included in the online libraries were materials designed to facilitate face-to-face teacher team interactions; we refer to these resources as study groups.

Applications of Online PD Models Implemented

Online Seminars

The online seminar approach was applied to the PD supporting the two full-year programs—QualityCore Algebra 1 and Ramp-Up Literacy. The baseline PD for each consisted of an initial summer institute continued through follow-up training days throughout the academic year. This continual connection provided a good opportunity to blend online with face-to-face delivery as described below.

QualityCore Algebra 1 PD typically consisted of three days of face-to-face training during the summer followed by two discrete days of face-to-face training during the academic year, usually one in the fall and one in the winter or spring. In this study, we used online delivery

for the specific content of the final face-to-face training day. This was easy to do within the PD design as the original face-to-face follow-up days are structured around short segments of content (modules). In this study, the content from the modules used for the final face-to-face training day was streamed out during the spring semester in a mix of webinars for small groups as well as individual coaching sessions. Online PD offerings for the final day of QualityCore Algebra 1 training began in January 2010 and continued through early May 2010. The topics covered included: scaffolding assessments to match instruction; looking at student work (using QualityCore's resources for systematically examining student work); and revising lessons for rigor and relevance. Online seminar was the primary method of delivery, with online tutorials used as a follow-up to the seminars.

Ramp-Up Literacy PD provided teachers implementing the course with eight days of training. These eight days typically are delivered as four initial days of face-to-face training in the summer followed by four days of training during the school year—two days in the early fall and two days in the winter or spring. As opposed to simply replacing one or two days of face-to-face follow-up training with online delivery of the same, the online PD offerings for Ramp-Up Literacy were designed to deliver the content of the follow-up training that explicitly supported the *work period* routine. This was chosen because the work period is often one of the most challenging aspects of implementation for teachers new to Ramp-Up. The online delivery began in December 2009 and continued through early May 2010. A series of three connected online seminars were featured, and the Ramp-Up Literacy design was modified to include journals, threaded discussion, and virtual "office hours" for individuals or small groups. The topics covered in the online seminars included: implementing the work period, using formative assessments to group students for independent and small-group activities, methods for looking at

student work, and building class profiles for small-group instruction delivered by the teacher. This design allowed for the facilitators to gain visibility into the classrooms using Ramp-Up so that they could monitor implementation and provide coaching support to teachers across the winter and spring.

Online Tutorials

Mathematics Navigator training is typically delivered as a brief "how to" orientation focused on the instructional design and materials. Sometimes, instructors are asked to implement the program with no orientation. This approach derives from its use as a short-cycle intervention that augments the regular curriculum and that is often taught by non-specialists, paraprofessionals, and/or volunteers in addition to mathematics specialists. Orientations are typically delivered in advance of the school year as a half- or full-day face-to-face training session. Often, training occurs at a time that is convenient for stand-alone PD but not necessarily optimal for supporting the start of the program (e.g., instructors are trained weeks prior to receiving materials or having any students assigned). Thus, a more flexible online support was seen as a promising approach. As such, the online PD for Mathematics Navigator was delivered through a series of online tutorials that were designed to occur (a) just prior to use, (b) after the first five lessons in order to address any implementation barriers, and (c) following the first formative assessment checkpoint, to help teachers use assessment data effectively throughout the remaining 12–15 lessons. To participate in this training, teachers used the collaborative whiteboard and a headset to communicate with tutors, who were skilled mathematics teachers trained by America's Choice in the delivery of Mathematics Navigator. This method allows tutors to see and respond to teachers' work and to carry on live discussions with the participating teachers. Tutors used the technology to (a) introduce teachers to the overall structure of

Mathematics Navigator (replacing the traditional face-to-face introduction), (b) help teachers with the PD-targeted strategies as they work through lessons, and (c) analyze student work and assessment results to unearth and correct misconceptions.

Online Collaboration Tools and Online Libraries

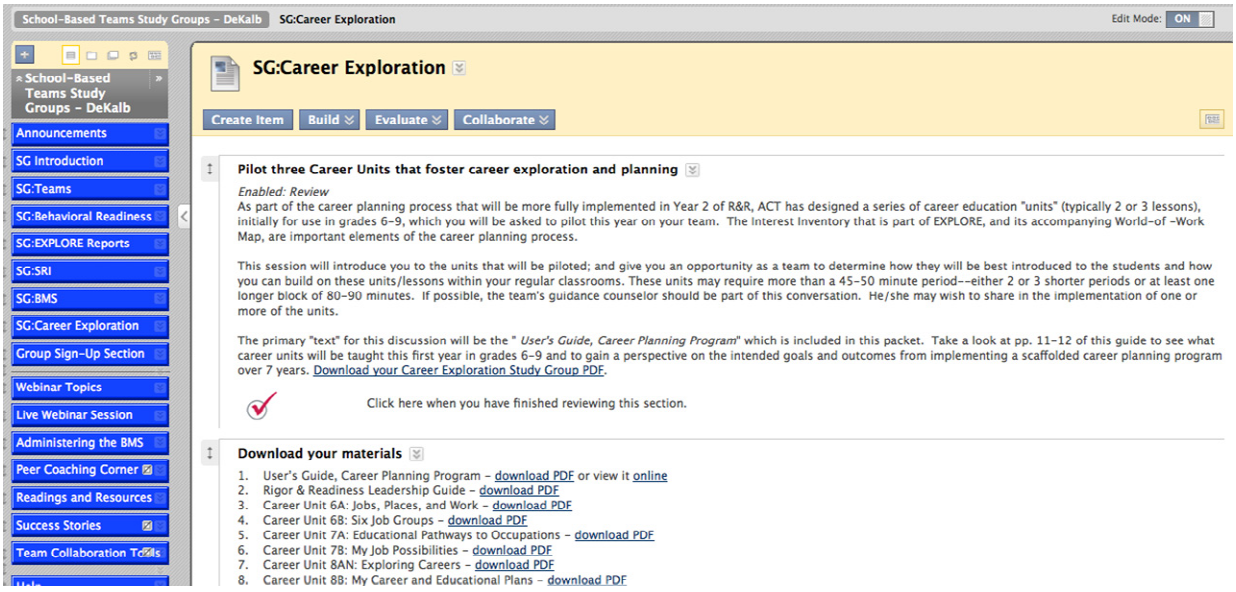
Support for teacher teams was the primary application of online collaboration tools. The context, training, and analysis of data relating to psychosocial assessment was supported with online PD through online collaboration tools and online libraries.

Teacher teams or professional learning communities (PLCs) have been shown to be a key mechanism for improving teacher effectiveness and instructional leadership (Lord, 1994). Within the scope of teacher teams is the "small learning community"; in particular, where a small group of core academic teachers share the teaching responsibilities for a specific group of students. In this way, teacher teams create a personalized learning environment for their students and can work together to provide support across disciplines and within the area of academic behavior (psychosocial supports).

In February 2010, teachers organized into teams were introduced to a virtual collaboration environment and guided through the use of tools and expectations for 9th grade teacher teams. The teacher teams had representation from the English language arts, mathematics, science, and social studies faculty members who work with a defined group of students, usually ranging in number from 20 to 80. A screenshot of the online team environment is presented in Figure 1. Study groups, which are downloadable materials that organize and facilitate learning objectives for face-to-face teacher team meetings, were developed for specific topics, including interpreting and using data from the student behavioral assessment (ENGAGE) and student behavioral ratings made by teachers (ENGAGE Teacher Edition), using academic

data (from ACT's EXPLORE assessment) to make decisions about students, and using resources for students' career exploration and planning. The goal of the study groups and online tools was to promote teacher team collaboration around psychosocial and academic data to understand the needs of students, and to help teachers work better as a team. ENGAGE was administered to approximately 5,500 9th grade students in fall 2009 or January 2010; the ENGAGE Teacher Edition assessments were collected from teachers for a subset of over 600 of these 9th grade students in February 2010. Data from these assessments were used in the teacher team meetings; the study group materials acted as a curriculum for the teacher team meetings focused on the assessment results. While use of the study group materials does not require online PD, it was included in our evaluation as a potentially effective and scalable training model for improving teacher teams.

FIGURE 1. School-Based Teams Study Group Environment



Research Methods

Development of Conceptual Map

The original study plans were built around Kirkpatrick's (1996) four-level model for measuring training effectiveness. The four levels are *Reactions* (participant satisfaction and perceived relevance of the training program to their everyday work), *Learning* (the extent that training participants have advanced in skills, knowledge, or attitude), *Transfer* (whether the newly acquired skills, knowledge, or attitudes are being used in the everyday environment of the training participant), and *Results* (the success of the training program in terms of whatever outcome it was conceived to achieve). According to this model, findings from each prior level serve as a base for the next level's evaluation. Thus, each successive level represents a more precise measure of the effectiveness of the training program.

An initial wave of data collection, in fall 2009, included classroom observations and teacher surveys ascertaining program implementation and satisfaction with face-to-face training. This wave of data collection, along with initial experiences designing and implementing the PD, gave the research team a better understanding of the schools, programs, and teachers that were the subject of the PD. After these initial experiences, the study plans were revisited to target the research towards questions that were most important and most likely to be informed by the study. The initial conceptual map, presented in Figure 2, was created to better organize the research inquiry and to help prioritize and guide data collection efforts. The map is intended to organize supports and barriers of effective PD, as well as outcomes of PD delivery. The arrows between the map's components represent expected directionality of effects. For example, the map posits that contextual factors influence training logistics and teachers' expectations about the training; and contextual factors, training logistics, and teachers' expectations all influence decisions to

participate in training. The map's components, as conceptualized by the research team, are described in Table 1.

FIGURE 2. Initial Conceptual Map

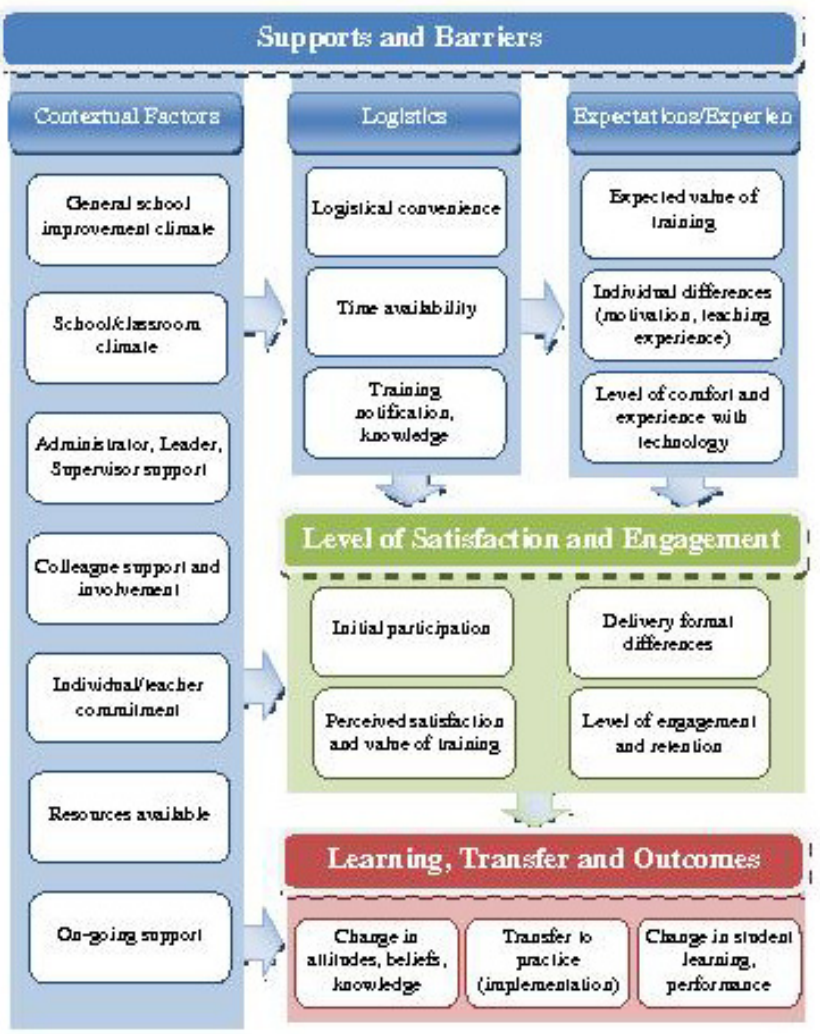


TABLE 1

Conceptual Map Component Descriptions

Component Name	Component Description
Supports and Barriers – Contextual Factors	
General school improvement climate	The extent to which a shared vision of school improvement, supported by district leadership, exists between school leaders and faculty and staff. School leaders and teachers work towards shared goals that are measurable and attainable.
School/classroom climate	The qualities of the school and classroom environment that promote learning, as well as teachers' ability and willingness to improve teaching. This includes the extent to which students feel safe and the extent to which the school and classroom are free of disruptions.
Leadership support	The support provided to teachers by school leaders in pursuit of a common goal. Leadership support entails giving feedback, support, and encouragement through effective communication, ample time for learning and collaboration, and support of teachers' experimentation with new strategies.
Colleague support and involvement	The degree that educator colleagues provide mutual support for participating in training, reflecting on teaching and how the training informs their practice, and transferring learning to practice. Colleague support and involvement also represents the degree that educators support each other's teaching endeavors, in general, and implementation of new teaching strategies, in particular.
Individual/teacher commitment	The extent to which teachers are committed to school improvement efforts through learning and implementing new programs.
Availability of training and classroom resources	The extent to which training materials and classroom resources associated with the training are made available to teachers in a timely manner for use during both training and implementation.
On-going support for training and implementation	Teachers' receipt of continued support from school leadership and training providers throughout the year for both training and implementation. This includes timely access to experts, resources for successful implementation, and adequate time for incorporating new ideas.
Supports and Barriers – Logistics	
Logistical convenience	The extent to which scheduled training times offer convenience and flexible times for teachers to attend training.
Time availability	The extent to which teachers are provided ample time to attend training without adversely affecting their teaching.
Knowledge of training topics and expectations	The extent to which teachers have been adequately informed of upcoming training activities. This also includes understanding of the purpose and nature of the training activities and expectations for attendance and engagement.
Supports and Barriers – Expectations/Experience	
Individual differences (motivation, teaching experience)	Personal characteristics of teachers that affect their disposition towards PD. These include attitudes, personality factors, teaching experience, and personal circumstances that affect their ability to attend training. For example, one teacher may be motivated by professional responsibility, while another teacher may feel that all PD is a waste of time.
Comfort and experience with technology	Teachers' level of comfort and experience with the technology needed for online training derived from their prior training or experience with the training tools.
Expected value of training	The level to which teachers believe that the planned training activities are worthwhile and will improve their teaching ability.
Satisfaction and Engagement	
Attendance and participation	The degree to which teachers not only show up for training, but also actively participate in training activities.

Delivery format differences	The extent to which teachers find value and satisfaction with different delivery formats, such as online seminars, one-to-one tutoring, collaboration, or whiteboard activities.
Engagement and retention	The level to which teachers feel engaged in and are able to learn from the training activities, increasing the chances they want to return for more training sessions.
Perceived satisfaction and value of training	The extent to which teachers feel satisfied with the quality of training they received, as well as the extent that they believe the training was worthwhile and will improve their teaching.
Learning, Transfer, and Outcomes	
Change in attitudes, beliefs, knowledge	The extent to which teachers' attitudes, beliefs, and pedagogical content knowledge change as a result of the training they receive.
Transfer to practice (implementation)	The degree to which teachers are able to transfer what they learn in training to their teaching activities and responsibilities in and out of the classroom.
Improved student learning	The extent to which students' learning gains improve based on PD-targeted strategies teachers have learned and implemented in their classrooms.

While the initial conceptual map retained components of Kirkpatrick's (1996) framework, it was acknowledged that the research was not designed to attribute differences in certain components (teacher learning and transfer; student learning outcomes) to differences in training experiences or the support and barrier components. It is more feasible to measure proximal components, such as teachers' reactions to the PD, than more distant components such as changes in teacher and student behavior. Other work that informed the map development or support its structure include: Guskey's (2002, 2000, 1999) work guiding evaluation of PD, and work by Knapp (2003) discussing the importance of teacher support, in terms of resources, time, and policies built on the factors related to effective PD. Knapp also discussed the role of the school context, nested within a larger policy context, which plays a role in teacher learning. Ingvarson, Meiers, and Beavis (2005) developed a theoretical framework for investigating factors related to the impact of PD on teacher and student outcomes, suggesting that the impact of PD was related to background variables pertaining to the teachers and school environment, structural features of the PD such as amount of time and amount of participation, and opportunity to learn, mediated by the professional community within schools. Several studies cite the convenience of online PD in terms of flexibility of time, opportunities for self-paced instruction,

access to experts and other teachers outside of the school or district, and opportunities to communicate after the conclusion of the PD (Carey, Louis, Kleiman, Russell, & Venable, 2008; Dominguez, Nicholls, & Storandt, 2006; Liu, Carr, & Strobel, 2009; Russell, Carey, Kleiman, & Venable, 2009). It has also been suggested that participants may be less inhibited when participating in online PD than they would be in a face-to-face situation (Carey, et al. 2008), and that school systems realize the cost effectiveness of online over face-to-face PD (Holmes, Signer, & MacLeod, 2010).

The initial conceptual map was developed in winter and spring of 2010 and used to guide the creation of end-of-year teacher surveys (given in May and June, 2010) and follow-up interview protocols completed in November 2010.

Research Questions

To further help guide the data collection efforts, broad research questions of interest were articulated after creating the initial conceptual map. As described next, survey and interview questions were designed to inform these questions.

- What are the environmental supports that need to be in place in order for online PD to be most effective?
- What factors affect teacher participation in, and level of engagement in, online PD?
- Relative to traditional PD, were teachers satisfied with the quality and relevance of the online PD?
- Did the online training enhance teachers' perceived knowledge of training-targeted concepts?
- Did teachers report being able to apply what they learned in online training to their work?

- Do teachers expect the online training to result in improved student learning?

Data Collection

Teacher Surveys. Development of surveys administered at the end of the 2009–2010 academic year was informed by the conceptual map and research questions. Two forms of surveys were developed—one for teachers who participated in online training (*online participants*) and one for teachers for whom online PD was offered, but who did not participate (*online nonparticipants*). With the exception of one item that addressed reasons for nonparticipation, the items on the survey form for online nonparticipants were a subset of the items on the form for online participants (the additional items addressed experiences with online PD).

The teacher surveys were paper & pencil forms. At the end of the 2009–2010 school year, the surveys were distributed to teachers by America's Choice and ACT personnel who worked within the districts as part of the Rigor & Readiness initiative. The surveys were distributed along with postage-paid, addressed envelopes and were returned to ACT for data entry. At the time of survey distribution, teachers were asked whether or not they participated in online PD—and their response determined which survey form they received. Teachers were assured that their individual responses would be kept confidential and that data would only be reported in aggregate form. Teachers were not provided special incentives for completing surveys.

Most of the survey items asked teachers to indicate their level of agreement with statements using a 6-point scale, where 1 = strongly disagree, 2 = moderately disagree, 3 = slightly disagree, 4 = slightly agree, 5 = moderately agree, and 6 = strongly agree. For example, online participants and nonparticipants were asked to rate their agreement with: "I understood

why I was asked to participate in online PD." Another 6-point scale ascertained satisfaction with different aspects of PD. For example, "Access to experts outside of PD" was rated as 1 = very dissatisfied, 2 = moderately dissatisfied, 3 = slightly dissatisfied, 4 = slightly satisfied, 5 = moderately satisfied, and 6 = very satisfied. This was rated separately with respect to face-to-face and online PD. Other items were rated on a 4-point scale, where 1 = did not influence, 2 = slightly influenced, 3 = moderately influenced, and 4 = strongly influenced. For example, teachers were asked to rate the extent that certain factors influenced decisions to participate in PD, such as "location convenience." Again, this item was rated separately with respect to face-to-face and online PD. The survey data are summarized and presented in Appendix A.

Structured Interviews. Structured interviews were developed and conducted with teachers and non-teachers (training facilitators, training coordinators, and program leaders) in the fall of 2010. The interviews assessed many of the same topics addressed by the survey, but at a deeper level—and with the potential to probe interviewees for more information. Some questions were open-ended, which allowed interviewees to reveal information we may have not known to ask about. By conducting the interview in the fall of 2010, teachers were able to provide information about the ongoing effect of the previous year's PD.

Interviews were first conducted with the non-teachers, which helped shape the questions on the teacher interviews. Two forms of teacher interviews were used. One form applied to teachers implementing the academic programs (QualityCore Algebra 1, Ramp-Up Literacy, and Mathematics Navigator). Another form applied to teachers who used the study groups within their teacher team meetings. Non-teachers were invited to participate in the interviews through emails and phone calls. Teachers were invited to participate with letters through regular mail,

and with follow-up email invitations. Teachers were given $100 for participating in the interview and were assured that their interview responses would be kept confidential.

Early in the teacher interviews for the academic programs, the interviewer determined if the teacher was an online participant or a nonparticipant. The flow of the interview and many of the specific questions asked were different for online participants and nonparticipants. Nonparticipants were asked about barriers to their participation in online training; for example, "Were there any scheduling conflicts that prevented you from attending online PD?" and "What would have made you more likely to participate in the online training?" Unlike nonparticipants, online participants were asked questions about their experiences with the online training, such as "What suggestions do you have for improving the online training?" and "Are there problems or barriers that have kept you from applying what you learned in online training to your teaching duties?" In lieu of these questions, nonparticipants were asked similar types of questions about their experiences with face-to-face training.

The interviews were conducted by four members of the project evaluation team and transcribed to electronic documents. To identify responses with common themes, a coding system was developed and applied to the transcribed data using software for the analysis of qualitative data (Muhr & Friese, 2004). An initial coding system was developed after review of the non-teacher interviews, and was informed by the conceptual map and our cumulative experience with the project prior to the teacher interviews. The coding system was revised after completion of nearly half of the teacher interviews (but before being applied to the transcribed interviews), and underwent smaller revisions through the course of coding the transcribed interviews. The interview data are summarized and presented in Appendix A, and the coding system is presented in Appendix B.

Reporting Conventions. Data are presented throughout the report for online participants, nonparticipants, and in some cases both groups combined. Some survey and interview data pertain to experiences with online PD, some pertain to face-to-face PD, while others ask PD-related questions but do not distinguish between the two modes. Other questions do not pertain directly to PD but rather assess school climate, relationships with other teachers, and comfort with technology. Interview data for the teacher team study group participants are reported separately from the data from the three academic programs because the training models differed considerably (study groups facilitated face-to-face interactions of teacher team members, while the online PD for the academic programs used online seminar, online tutorial, and online collaboration tools and resource libraries) and because a different interview form was used for the study group participants.

The survey data referenced in this report are calculated means and percentages of teachers agreeing with certain statements. For example, the mean response (using the 1–6 agreement scale) to "I often have difficulty choosing what to do in my classroom after hearing about so many best teaching practices" was 3.1, indicating that surveyed teachers "slightly disagreed" with the statement, on average. Meanwhile, 42% of teachers agreed to some extent with the statement.

The interview data are presented in this report as percentages (either absolute or using a qualifying descriptor of the percentage) of teachers who expressed a certain theme. We also use teacher (and non-teacher) quotes that exemplify certain themes. Qualifying frequency descriptors are often used in place of reporting actual percentages using the conventions described in Table 2.

TABLE 2

Qualifying Descriptors of Frequencies Used to Present Interview Data

Descriptors of teacher frequency	Descriptors of theme prevalence	Percentage range	Example
Nearly all	Nearly unanimous	75–100%	**Nearly all** of the teachers interviewed indicated a medium or high level of comfort with technology and participating in online training.
Most	Prominent	50–74%	**Most** interviewed teachers found the online PD to be engaging.
Some	Common	25–49%	Another **commonly** cited positive aspect of online PD was being able to communicate and share with others outside of the school or district.
Few, a small number of	Less common	10–24%	Though **less common**, setting clear expectations was suggested by interviewed online participants as a way to improve online PD.

Program, Training, Survey, and Interview Participants

Summary counts of the number of teachers participating in each program, including those who participated in online training and those who did not, are presented in Table 3. Also given are the numbers of teachers providing survey data, interview data, or either form of data (*N*). The counts in the *Total* columns are estimates based upon program training rosters, reports from training facilitators and program leaders, and records of participants using online training resources. The counts in the *N*, *Survey*, and *Interview* columns are based on the data collected from teachers in the surveys and interviews. From Table 3, we see that the percentage of teachers that participated in online training varied significantly across the three programs from 18% for QualityCore Algebra 1, 53% for Math Navigator, and 68% for Ramp-Up Literacy. Because we only received data for teachers that participated in the study groups supporting teacher teams—and did not have an indication for which teachers were offered study groups but chose not to participate—the columns for *Online Nonparticipants* are not applicable for the teacher team / study group program. The small percentage of online participants for QualityCore Algebra 1 is due primarily to a low participation rate (9 of 96 teachers, 9%) in the district with the most

teachers implementing QualityCore Algebra 1. In this district, teachers were going to have the final day of face-to-face training regardless of whether or not they attended the online training, and thus the online training was not deemed important.

TABLE 3

Survey and Interview Participants

Program	Online Participants				Online Nonparticipants				Total Number of Program Participants
	Total	N[1]	Survey	Interview	Total	N[1]	Survey	Interview	
QualityCore Algebra 1	27	13	9	8	125	22	18	4	152
Math Navigator	62	14	5	11	54	8	6	2	116
Ramp-Up Literacy	36	17	7	11	17	17	7	12	53
Teacher team / Study Groups[4]	34	13	8	6	NA	NA	NA	NA	34
Total	148[2]	51[2,3]	29	36	191[2]	47[3]	31	18	329[2]

[1]Number of program participants with survey or interview data.
[2]Total is less than the sum across rows because some teachers were participants in multiple programs.
[3]The total number of teachers with interview or survey data is 92; six teachers were online participants for one program but nonparticipants for another program.
[4]Use of study group materials is not considered online PD, but is reported here along with online participants to capture the number of teachers who participated in a nontraditional form of PD.

Overall, 92 individuals contributed survey, interview, or both sources of data towards the three academic programs or teacher team study groups. Nine non-teacher interviews were conducted with personnel external to the school systems—including four content experts who delivered the online PD (training facilitators), two training coordinators, and three program leaders who designed the online PD systems. Overall, data from 101 individuals are referenced in this report.

Among the 60 teachers who completed the end-of-year survey, 29 were online participants and 31 were nonparticipants. Teachers in both groups tended to be experienced

teachers, with 76% and 81% of online participants and nonparticipants, respectively, having at least four years of experience. Only 10% of surveyed teachers had less than two years of teaching experience.

Fifty-four teachers participated in the teacher interviews, including 36 online participants and 18 nonparticipants. Among the 54 teachers interviewed, 12 implemented QualityCore Algebra 1, 23 Ramp-Up Literacy, 13 Mathematics Navigator, and six participated in study groups. Overall, the sample of teachers interviewed were experienced teachers, although there were more teachers with five years of experience or less who participated in online PD (41%) relative to the nonparticipants (26%). Nearly half of the teachers in both groups had more than 10 years of teaching experience, with 49% and 58%, respectively, of online participants and nonparticipants reporting more than 10 years experience. Nearly all teachers interviewed indicated that they had also received face-to-face PD for their respective program.

Among surveyed teachers, 80% reported attending at least three sessions of face-to-face PD; just one reported attending no face-to-face PD sessions. Among the surveyed online participants, 58% reported attending at least five hours of online PD and 16% reported attending less than two. Most interviewed online participants attended at least three online PD sessions, while about one-third attended just one or two sessions. All interviewed nonparticipants reported attending at least three sessions of face-to-face PD.

Study Limitations. Our data are based on teacher self-report, which can be inaccurate due to respondents' inability to recall prior events, or their inclination to provide socially-desirable responses. The PD was delivered during the 2009-2010 school year, the surveys were administered at the end of the school year, and the interviews were conducted during the fall of 2010; therefore, memory decay is probably not a large source of error. Social desirability bias is

potentially more of a concern; teachers have been shown to over-report positive changes in classroom practices, which is attributed to a desire to appear favorably in relation to one's peers (Kopcha & Sullivan, 2006). However, the extent to which participants feel that their responses are private can help reduce this bias (Scaeffer, 2000). Teachers were told both in the survey instructions and at the start of the interview that their responses would remain anonymous; therefore, while the possibility of social desirability bias should not be overlooked when interpreting the results of this study, steps were taken to try to mitigate this problem.

As shown in Table 3, we were only able to collect survey or interview data on about one-third of the online participants and about one-fourth of the nonparticipants. It is possible that the sample of teachers who did not respond has different perceptions of the programs and training. With a relatively small sample of teachers within each program and overlap of online delivery methods across programs, we have little power to attribute differences in teachers' perceptions to program-specific training content. Additionally, teacher background and demographic information was provided for only about 50% of the participants. Another limitation is that the study was conducted in four large school districts that have historically low aggregate achievement and that are undergoing extensive school improvement reform; it is therefore possible that some of our findings are specific to this context. The study evaluated PD programs delivered by one organization and it is possible that there are nuances to our findings that may not be encountered by other PD providers. As described earlier under the development of the conceptual map, the study was not designed to attribute differences in teachers' training experiences to objective measures of teacher knowledge, implementation, or student learning outcomes. Aside from teacher perceptions, the effectiveness of the training facilitators, and the quality of the PD itself were not assessed using other objective measures. Another limitation is

that there was no formal cost analysis to determine whether the potential cost savings offered by online PD was realized.

Results and Lessons Learned

Our study unearthed some practical suggestions for improving the delivery of blended PD models. While some of the findings are specific to online PD, others are applicable to any PD endeavor. To present results, we grouped common findings together into seven lessons learned. Based upon these lessons learned, a revised conceptual map will be presented, along with specific recommendations for the design and implementation of blended PD models.

Lesson 1: Synchronous forms of online PD suffered from coordinating difficulties

Live, or synchronous, forms of online training can be hindered by scheduling and coordinating difficulties. Asynchronous forms of training may reduce the need for common training time and alleviate scheduling difficulties; however, they also eliminate the community, collaboration, and individualization offered by synchronous forms. Results from the study indicate that online training can be more difficult to schedule and coordinate than face-to-face PD, particularly when regular teacher PD days are not utilized and teachers must use their planning periods or class time to participate. In order for synchronous online PD to run smoothly, multiple teachers need to be scheduled during the same time, all computers and peripherals must be running properly, and if regional PD is desired, then schedules would need to be coordinated across multiple districts.

Among surveyed teachers, over half indicated that they typically participated in face-to-face PD during teacher work days (51%), whereas when they participated in online PD was more variable, including during regular planning time (26%), teacher work days (42%), or other days (32%). Similarly, interviewed teachers who participated in online PD indicated that they did so

mainly during school hours other than the planning period (39%), or during the planning period (35%). Two of the interviewed teachers mentioned a lack of common planning periods within their school as an impediment to participating in the online PD, and one of the training coordinators interviewed said that differences in schedules across schools (e.g., 60- vs. 90-minute class periods) made scheduling very difficult. Surveyed teachers slightly disagreed, on average, that online PD was easier to schedule than face-to-face PD (mean=3.0 on the 6-point scale).

According to the non-teachers interviewed, districts realized during the school year that state funding was in serious trouble and they were going to have a difficult time paying for substitute teachers. Adding to the fact that substitutes were not going to be provided, most districts had determined that online training was only to be offered during normal school hours. In some cases, teachers used their planning periods to attend training or to cover other teachers' classes so they could attend training. It was common for teachers to miss either the beginning or ending of training sessions due to classroom coverage issues. In a few instances, teachers had to split their students across more than one classroom to keep from overburdening the teachers covering for them.

Teachers interviewed also indicated that classroom coverage created scheduling and participation problems; most of the teachers surveyed indicated that substitute teachers were needed to teach while they participated in online PD. However, substitute teachers were often not available. A lack of time or substitute teachers was mentioned as a disadvantage of online PD by a majority of the interviewed online participants. Again, this problem was exacerbated by school budget cuts that made it difficult or impossible to use substitute teachers. Moreover, four of the non-teachers interviewed noted that teachers lacked time to attend or didn't want to be away

from class. One teacher expressed frustration that he had to participate in online PD while managing his classroom:

> *"The way it was presented to us was that we had to do it, it would be the last 30 minutes of our last class, and somebody would come in and watch the classroom. Well, that was not happening and I could not pay attention to a webinar, dial in on my cell phone, listen and watch that computer monitor, and take care of my classroom."*

While perhaps not able to fully replace synchronous online PD, the coordinating difficulties could be partially addressed by making greater use of online resource libraries—something that both teachers and trainers felt could be advantageous. Most surveyed online participants indicated that they found access to online resources that they could use on their own time somewhat (25%) or very effective (45%) at engaging them in online PD. Aside from not having the coordinating difficulties associated with synchronous training, online resource libraries allow teachers to revisit ideas on an as-needed basis, and at their own pace. One teacher indicated that she was "looking for training that not only focused on new ideas and 21st century curriculum, but that also offers the ability to periodically revisit ideas, rather than one that regurgitates everything in one day." Another teacher talked about how she benefitted from repeating a PD session:

> *"I think it is where the value of re-teaching comes in, because sometimes the same stuff that was presented the first time seems a little bit overwhelming. Then when you revisit it 4 months later all of a sudden more pieces fall into place, and as we go through it more and enact in the classroom, more and more pieces fall into place."*

Lesson 2: Technical problems still emerge, even with adequate technology

Most teachers and trainers felt that the available technology was adequate for the training activities. We found that technical problems did arise, however. A number of teachers reported audio problems that interfered with collaboration activities. Some technology problems were related to configuration or connectivity issues, while others were due to teachers' (and sometimes trainers') lack of knowledge or skill in using the technology. Some teachers also experienced problems logging into online sessions. Technical problems such as these distracted from the learning experience, caused wasted time, and caused frustration and anxiety. In some cases, teachers could not attend online PD or chose not to continue their participation in online training because of the technology problems. Although many teachers reported problems using the technology, not all felt that the problems impacted their ability to learn.

> *"I don't think it [technology problems] had any impact on my ability to learn. I'm not a really fast typer so sometimes I think I didn't get my point across fast enough where I was able to answer the questions or be a part of the conversation quick enough, but I definitely felt that I was able to learn."*

Nearly all of the trainers and coordinators believed that the technology available to teachers was adequate for the training activities. Teacher survey responses, however, were more variable. While the surveyed online participants "slightly agreed," on average, that the technology provided by their school was adequate for participating in the online PD (mean = 4.3 on a 6-point scale), nearly one-third moderately or strongly disagreed. Surveyed teachers were also asked about their experience and comfort with computers and technology, and results reveal that many teachers are uncomfortable with computer technology. Only 64% of teachers felt comfortable turning to an online discussion group when help is needed, 69% felt confident

troubleshooting internet problems, 65% felt that help is available when they experience computer problems, and 29% reported having difficulties with most online programs they tried to use. However, only 13% felt that working with computers is very frustrating and 94% were confident in their ability to use a computer to learn. Online participants and nonparticipants did not differ much in their reported comfort with computers and technology, suggesting that comfort with technology did not affect participation decisions.

Despite the adequacy of the technology available, technical problems were a major impediment to successful delivery of online PD. Problems with technology and the resulting wasted time was commonly cited, mentioned by nearly all of the teachers interviewed who participated in online PD. Only a few of the online participants indicated that technology problems deterred them from attending the online training. However, technology problems were more commonly cited as a deterrent to participation among interviewed nonparticipants.

Audio problems were cited by about half of the interviewed online participants (52%) and included (a) difficulties with, or sometimes missing, headsets, (b) room configurations with phone lines on opposite ends of rooms from computers, (c) issues with school dial-out policies (some had to use cell phones), and (d) delay or lag in communication with the trainer that interfered with collaboration activities. Teachers ended up being able to communicate in most cases; however, some were forced to type or write rather than speak, and some could not hear what the trainer was saying. Configuration and computer equipment problems—as well as connectivity problems—were also commonly mentioned by interviewed online participants.

Other problems were due to teachers' (and sometimes trainers') lack of knowledge or skill in using the technology, or problems logging into the online session. Training facilitators and coordinators interviewed mentioned similar technology problems, including connectivity and

login issues, room configuration and phone line issues, and headset or audio issues which hindered the start of the session. A common theme from the training facilitators and coordinators was that teachers lacked skill or comfort with the technology at first, but that skill and comfort improved over time, suggesting that with proper prior setup and training, the technology problems can be alleviated.

The technical problems with the online PD distracted from the learning experience and wasted time. A few teachers commented that they were limited in how much they could cover due to time lost dealing with technical problems. Inevitably, the technical problems caused frustration and anxiety—and in a few cases were cited as reasons for discontinuing the online PD. One teacher remarked, "I only attended the sessions that were mandatory, because the technology problems were annoying and frustrating." In an attempt to reduce these frustrations and anxiety, one of the training coordinators interviewed suggested that teachers would find great value in an initial "open house" to describe follow-up online training, set expectations, and practice how to interact with the technology. A few of the online participants interviewed indicated a desire to be trained on using the technology prior to the start of the PD (23%).

Although many teachers reported technical problems, results indicated that they still found the training to be at least somewhat engaging. Most of the online participants interviewed indicated that the online PD was engaging or very engaging (55%); about half of the training facilitators and coordinators said that teachers seemed engaged in the online PD. However, in many cases, the technical problems impacted teachers' ability to learn. One-third of online participants surveyed said that technology limited their ability to learn from online seminars and online resources they could use on their own time. It was also common for survey respondents to report that technology limited their learning from online collaborative tools (e.g., discussion

boards and blogs) and online tutorials. Despite technology problems, learning did occur; less than a third of interviewed online participants said that technology problems impacted their ability to learn from the PD (29%). Additionally, although some of the interviewed online participants indicated that the technology problems impacted their ability to learn from the online PD, technology problems were less likely to impact their opinion of online PD or their willingness to participate in more online PD.

Lesson 3: Face-to-face PD is often preferred because of human contact and better engagement

The online participants and nonparticipants both generally preferred face-to-face PD because of the human contact and feelings of engagement. Study groups were made available through online libraries and offered a low-cost and scalable alternative to face-to-face delivery, while still promoting human contact and engagement.

Most of the teachers interviewed said that they preferred face-to-face PD (54%), and 68% of surveyed online participants agreed that online PD was less effective than face-to-face. Collaboration with other teachers and personal interaction with trainers was nearly unanimously cited as an advantage of face-to-face PD. Similarly, surveyed teachers who had participated in online PD "moderately agreed," on average, that they would rather have had face-to-face training (mean = 5.1 on the 6-point scale).

Low participation was mentioned by both teachers and trainers as an impediment to teacher interactions during online PD. One teacher remarked, "I think that we would benefit more from more participants; they might think of something we didn't." One of the training facilitators concurred:

> *"…one of the issues that worked against being able to get much collaboration going was that so few teachers actually attended … I might have planned to*

divide into groups and talk about something, but if you only have two people then that plan wasn't going to be very useful."

Greater participation in online PD among teacher colleagues might improve feelings of engagement. Colleague support for attending online PD was mixed; 32% of online participants interviewed said that colleagues were supportive of online PD participation, while 26% said that colleague support was lacking or mixed. Teacher comments ranged from "Absolutely, I had a partner who attended the training in my school library with me" to "I would say with one or two exceptions, there was more ambivalence than encouragement."

Using materials downloaded from the online libraries provided the 9th grade teacher teams a low-cost and scalable alternative to face-to-face training that retained the human element. The study groups facilitated collaborative work in which teachers learned through discussing and working through the materials as a team. Nearly all of the respondents to the study group surveys agreed that the study group format is an effective way to learn new topics and that the study groups improved their team's conversations and collaboration. Study group interviewees all reported that the study groups were useful in guiding discussions with colleagues. Five of the six people interviewed about their participation in study groups indicated that their implementation of the information learned has or will result in improved student learning.

About one quarter of the interviewed online participants experienced problems with the online PD because of difficulty understanding the speaking of the training facilitators. While all facilitators and teachers spoke English, not all facilitators were from the same geographic region and/or ethnicity as the teachers, which may have led to some language barriers. Two of the online tutors for Mathematics Navigator were not native English speakers, which also

contributed to language barriers. These problems resulted in less engagement with the facilitators than would have otherwise been realized.

Lesson 4: Teachers cited the convenience and value of online PD

Although many teachers preferred face-to-face training, most reported value in the online training and that their teaching practices changed because of the training. Teachers cited the convenience of online PD, indicated a desire for future online training, and acknowledged that online PD is the logical path for future training.

> *"It [online training] definitely has a place. It can definitely help in bringing really good results, and I think it's something that is only going to get better."*

Teachers expressed enthusiasm about online PD. Nearly all online participants cited one or more of the following as key benefits of online PD: preservation of class time (16%), less travel (52%), more flexibility (35%), and cost savings (32%). Other commonly cited positive aspects included being able to communicate and share with others outside of their school or district (35%) and comfort of participating in their own surroundings and feeling that online training provided a safe, less intimidating environment (32%). One teacher remarked, "During face-to-face training some of them [teachers] are shy or scared to speak up, but it seemed like over the web, people spoke up more… it seemed that people were a lot more open."

When reflecting on face-to-face and online PD related to their respective program, teachers reported the PD to be engaging and effective. On average, surveyed teachers moderately agreed that "the PD actively engaged them in reflecting on their teaching" and that the PD "will eventually result in greater student learning" (mean = 5.1 on the 6-point scale). Similarly, as mentioned previously, a majority of interviewed teachers found the online PD to be engaging (55%). Of the interviewed teachers, most indicated an overall positive impression of both types

of PD. When reflecting upon their online training, most of the interviewees indicated that the PD influenced them positively, including providing them with new ways of teaching or new ways of learning (55%).

The interviews also asked teachers about PD's impact on certain teaching skills and practices. Online participants reflected on the impact of their online training while nonparticipants reflected on the impact of face-to-face PD. Interviewed online participants tended to indicate less impact of the PD on their skills and practices than did interviewed non-participants. A majority of the interviewed teachers indicated that the PD positively impacted their use of assessment data and student work to respond to student needs (52% and 74%, respectively, for online and face-to-face delivery), their ability to address student misconceptions (55% and 74%, respectively), the frequency or quality of collaborations with other teachers (55% and 68%, respectively), and their participation in professional learning communities (PLCs) within the school or district (52% and 58%, respectively).

> *"When I had my training in person, we really didn't talk about or see how we could capture that [assessment data] and examine it either by standard or by students. The web training that I had…did look at that and gave us the information on how to do that."*

The level of the PD's impact may not have been strong: On average, surveyed teachers only slightly agreed that their "confidence in teaching has increased as a result of the PD" (mean = 4.4 on the 6-point scale). However, as mentioned previously, five of the six people interviewed about their participation in study groups indicated that their implementation of the information learned has or will result in improved student learning.

While the study group training format is not considered online PD, results suggest value in this alternative form of scalable training. Interviewees thought that the study groups improved their ability to use assessment results to understand and respond to students' needs. In one teacher's words, "The behavioral management (topics) gave you different insights into the student… We were able to find across the board with teachers, with the rating scale that we were having the same issues with the same student and it kind of gave us indicators to have a base point to decide what to do going forward with the student or how to better serve the student." Another teacher said, "Some teachers don't even consider sometimes why a student is acting the way they are… This kind of returns the personal aspect to teaching… that each individual has an individual situation."

Lesson 5: Careful system design, planning, and introduction can enhance online PD

Most teachers thought that the PD could be improved and the impact optimized through better planning and preparation—addressing who, what, when, where, and why—and communicating these essential points to teachers in a timely fashion. Nearly half of surveyed teachers (44%) expressed dissatisfaction with the planning and organization of the online activities. Lack of planning and prior notification was noted by most interviewed online participants (68%), and nearly half of the nonparticipants said that they were not aware that online PD was being offered (53%). More online participants were contacted about the online PD via email (58%) than contacted in person (23%).

"I found out about it [online PD] actually after it had taken place."

Better coordination was the most common suggestion made by interviewed teachers for improving PD in their district, mentioned by over 40% of online participants and nonparticipants. Many teachers expressed a feeling that (a) adequate preparations had not been

made in ensuring technological functionality, or critical informational materials were not available beforehand (e.g., manuals, student handbooks), and (b) as a result, they themselves were unprepared, didn't know what to expect, were confronted with obstacles or unanticipated problems, or went into training uncertain of why they were there.

"...I did not have any of the materials, so when the training was going on and the instructor told me to look at this or turn to this page, I could not do that..."

Lack of communication was mentioned by all nine of the training facilitators and coordinators interviewed; many teachers were notified of training just days before needing to attend. Less commonly, setting clear expectations was suggested by interviewed online participants as a way to improve online PD (16%). The study group interviews revealed that not all participants had the study group materials available for review prior to teacher team meetings. Teachers remarked that having the materials available would have made the meetings run more smoothly, and would have improved teacher buy-in to the study groups.

Most interviewed teachers believed implementation of the program for which they received PD would result in improved student learning (63%). Thus, most teachers understood the value of their implementation efforts. Moreover, 85% of surveyed teachers agreed that they understood why they were asked to participate in PD. However, a theme that emerged from the teacher interviews was that some of the PD was not perceived as relevant. While nearly all teachers interviewed said that PD is important, 39% feel PD is important when relevant. A few teachers (11%) indicated that PD is usually a waste of time. A small number of teachers stated that while some of the PD they received was good, sometimes the material covered is something that they have already received training for or is self-explanatory. Teachers remarked that some of the training material didn't require synchronous PD but could be self-directed (e.g., accessing

the online libraries). Interviewed online participants were less likely than nonparticipants to say that PD can be irrelevant or a waste of time (29% versus 68%). While we did not test a complete model for factors predicting participation in online PD, this finding suggests that perceived relevance may have affected decisions to participate in online PD.

Some teachers remarked that PD (face-to-face and online) could be improved if leadership sought input from them with respect to their needs, the relevance of training, and the timing and scheduling of PD in their districts. Desire for teacher input was commonly mentioned by interviewed nonparticipants (42%), but less commonly cited by online PD participants (16%). One teacher stated it simply, "Just ask the people who are in the trenches a little bit more as to how it would be a better training for them (e.g., when it would be most convenient)."

Lesson 6: There are common barriers to applying what is learned in PD

In the surveys and interviews, teachers were asked if they were able to implement what they learned in PD and also to identify implementation barriers. Almost all teachers reported implementing what they learned in PD, to some extent. Common barriers included not enough support, lack of materials, lack of knowledge, learning the materials too late in the school year to have the chance to fully implement, and general lack of time. Another obstacle to implementation was poor student behavior and lack of classroom management. These issues affected teachers' ability to implement programs as designed. One teacher remarked:

> *"You have to focus a lot on behavior management, so it really impacted being able to move through the routine in the time that is recommended for each section of the workshop."*

For the teacher team study groups, a lack of time was the biggest obstacle to using what was learned. Interviewees mentioned this in response to multiple questions, and four of the six

interviewees mentioned time specifically as a barrier keeping them from applying what they learned in the study groups. In one teacher's words:

> *"(There needs to be) enough time set aside to really go through the information as a team and make comparisons. It was really important to take the time that it takes to get the overall picture of the student data."*

Despite the implementation barriers, teachers were nearly unanimous in reporting that they had begun, and plan to continue, implementing the skills they learned during PD. This suggests that, despite the barriers discussed below, the PD was transferred to practice to some extent.

Teachers expressed a sense that ongoing and frequent support was an important part of learning effective implementation strategies. Several sources of support were identified by teachers, including school or district facilitators/coordinators/coaches, school and district administrators, other teachers, and external training providers and program experts. Many teachers expressed reliance on and satisfaction with external program or topic experts. However, a small number of teachers commented that the level of support provided during the second year of implementation (2010-2011) declined drastically—noting that access to experts was better the previous year or that administration was more supportive the previous year.

Nearly all teachers reported good support from school leaders for attending both online and face-to-face training. Most teachers also indicated that school administrators were committed to school improvement and full implementation of the Rigor & Readiness programs. However, a small number of the interviewed online participants indicated that administration was not supportive enough (19%), or that there was poor communication between administrators and teachers (10%). Also, surveyed teachers only "slightly agreed" that their supervisors allowed

them ample time to participate in online PD. Additionally, 29% indicated that they did not have the time to implement new strategies. One of the training coordinators interviewed suggested that some teachers reported having leadership support because they were told to attend the training (most online participants interviewed indicated that the online PD was required), but they did not receive the support they needed in terms of substitute teachers to cover class while they attended PD, materials needed for PD and implementation, or time to apply what was learned in PD to their everyday practice.

Teachers want more time for peer interaction and review; however, our results indicate that teachers' schedules provided little time with colleagues during school hours, and it was difficult for teachers to meet outside of scheduled hours because of personal commitments and union restrictions. Nearly half of the surveyed teachers indicated that they are not given adequate time to collaboratively plan (48%). Among surveyed teachers, 44% indicated that they do not visit colleagues' classrooms to observe their teaching; interestingly, online participants were less likely to indicate that they visit colleagues' classrooms (26%) than nonparticipants (70%). Colleague support for, and involvement with, the implementation of what teachers learned in PD was mixed; 48% of online participants and 63% of nonparticipants interviewed said that colleagues were supportive, while 35% of online participants and 26% of nonparticipants said that colleague support was lacking or mixed.

Assuming that enough time is available for collaborative work, greater use of online libraries could help teachers apply PD to their work. In particular, those interviewed about using study groups as part of teacher teams had positive reactions to the collaboration it provided with other teachers. One teacher remarked "The study groups facilitated teachers sitting down and having dialogue…. sometimes I don't always know the right questions to bring out the points

that we are needing to make and so I thought they just were great for facilitating good discussions."

Teachers are very interested in collaborating with other teachers—not only from their schools—but with others from other schools and districts who are facing similar implementation challenges. A few teachers alluded to the potential for a wider professional learning community (i.e., nationwide) that could also function as a support network. A few teachers also said they benefitted from collaborations both with people they knew and those they did not. Having access to other educators allowed teachers to learn new instructional strategies, share ideas, gain new insight from questions asked by their peers, and gain perspective on topics of interest. One teacher commented "I liked that there were people that I did know to bounce ideas off and I liked the fact that there were people I didn't know outside the district giving me a fresh look or a different view."

The study groups seem to be an effective format for fostering and facilitating teacher collaboration. Eighty percent of the survey respondents agreed that the study group format is an effective way to learn new topics and 85% thought the study groups improved their team's conversations and collaboration. Interviewees all reported that the study groups were useful in guiding discussions with colleagues.

A small number of the interviewed teachers indicated that lack of materials (e.g., program manuals, student handbooks) was a barrier to applying what they learned in PD to their practice. Specifically, not all districts were able to provide adequate materials for all students—due to either budget issues or coordinating problems. A small number of teachers also cited lack of knowledge of how to implement programs and lack of implementation time as barriers. Similarly, over a quarter of surveyed teachers expressed that they were not given the time they

needed to implement what they learned in PD (27%). Timeliness of the online PD was also mentioned by a few teachers as a barrier to implementation. As one teacher put it:

> *"The training kind of came after I had already begun the program. So that was, you know, not as good a system as if I would've been trained prior to or at least did a couple trainings before I had to initiate a class."*

A particularly important and challenging barrier to implementation was student behavior and classroom management. Though less common, student behavior problems were cited by interviewed teachers, and were also mentioned by one of the training coordinators interviewed. Interestingly, classroom management was the most commonly mentioned topic for additional PD needed, requested by 39% of interviewed online participants and 37% of nonparticipants. From the interviews, we learned that teachers struggled with disruptions, poor student behavior, and willingness to participate. In some instances, school-wide disciplinary procedures did not always allow students to be suspended or removed from the classroom. Among surveyed teachers, nearly half reported that they do not have the tools needed to support students who are struggling with motivation and other behavioral issues that impact learning (49%). One teacher acknowledged struggling with understanding students' backgrounds, saying "We don't always understand about family dynamics, and we don't all come from that kind of family."

Lesson 7: The school improvement climate can cause discontinuity, reducing expectations of online PD's impact

The current atmosphere of school improvement present in the districts studied has some teachers feeling inundated with evolving mandates and multiple initiatives. The lack of continuity caused teachers to wonder whether the programs supported with PD would be around the following year. A few teachers expressed concern and frustration over the discontinuity, which may impede efforts to construct an ongoing collaborative culture of professionals

committed to program implementation. A small number of teachers indicated they were no longer teaching the same program the year following initial implementation. A few teachers commented that "it's just one program after the next" and that "this program will go away like the previous programs have." Some teachers, therefore, felt that it was wasteful to invest their time and energy to learn and implement a new program when it is just "going to go away."

Nearly one-third of the interviewed teachers mentioned that programs change frequently or that they are no longer teaching or using the program (32%). A small number of teachers remarked that support for their program was better the previous year (4%) or that access to experts was better the previous year (10%). One of the program leaders interviewed also noticed teacher frustration with frequently changing improvement strategies:

> *There were a lot of people who said to us, literally, "We doubt that you'll be back for the second year because we have done so many initiatives in this district and you'll just be a one-year wonder."*

Some teachers expressed a desire for their schools/districts to "choose a program and stick with it." Over 40% of surveyed teachers agreed that they often have difficulty choosing what to do in the classroom after hearing about so many "best" teaching practices. To combat the discontinuity problem and encourage teachers to experiment with new strategies, a long-term commitment and extended schedule of expected results is needed.

Perhaps due to the current accountability structure's reliance on adequate yearly progress towards higher proficiency rates, teachers are more inclined to utilize programs that they perceived would not help students do well on state assessments. A small number of teachers expressed that although there are many good programs available, most seem to lack content relevant to individual state tests. As such, teachers feel following these programs with fidelity

results in a disservice for the students. One teacher remarked, "I felt like I didn't teach them what they needed to know because I was following the program."

Despite the concerns with discontinuity, over 90% of surveyed teachers agreed that they had support and encouragement to implement new strategies from school leaders, and 67% of teachers agreed that the school improvement initiative (Rigor & Readiness) does not conflict with other job responsibilities. Some PD recipients indicated that their improvement efforts would be sustained and would lead to improved student performance. When asked whether implementation of what was learned from the study groups would result in improved student learning, a school principal remarked:

> *"It has and it will continue to… My teachers understand there's a big picture and how they fit into it. So, they know study groups are part of the plan, and helping them to understand data, how to use it, and helping them understand how to work together as a team. I absolutely think that we are going to see the results on our students' performance."*

Summary and Recommendations

This study examined teacher perceptions of online and face-to-face PD in four large school districts implementing an integrated school improvement initiative. The online PD of this study was designed to support core 9th grade mathematics curriculum, and aligned safety net programs in literacy and mathematics. Study groups, a training format that provides materials to facilitate face-to-face teacher team meetings, supported collaboration within teacher teams in middle and high schools. Survey and interview data on 101 individuals—including 51 teachers who participated in online PD or study groups—are used in this report. The study guided recommendations for practitioners implementing blended PD models tied to a conceptual map of

factors affecting successful delivery of the PD. Lessons learned from the study include lessons relating specifically to online PD and others related to PD in general. Lessons learned specific to online PD include:

1) *Synchronous forms of online PD suffered from coordinating difficulties, which may have contributed to low participation rates.* Teachers lacked common time for training and substitute teachers were not always available, causing problems with classroom coverage.
2) *Teachers and trainers felt the technology available to them was adequate for the online training, but technical problems still emerged.* The technical problems caused wasted time and impacted teachers' ability to learn.
3) *Most teachers preferred face-to-face over online PD—often because of its human contact and better engagement.* Teachers who participated in study groups as part of teacher teams reported high levels of engagement and satisfaction with interactions between team members.
4) *Teachers cited the convenience and value of online PD.* While most teachers preferred face-to-face training, most reported that the online training was valuable and convenient and that their teaching practices changed because of the training.

Lessons learned related to PD in general include:

5) *Teacher buy-in and participation in PD could be enhanced with careful system design, planning, and introduction.* Teachers were not always aware that online training was being offered, and they perceived a lack of coordination that affected their readiness for training.
6) *Common barriers to transfer what was learned in PD included lack of time and lack of ongoing support.* Lack of materials, knowledge, and collaboration opportunities were

other obstacles keeping teachers from fully implementing what they learned in training. Several teachers expressed a strong need for tools to improve classroom management.

7) *The current climate for school improvement caused discontinuity in approaches to raising student achievement, leading teachers to wonder whether the new programs supported with PD will persist.* Some teachers expressed a desire for their school systems to "choose a program and stick with it."

Revisiting the Conceptual Map and Recommendations

While the study focused on online PD for specific programs within a school improvement initiative, the findings have implications for the successful design and delivery of other online PD solutions for K-12 educators. The eight recommendations that follow are tied to a conceptual map of factors affecting successful delivery of PD. The conceptual map and recommendations were derived from our study, as well as from existing literature on factors affecting successful face-to-face, online, and blended PD models. The map and recommendations are intended to provide school system leaders and PD providers general guidance on implementing PD and understanding what the barriers are to PD having its desired impact.

The conceptual map, presented in Figure 3, is organized by five categories of factors that are believed to affect, or be outcomes of, successful delivery of PD. Three of the five categories (contextual factors, logistics, and expectations/experiences) are considered supports for successful PD, while two categories (satisfaction and engagement and learning, transfer, and outcomes) are PD outcomes. The eight recommendations, discussed in greater detail below, are intended to improve the factors affecting successful PD. The conceptual map was modified from its original state presented in Table 1 and Figure 2. The modifications reflect insights we gained

from the study and judgments about the importance and interrelationships (directionality) of map components. The map's components are described in Table 4.

***FIGURE 3*. Revised Conceptual Map with Recommendations**

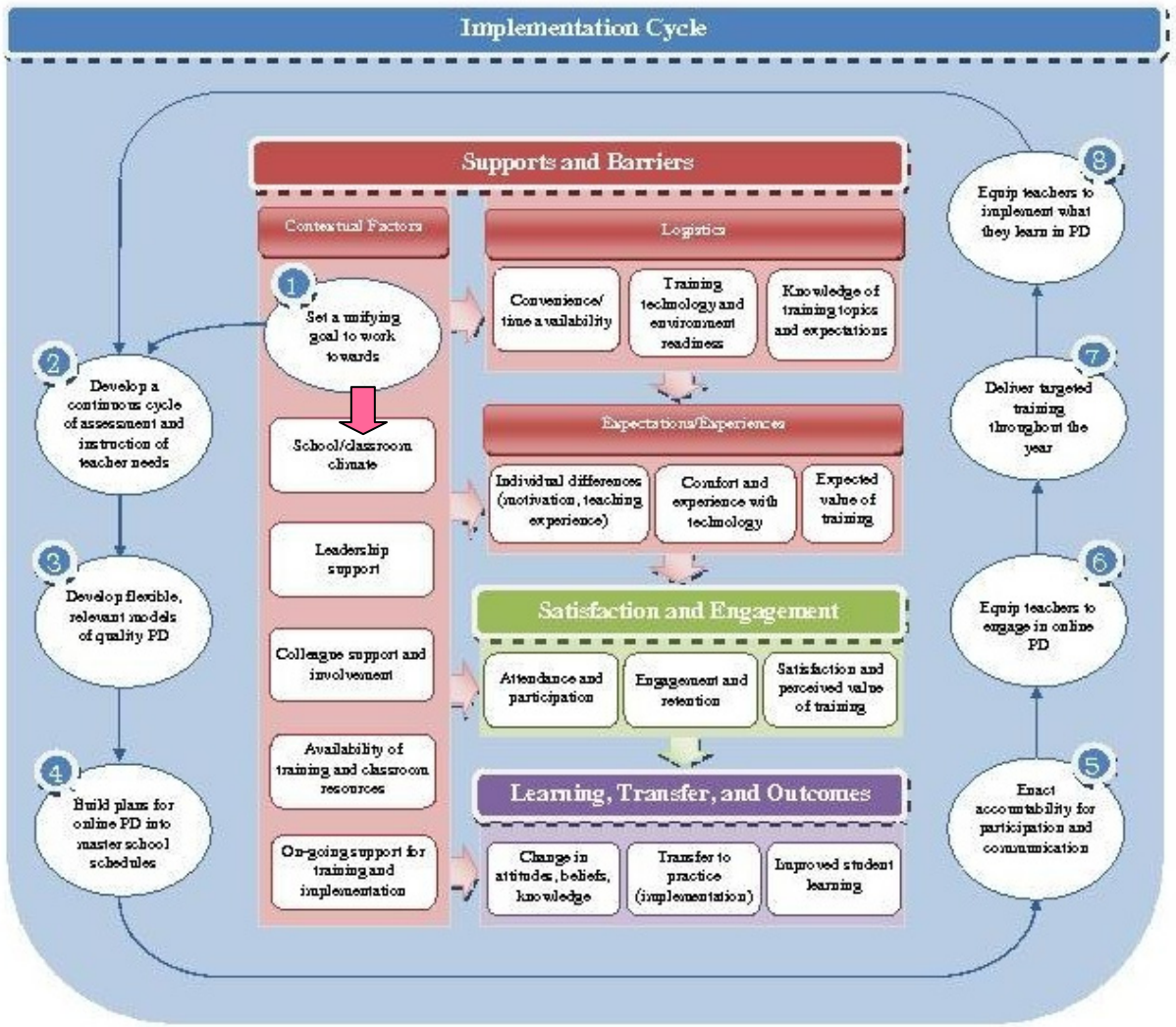


TABLE 4

Revised Conceptual Map Component Descriptions

Component Name	Component Description
Supports and Barriers – Contextual Factors	
Step 1 of the implementation cycle: Set a unifying goal to work towards	The extent to which a shared vision of school improvement, supported by district leadership, exists between school leaders and faculty and staff. School leaders and teachers work towards shared goals that are measurable and attainable.
School/classroom climate	The qualities of the school and classroom environment that promote learning, as well as teachers' ability and willingness to improve teaching. This includes the extent to which students feel safe and the extent to which the school and classroom are free of disruptions.
Colleague support and involvement	The degree that educator colleagues provide mutual support for participating in training, reflecting on teaching and how the training informs their practice, and transferring learning to practice. Colleague support and involvement also represents the degree that educators support each other's teaching endeavors, in general, and implementation of new teaching strategies, in particular.
Leadership support	The aid and support provided to teachers by school leaders in pursuit of a common goal. Leadership support entails giving feedback, support, and encouragement through effective communication, ample time for learning and collaboration, and support of teachers' experimentation with new strategies.
Availability of training and classroom resources	The extent to which training materials and classroom resources associated with the training are made available to teachers in a timely manner for use during both training and implementation.
On-going support for training and implementation	Teachers' receipt of continued support from school leadership and training providers throughout the year for both training and implementation. This includes timely access to experts, resources for successful implementation, and adequate time for incorporating new ideas and collaborating with colleagues.
Supports and Barriers – Logistics	
Convenience/time availability	The extent to which scheduled training times offer convenience and flexible times for teachers to attend training. It also entails teachers being provided with ample time to attend without adversely affecting their teaching.
Training technology and environment readiness	The degree that teachers are familiar with the technology, tools, and the environment in which online PD will take place. Environment readiness also includes the school's technology systems being adequately prepared for teachers to fully participate in online PD (e.g., system configuration, phone line and computer placement, functioning equipment).
Knowledge of training topics and expectations	The extent to which teachers have been adequately informed of upcoming training activities and expectations for those activities. This also includes understanding of the purpose and nature of the training activities and expectations for attendance and engagement.
Supports and Barriers – Expectations/Experience	
Individual differences (motivation, teaching experience)	Personal characteristics of teachers that affect their disposition towards PD. These include attitudes, personality factors, teaching experience, and personal circumstances that affect their ability to attend training. For example, one teacher may be motivated by professional responsibility, while another teacher may feel that all PD is a waste of time.
Comfort and experience with technology	Teachers' level of comfort and experience with the technology needed for online training derived from their prior training or experience with the training tools.
Expected value of training	The level to which teachers believe that the planned training activities are worthwhile and will improve their teaching ability.

Satisfaction and Engagement	
Attendance and participation	The degree to which teachers not only show up for training, but also actively participate in training activities.
Engagement and retention	The level to which teachers feel engaged in and are able to learn from the training activities, increasing the chances they want to return for more training sessions.
Satisfaction and perceived value of training	The extent to which teachers feel satisfied with the quality of training they received, as well as the extent that they believe the training was worthwhile and will improve their teaching.
Learning, Transfer, and Outcomes	
Change in attitudes, beliefs, knowledge	The extent to which teachers' attitudes, beliefs, and pedagogical content knowledge change as a result of the training they receive.
Transfer to practice (implementation)	The degree to which teachers are able to transfer what they learn in training to their teaching activities and responsibilities in and out of the classroom.
Improved student learning	The extent to which students' learning gains improve based on PD-targeted strategies teachers have learned and implemented in their classrooms.

Eight Recommendations for Practitioners

1) Set a unifying goal to work towards—and stick with it

Any school improvement effort, including enhancing PD offerings, should begin with identifying the goal of the school system. Many states and school systems have adopted college and career readiness as their end goal. This trend was evident in the development of the Common Core State Standards, which adopted the definition of college and career readiness as the acquisition of the knowledge and skills a student needs to enroll and succeed in credit-bearing, first-year courses at a postsecondary institution (such as a two- or four-year college, trade school, or technical school) without the need for remediation (ACT, 2010). With a clear unifying goal to work towards, educators and policymakers can adopt strategies that align to the goal and discard strategies that do not. Teachers will be more likely to benefit from PD if the training program is aligned tightly with other components of the school system, including standards, curriculum, and assessment—and if all components work towards the common goal. Decisions of how to design or improve teacher PD should be made with the unifying goal in mind. Setting a unifying goal, and sticking with it over multiple years, could have positive direct effects on components within the conceptual map, including school/classroom climate, leadership support, and colleague

support and involvement. It could also improve teachers' motivation to participate in training, as well as their ability to anticipate training topics.

While not an original focus of this study, one theme that emerged from the teacher interviews was that teachers are frustrated with programs that change frequently, sometimes after a single year (see lesson learned #7). They feel that programs cycle in and out, and they do not want to invest their time and effort into learning and trying to implement a new program only to abandon it the following year. This discontinuity problem might be alleviated by building tight alignment between school system components and PD offerings. With tight alignment, new strategies are less likely to be perceived as loosely connected programs because they fit in well with existing efforts. School system leaders can improve the impact of PD by sticking with well-conceived strategies that align to their end goal. Policymakers can also help by enacting laws and policies that allow more time for improved student achievement and meaningful accountability metrics that reflect students' academic growth. These steps will reduce the temptation for school system leaders to abandon good strategies prematurely.

2) Develop a continuous cycle of assessment and instruction of teacher needs

"Teachers are students too" was a common refrain echoed within our study. Like their students, teachers could benefit from a continuous cycle of assessment of their areas of need and delivery of PD to meet those needs. Developing a continuous cycle of assessment and instruction of teacher needs could have positive effects on components within the conceptual map, including knowledge of training topics and expectations, expected value of training, and perceived satisfaction and value of training.

Assessment could take several forms, including self-help inventory or teacher-specified needs, classroom observation, content and pedagogical knowledge assessment (Goldschmidt &

Phelps, 2010), student survey (The Bill and Melinda Gates Foundation, 2010b), value-added statistical analysis using student assessment data, and peer review. In response to this assessment challenge, a large-scale research study of measures of teaching effectiveness is seeking to develop fair and reliable measures of effective teaching that can be used to help identify teachers' needs (The Bill and Melinda Gates Foundation, 2010b).

Assessing what teachers need ensures that teachers help determine which PD topics they receive, which our study suggested is important. Teachers suggested that teacher buy-in, satisfaction, and participation might improve if teachers are part of the PD design and planning process. Prior research and policy work supports this finding, and suggests that teachers are more likely to support improvement efforts if they are consulted during system design (Corcoran, 1995).

While we did not test a complete model for factors predicting participation in online PD, our results suggest that perceived relevance may have affected decisions to participate in online PD. This underscores the need for targeting PD to individual teachers' needs—in the same way that teachers strive to target instruction towards their students' unique needs. Because every teacher's assessed needs are likely to be different, PD offerings should be somewhat flexible or modularized. Our study revealed that teachers often view PD as a waste of time; this design element should help teachers see relevance and value in their PD.

The continuous cycle of assessment should inform individual teachers' needs, as well as aggregate needs for the school system. Aggregated measures of student academic achievement, psychosocial factors, demographics (e.g., English language learner population), and other measures (e.g., absenteeism rates, number of students with special learning needs) can also help bring a school system's need for certain PD topics into focus.

3) Develop flexible, relevant models of quality PD

Recent studies (Hidalgo, 2010; U.S. Department of Education, 2010) suggest that models that blend face-to-face and online delivery may be most effective and economical. There is a great need for more ongoing, targeted training that helps teachers address obstacles as they meet them during the school year—and online PD makes it easier to deliver just-in-time training. Developing flexible and relevant models of quality PD might have positive effects on ongoing support for training and implementation, convenience and time availability, and training technology and environment readiness. (See Table 4 for descriptions of these map components.)

An important design consideration is to determine what PD should be delivered face-to-face and what can be delivered online. Careful analysis of the PD curriculum and learning objectives, along with research of online learning theories, can inform these decisions. For PD that need not be face-to-face, analysis must also address whether it needs to be synchronous. Our study suggests that teachers want to be more involved in PD design. One way that teachers can help design PD is to analyze which delivery methods (e.g., face-to-face, online seminar, online tutorial, online libraries, or study groups for teacher teams) are most appropriate for specific learning objectives.

Our study demonstrated that synchronous forms of online PD can have significant coordination and technical problems (lessons learned #1, 2). Online libraries and other non-synchronous forms of online PD are less likely to have these problems. Moreover, recorded training sessions (either online or face-to-face) offer teachers the opportunity to view missed training sessions or to review particular sessions of interest. Positive training experiences can also be captured through threaded discussions and sharing of student work. One day's

synchronous experiences can become part of tomorrow's online libraries. The online libraries facilitate review and new staff training—and could make these activities more affordable.

4) Build plans for online PD into master school schedules

We learned in this study that scheduling and coordinating online PD can be more difficult than scheduling face-to-face PD (lesson learned #1). This was mainly due to face-to-face training being scheduled further in advance, but was also due to difficulties in finding common planning times across schools for synchronous online PD. Building plans for online PD into master school schedules may have positive effects on conceptual map components such as colleague support and involvement, convenience/time availability, and attendance and participation.

In order for teachers to benefit from synchronous forms of online PD, they must have time to prepare and attend. If online PD is offered during school hours outside of teachers' planning times, substitute teachers are needed for classroom coverage. School system leaders can improve synchronous online PD offerings by building plans into master school schedules and synching up common planning times for same-subject teachers across schools. This would afford teachers the opportunity to participate at the same time as their colleagues within and across schools. In our study, teachers felt that the online PD lacked human engagement (lesson learned #3), in some cases due to low participation rates; our findings suggest that greater participation in online training by groups of teachers would improve engagement and satisfaction.

5) Enact accountability for participation and communication

The online PD environment is different from a face-to-face PD session. Teachers may feel comfortable expressing opinions that they would not express in a face-to-face session. Unfortunately, the perceived anonymity of the online environment might also decrease feelings of accountability, resulting in less engagement and participation. An accountability mechanism

should be in place to ensure that teachers not only attend training, but participate and engage at a high level. Enacting accountability for participation in (and communication of) training may have positive effects on knowledge of training topics and expectations, expected value of training, attendance and participation, and engagement and retention. (See Table 4 for descriptions of these map components.)

One way to encourage teachers to attend online PD is to provide incentives, such as continuing education or professional learning credits. Most teachers believe that PD is very important; however, their time is limited by teaching, planning, and other professional duties. If online PD cuts into that time, they might not place a high priority on it relative to their other, more immediate, responsibilities. Recognizing teachers for participation may be one way to make online PD a higher priority.

As evidenced in our study, clear lines of communication are needed for successful delivery of online PD (lesson learned #5). Any PD system design should specify who is responsible for communicating the "who, what, where, when, and why" information to teachers. Ensuring that teachers know what to expect will help them get the most out of PD. They need to be given information about the purpose and nature of the PD, including expectations for engagement, so that they can be prepared to participate.

6) Equip teachers to engage in online PD

The PD system design must ensure that teachers have the tools necessary for full participation, including the proper computer setup, headphones, digital tablets, or other necessary equipment, as well as any training materials needed. Ensuring that the computer system is working properly is not sufficient (lesson learned #2); teachers need to practice using the technology prior to engaging in online PD. Teachers need to be familiar and comfortable with

the technology to minimize frustration and anxiety, allowing them to fully engage in the learning experience. Equipping teachers to engage in online PD addresses conceptual map components such as availability of training and classroom resources, ongoing support for training and implementation, training technology and environment readiness, and comfort and experience with technology.

Early face-to-face PD sessions could include training to familiarize teachers with the tools they will be using in the online PD. This would help teachers and PD coordinators anticipate technology problems and correct them before online training commences. Additionally, beginning PD with face-to-face sessions before transitioning to online follow-ups could help build the community of learning that continues when online sessions commence. This could help address teachers' expressed desire for personal interaction and collaboration, especially if it results in higher levels of participation in the follow-up training.

Recommendations for improving engagement in online PD can also be drawn from standards for K-12 online teaching. The *National Standards for Quality Online Teaching* contains guidelines for the design and delivery of online training (North American Council for Online Learning, 2010). The standards refer to "teachers" and "students." In the case of online PD, "teachers" are the providers of the online PD and "students" are the teachers receiving the online PD. Standards C, D, and M are relevant to providing an environment in which teachers can participate in and learn from the PD. Standard C states "The teacher plans, designs, and incorporates strategies to encourage active learning, interaction, participation, and collaboration in the online environment," and Standard D states "The teacher provides online leadership in a manner that promotes student success through regular feedback, prompt response, and clear expectations." Standard M states "The teacher arranges media and content to help students and

teachers transfer knowledge most effectively in the online environment." In other words, the online PD should be designed in such a way as to take advantage of the unique benefits provided by the online medium and to facilitate teachers' ability to engage in and learn from the PD.

7) Deliver targeted training throughout the year

Teachers in our study indicated a desire for having more periodic training throughout the year rather than concentrating all training during the summer or at the start of the school year. Continuous training allows teachers to ask questions as they arise and share experiences and advice with one another. A blended solution may be a cost effective way to provide this just-in-time training. Early face-to-face PD sessions can be used for community building which can be sustained throughout the school year in online PD sessions. Delivering targeted training throughout the year addresses conceptual map components such as expected value of training, engagement and retention, and satisfaction and perceived value of training.

8) Equip teachers to implement what they learn in PD

For PD to have its desired impact, teachers must have the resources and ongoing support needed to implement what they learned. Common barriers to implementation included lack of time, lack of materials, lack of knowledge, and learning the materials too late in the school year to have the chance to fully implement (lesson learned #6). Equipping teachers to implement what they learn in PD enhances colleague support and involvement, ongoing support for training and implementation, and transfer to practice. (See Table 4 for descriptions of these map components.)

Another obstacle to implementation was poor student behavior and lack of classroom management. Interestingly, classroom management was the most commonly mentioned topic for additional PD needed, requested by nearly 40% of teachers interviewed. Improving student

behavior and classroom management could potentially improve the transfer of PD-targeted knowledge and practices to classroom implementation. Classroom interruptions such as those caused by students talking off-task, students or others walking into the classroom unexpectedly, and students missing materials may be hindering teachers' ability to improve instruction. Disruptions—especially those caused by students—can create a great deal of anxiety for teachers and compromise daily lesson structures, requiring teachers to develop adaptive strategies that may not be consistent with improvement strategies. In our study, some of the PD-targeted instructional strategies involved group activities, which may actually increase the likelihood of distractions in the classroom, thus undermining their purpose (Kennedy, 2005).

Making more time for teacher collaboration can also help teachers implement what they learn in PD. With colleagues to bounce ideas off of and to share successes and failures with, teachers may be less likely to feel alone in their struggle to apply new ideas in their classrooms. Other studies also point to a lack of administrative support and adequate time for planning and implementation as a common problem faced by teachers. It is estimated that 50% of teachers leave the profession permanently after only five years, and a frequently cited reason for this departure is lack of administrative support (Lewis, 2010). Teachers in high performing countries, on average, are provided with more time to plan and collaborate. For example, in many high-performing European and Asian countries, teachers spend about 60% of their working time teaching students, and spend the remaining 15 to 20 hours per week engaging in other activities such as planning, meeting with students and parents, and collaborating with other teachers. In the U.S., teachers typically spend about 80% of their working time teaching students, and have about 3 to 5 hours a week for planning, which tends to be less collaborative (Wei, Darling-Hammond, Andree, Richardson, & Orphanos, 2009).

Also, by following the first recommendation ("set a unifying goal to work towards—and stick with it"), school system leaders would signal to teachers that they are supportive of their implementation efforts and that teachers are expected to improve and adapt their implementation over a long period of time—not a matter of weeks or months. Teachers might then be more likely to apply what they learned in training, knowing that their efforts will not be wasted due to new replacement initiatives.

Appendix A: Survey and Interview Results

Results are organized by the conceptual map's sections (contextual factors, logistics, expectations and experiences, satisfaction and engagement, and learning, transfer, and outcomes). Each section contains results from three data sources: non-teacher interviews, teacher interviews, and teacher surveys. The abbreviations in the tables are as follows: "OP" refers to online participants and "ONP" refers to nonparticipants. Unless noted, the numbers in the tables are counts of the number of individuals endorsing a particular statement.

When summarizing interview results, we often compare the percentage of teachers who endorsed a certain theme. The denominators used for calculating the percentages are 31 for the online participants and 19 for the online nonparticipants, reflecting the number of teachers who reported online participation at the start of the interview.

Contextual Factors

Table A1 contains results from interviews of training facilitators and coordinators regarding whether the training was already part of the district plans prior to the start of the school year. One participant indicated that it was in the original plans, while three indicated that it was not in the original plans, two indicated that a communication plan was lacking, and one said that teachers were not always aware that the training was going on.

Table A1. District Plans (non-teacher interview)	**N**
Not in original plans	3
In original plans	1
Communication plan lacking	2
Teachers not always aware	1

Table A2 contains coded comments from teacher interviews regarding perceived discontinuity in school improvement programs from year to year. Some teachers indicated that at their school, programs are introduced one year only to be abandoned within a year or so.

Similarly, a few teachers indicated that support for their program was better the previous year. Overall, about one-third of the teachers interviewed mentioned one or more of these issues.

Table A2. Discontinuity (teacher interview)	**OP**	**ONP**	**Total**
Programs change frequently	4	3	7
No longer teaching program	3	2	5
Administrative support better last year	0	2	2
Access to experts better last year	3	2	5
One or more discontinuity issues	9	7	16

Table A3 contains results from the teacher survey indicating the extent to which teachers feel able to choose between multiple teaching practices. Teachers appear to have some slight difficulty choosing what to do in the classroom after hearing about many "best" teaching practices.

Table A3. I often have difficulty choosing what to do in my classroom after hearing about so many "best" teaching practices. (teacher survey)	**OP**	**ONP**	**Total**
Strongly Disagree	4	6	10
Moderately Disagree	5	4	9
Slightly Disagree	6	4	10
Slightly Agree	2	7	9
Moderately Agree	4	6	10
Strongly Agree	0	2	2
Not Applicable	0	1	1
Mean	2.9	3.3	3.1

Table A4 contains results from the teacher survey regarding alignment between PD and school improvement efforts. Overall, teachers indicated slight to moderate disagreement with the statement that the PD activities are not aligned with other school improvement efforts (mean = 2.5), meaning that overall, they believe they are at least somewhat aligned.

Table A4. The PD activities don't seem aligned with our other school improvement efforts. (teacher survey)	**OP**	**ONP**	**Total**
Strongly Disagree	6	9	15
Moderately Disagree	5	9	14
Slightly Disagree	7	4	11
Slightly Agree	2	4	6
Moderately Agree	0	5	5
Strongly Agree	1	0	1
Mean	2.4	2.6	2.5

Table A5 contains results from the teacher survey indicating the extent to which teachers perceive an alignment between Rigor & Readiness and their other job responsibilities. Overall,

teachers slightly to moderately agreed that Rigor & Readiness did not conflict with their other job responsibilities (mean = 4.4).

Table A5. Implementation of Rigor & Readiness does not conflict with my other job responsibilities (teacher survey)	**OP**	**ONP**	**Total**
Strongly Disagree	3	1	4
Moderately Disagree	2	2	4
Slightly Disagree	2	6	8
Slightly Agree	2	3	5
Moderately Agree	4	6	10
Strongly Agree	7	11	18
Not Applicable	1	0	1
Mean	4.2	4.5	4.4

Table A6 contains results from teacher interviews regarding perceived administrator support for Rigor & Readiness. Most teachers indicated that administrators were committed to school improvement and full implementation of the Rigor & Readiness programs, with 58% and 68%, respectively, of online participants and nonparticipants indicating that they were very supportive. However, 19% of the online participants indicated that administration was not supportive enough, and 10% indicated that there was poor communication between administration and teachers.

Table A6. To what extent were administrators committed to school improvement and full implementation of the Rigor & Readiness programs? (teacher interview)	**OP**	**ONP**	**Total**
Provided time to implement	0	1	1
Provided resources	1	0	1
Very supportive	18	13	31
Skeptical	0	1	1
Not involved enough	6	0	6
Poor communication	3	0	3
Lacked resources/support	4	0	4
More supportive last year	0	2	2

Table A7 contains results from teacher interviews regarding the extent to which colleagues were supportive of and involved in implementation of the program for which they received PD. Nonparticipants were more likely to indicate that their colleagues were supportive (63%) as compared to online participants (48%). Some online participants indicated that their colleagues were skeptical of the program (23%).

Table A7. To what extent were your colleagues supportive of and involved in the implementation of _____? (teacher interview)	**OP**	**ONP**	**Total**
Supportive	15	12	27
Not supportive	3	0	3
N/A or don't recall	2	0	2
Skeptical	7	3	10
Split	1	2	3

Table A8 contains results from interviews with the 9 training facilitators and coordinators regarding their perceptions of leadership support to attend online training. Failure to communicate was the most common response (n=4). Participants also indicated that leadership was lacking (n=2) or that support varied (n=2). Two participants did indicate that leadership was supportive.

Table A8. Leadership Support (non-teacher interview)	**N**
Supportive of initiative	2
Failed to communicate	4
Leadership lacking	2
Support varied	2

Interviewed teachers were also asked about leadership support, and the results are presented in Table A9. Overall, teachers reported good leadership support, with 81% and 89%, respectively, of online participants and nonparticipants reporting good leadership support. Four online participants reported a lack of leadership support for attending online training, and three nonparticipants reported a lack of leadership support for attending online training. None of the teachers who received face-to-face PD indicated a lack of support for attending face-to-face PD.

Table A9. Was the principal or other school leadership supportive of you attending training? (teacher interview)	**OP**	**ONP**	
	Online PD	**Online PD**	**F2F PD**
Good leadership support	25	3	17
Lacked leadership support	4	3	0
N/A or don't recall	1	3	0

Table A10 contains results from teacher interviews regarding whether training was required or optional. Most online participants indicated that it was required or strongly

encouraged (71%). None of the nonparticipants indicated that the face-to-face PD was optional or that the online PD was required.

Table A10. Was training required or optional? (teacher interview)	OP	ONP	
	Online PD	Online PD	F2F PD
Required	18	0	12
Optional	5	5	0
Not sure or don't recall	3	1	1
Recommended/encouraged	4	0	3

Table A11 contains results from teacher surveys regarding whether online participants were provided with enough time to participate in online PD. Overall, online participants indicated slight agreement that their supervisors allowed them ample time to participate in online PD (mean = 4.3).

Table A11. My supervisor allowed ample time for me to participate in web-based PD. (teacher survey)	OP
Strongly Disagree	1
Moderately Disagree	3
Slightly Disagree	2
Slightly Agree	4
Moderately Agree	4
Strongly Agree	6
Mean	4.3

Table A12 contains results from teacher surveys regarding whether teachers were given adequate time to collaboratively plan. Online participants tended to slightly to moderately disagree that they were given enough time (mean = 2.8), whereas nonparticipants tended to slightly agree that they were given enough time (mean = 4.2).

Table A12. Teachers in my department are given adequate time to collaboratively plan. (teacher survey)	OP	ONP	Total
Strongly Disagree	7	3	10
Moderately Disagree	5	5	10
Slightly Disagree	2	3	5
Slightly Agree	2	2	4
Moderately Agree	2	6	8
Strongly Agree	3	11	14
Not Applicable	0	1	1
Mean	2.8	4.2	3.6

Table A13 contains results of the teacher survey regarding the perceived adequacy of the technology in the schools. Overall, the online participants indicated slight agreement that the technology provided by their school was adequate for participating in online PD (mean = 4.3).

Table A13. The technology provided by my school was adequate for my participation in web-based training. (teacher survey)	**OP**
Strongly Disagree	3
Moderately Disagree	1
Slightly Disagree	2
Slightly Agree	2
Moderately Agree	6
Strongly Agree	6
Mean	4.3

Table A14 contains results from the teacher survey regarding the extent to which teachers believe they have the tools they need to *identify* struggling students. Overall, teachers slightly agreed that they have the tools they need to identify struggling students (mean = 3.8). Online participants were slightly less likely to agree with the statement (mean = 3.7) than nonparticipants (mean = 3.9).

Table A14. I have the tools I need to identify students who are struggling with motivation or other behavioral issues that impact learning. (teacher survey)	**OP**	**ONP**	**Total**
Strongly Disagree	2	5	7
Moderately Disagree	4	3	7
Slightly Disagree	3	4	7
Slightly Agree	6	3	9
Moderately Agree	2	9	11
Strongly Agree	4	6	10
Not Applicable	0	1	1
Mean	3.7	3.9	3.8

Table A15 contains results from the teacher survey regarding the extent to which teachers believe they have the tools they need to *support* struggling students. Overall, teachers were split with respect to the extent to which they have the tools they need to support struggling students (mean = 3.5). Online participants slightly disagreed (mean = 3.3), whereas nonparticipants were split (mean = 3.5).

Table A15. I have the tools I need to support students who are struggling with motivation and other behavioral issues that impact learning. (teacher survey)	OP	ONP	Total
Strongly Disagree	1	8	9
Moderately Disagree	6	1	7
Slightly Disagree	6	3	9
Slightly Agree	3	6	9
Moderately Agree	3	9	12
Strongly Agree	2	3	5
Not Applicable	0	1	1
Mean	3.3	3.5	3.5

Table A16 contains results from teacher interviews regarding access to experts outside of PD. Overall, teachers indicated that they had good access to program or topic experts outside of PD, with 68% and 79%, respectively, of the online participants and nonparticipants indicating that they had good access. Three online participants and two nonparticipants indicated that their access to experts was better the previous year.

Table A16. To what extent did you have access to program or topic experts outside of PD? (teacher interview)	OP	ONP	Total
Good access	21	15	36
No access	3	0	3
Access was better last year	3	2	5
Limited access	5	1	6

Table A17 contains results from the teacher survey regarding access to experts outside of PD. Overall, teachers were slightly to moderately satisfied with their access to experts outside of the face-to-face PD (mean = 4.5), and slightly satisfied with their access to experts outside of the online PD (mean = 3.8). Online participants were moderately satisfied with expert access outside of face-to-face PD (mean = 4.8), whereas nonparticipants were slightly satisfied with expert access outside of face-to-face PD (mean = 4.3).

Table A17. Please rate your satisfaction with access to experts outside of PD (teacher survey)	Online PD	F2F PD		
	OP	OP	ONP	Total
Very Dissatisfied	4	1	2	3
Moderately Dissatisfied	0	1	2	3
Slightly Dissatisfied	0	2	2	4
Slightly Satisfied	2	1	7	8
Moderately Satisfied	2	6	5	11
Very Satisfied	4	8	8	16
Not Applicable	7	2	4	6
Mean	3.8	4.8	4.3	4.5

Table A18 contains results from the teacher survey regarding the extent to which teachers have administrative support to implement new strategies. Overall, teachers moderately agreed that they have support to implement new strategies (mean = 4.9).

Table A18. I have support and encouragement to implement new strategies from administrators at my school. (teacher survey)	**OP**	**ONP**	**Total**
Strongly Disagree	1	2	3
Moderately Disagree	0	0	0
Slightly Disagree	0	1	1
Slightly Agree	6	5	11
Moderately Agree	6	9	15
Strongly Agree	7	13	20
Not Applicable	1	1	2
Mean	4.9	4.9	4.9

Table A19 contains results from the teacher survey regarding the extent to which teachers were given adequate time to implement Rigor & Readiness. Overall, teachers slightly agreed that they were given the time they needed to implement Rigor & Readiness (mean = 4.2). Online participants were more likely to disagree (mean = 3.7) than nonparticipants (mean = 4.5).

Table A19. I am given the time I need in order to implement Rigor & Readiness programs. (teacher survey)	**OP**	**ONP**	**Total**
Strongly Disagree	5	1	5
Moderately Disagree	2	2	2
Slightly Disagree	7	3	7
Slightly Agree	11	6	11
Moderately Agree	18	12	18
Strongly Agree	8	6	8
Not Applicable	0	0	0
Mean	3.7	4.5	4.2

Table A20 contains results from teacher interviews regarding implementation barriers. Common themes included lacking materials (16% of both groups), student behavior issues (10% and 16%, respectively, of online participants and nonparticipants), lacking time (6% and 16%, respectively, of online participants and nonparticipants), and no longer teaching the program (10% and 11%, respectively, of online participants and nonparticipants).

Table A20. Are there problems or barriers that have kept you from applying what you learned in training to your teaching duties? (teacher interview)	OP	ONP	Total
Lacking time	2	3	5
Lacking knowledge	3	1	4
Lacking materials	5	3	8
No longer teaching program	3	2	5
Lacking support	3	0	3
Student behavior issues	3	3	6

Nonparticipants surveyed were asked why they did not participate in online PD, and the results are presented in Table A21. The most common response was that they were not told about the training (55%), followed by they did not have enough time or had scheduling conflicts (23%), and their supervisor did not ask them to participate (13%).

Table A21. If you did not participate in web-based PD, what are the reason(s) why not? (Check all that apply.) (teacher survey)	ONP
I wasn't told about the web-based training	17
Not enough time / scheduling conflicts	7
I don't need training	1
Lack of resources or limited technology	2
My supervisor did not ask me to participate	4
I did not have enough prior notice to attend	3
Other	1

Table A22 contains results of the teacher survey regarding whether teachers visit colleagues' classrooms to observe their teaching. Online participants were less likely to indicate that they visit colleagues' classrooms (26%) than nonparticipants (70%).

Table A22. I visit colleagues' classrooms to observe their teaching. (teacher survey)	OP	ONP	Total
Strongly Disagree	8	5	13
Moderately Disagree	3	2	5
Slightly Disagree	3	2	5
Slightly Agree	5	9	14
Moderately Agree	0	3	3
Strongly Agree	0	9	9
Not Applicable	2	1	3
Mean	2.3	4.0	3.3

Table A23 contains results of the teacher survey regarding whether teachers meet with others who teach the same grade-level course to discuss student work and assessment. Overall, teachers slightly agreed (mean = 3.9). There were substantial differences between online

participants and nonparticipants; online participants indicated slight disagreement that they discussed student work and assessment with other teachers (mean = 3.0), whereas nonparticipants indicated moderate agreement (mean = 4.5).

Table A23. I meet with teachers who teach the same grade-level course regularly to discuss student work and assessment items. (teacher survey)	**OP**	**ONP**	**Total**
Strongly Disagree	4	1	5
Moderately Disagree	4	2	6
Slightly Disagree	3	3	6
Slightly Agree	7	7	14
Moderately Agree	3	7	10
Strongly Agree	0	8	8
Not Applicable	0	3	3
Mean	3.0	4.5	3.9

Table A24 contains results from the teacher survey regarding the extent to which principals regularly share information on school progress. Online participants, on average, slightly agreed that their principal regularly shared information (mean = 4.0), whereas nonparticipants, on average, slightly to moderately agreed (mean = 4.6).

Table A24. Our principal regularly shares information on school progress. (teacher survey)	**OP**	**ONP**	**Total**
Strongly Disagree	3	2	5
Moderately Disagree	1	4	5
Slightly Disagree	3	0	3
Slightly Agree	4	4	8
Moderately Agree	7	7	14
Strongly Agree	3	13	16
Not Applicable	0	0	0
Mean	4.0	4.6	4.4

Table A25 contains results from the teacher survey regarding the extent to which leadership facilitates two-way communication between teachers and leaders. Overall, teachers slightly agreed that school leaders facilitate two-way communication (mean = 3.9).

Table A25. Leadership in our school facilitates two-way communication, providing information and receiving feedback from teachers and others. (teacher survey)	**OP**	**ONP**	**Total**
Strongly Disagree	3	5	8
Moderately Disagree	1	3	4
Slightly Disagree	5	2	7
Slightly Agree	2	7	9
Moderately Agree	8	7	15
Strongly Agree	2	7	9
Not Applicable	0	0	0
Mean	3.8	3.9	3.9

Table A26 contains results from teacher interviews regarding the extent to which teachers believed that the program they were implementing would work well for their students. Overall, more online participants indicated that they thought the program would be a good fit for their students (52%) than did nonparticipants (21%). Several nonparticipants indicated that they were skeptical of the fit of the program for their students (37%).

Table A26. Prior to implementation, did it seem like _____ would work well for your students? (teacher interview)	**OP**	**ONP**	**Total**
Good fit	16	4	20
Not good fit	4	1	5
No expectation	4	4	8
New lower program	0	2	2
Skeptical	0	7	7

Logistics

Table A27 contains a summary of themes relating to planning and scheduling difficulties mentioned during interviews with training facilitators and coordinators, including problems with availability of substitute teachers (56%) and scheduling issues (56%). A dominant theme concerned communication issues, and was mentioned by every participant of the non-teacher interviews. These communication issues tended to be related to lack of communication from districts to principals to teachers, and were mostly related to problems scheduling teachers and teachers not knowing what to expect of the training.

Table A27. Planning Themes (non-teacher interview)	N
Substitute teachers	5
Communication issues	9
Scheduling issues	5

Tables A28 and A29 contain training facilitator and coordinator responses to interview questions about the online PD scheduling process. As can be seen in Table A28, participants indicated that the schedules were determined by the district (56%). In some cases, the teachers were emailed directly to schedule the training (44%), but one participant indicated that teachers were not consulted when scheduling training.

Table A28. Scheduling Process (non-teacher interview)	N
Determined by district	5
Posted on Community of Learning	1
Emailed teachers	4
Failed to include teachers	1

As can be seen in Table A29, over half of the participants indicated that scheduling was somewhat difficult (33%) or very difficult (22%). Only one participant indicated that scheduling the online training was easy (11%).

Table A29. Scheduling Ease (non-teacher interview)	N
Easy	1
Somewhat difficult	3
Very difficult	2

Table A30 contains results from interviews with training facilitators and coordinators regarding online PD attendance. A common theme was that teachers often arrived late and/or left early (44%), often due to classroom coverage issues. It was also commonly mentioned that teachers lacked incentive to participate (22%).

Table A30. Attendance (non-teacher interview)	N
Teachers often late/left early	4
Lacked incentive	2
District structure impeded	1
Technical issues impeded	1
Attendance good	2
Attendance poor	2

Table A31 contains results from interviews with training facilitators and coordinators regarding factors that may have affected online PD attendance. The most common theme was that teachers did not have the time to attend or did not want to be away from class (44%). Other common themes included a lack of knowledge or expectations about the online PD (22%) and uncertainty/reluctance to change from face-to-face to online PD (22%).

Table A31. Attendance Pressures (non-teacher interview)	**N**
Lack of knowledge/expectation	2
Lack time/don't want to be away	4
Lack common time	1
Uncertainty/reluctance to change	2
Skeptical of program's future	1
Other	2

Table A32 contains responses of interviewed nonparticipants of online PD. Nearly half (47%) of the nonparticipants indicated that they were not aware that online PD was being offered.

Table A32. Were you aware that web-based professional development was being offered? (teacher interview)	**ONP**
Aware	9
Not aware	10

Table A33 contains results from teacher interviews regarding the manner in which they were contacted about participating in PD. Online participants were more likely to have been contacted regarding the PD via email (58%) than in person (23%), whereas nonparticipants were more likely to have been contacted in person (53%) than via email (16%).

Table A33. When and how did you first find out about the professional development sessions? Who contacted you about the training? (teacher interview)	**OP**	**ONP**	
	Online PD	**Online PD**	**F2F PD**
Contacted via email	18	5	3
Contacted via staff	7	0	10

Table A34 contains results from teacher interviews regarding when online participants and nonparticipants attended PD. Overall, online participants reported that they did so during school hours (39%) or their planning period (35%), or outside of school hours (19%).

Nonparticipants reported that they attended PD during school hours (53%) or that it varied (37%), for example attending some PD sessions during the summer and others during school hours. None of the nonparticipants reported attending PD during their planning period.

Table A34. When did you attend training? (teacher interview)	**OP**	**ONP**	**Total**
During school hours	12	10	22
During planning period	11	0	11
Outside school hours	6	0	6
Summertime or day off	0	2	2
Varied	1	7	8

Table A35 contains the results of the teacher survey regarding when online participants and nonparticipants attended PD. Teachers indicated that they typically participated in face-to-face PD during teacher work days (51%) or other days (26%), rather than regular planning time (15%) or evenings or weekends (9%).

Table A35. When did you typically find time to participate in PD? (teacher survey)	**Online PD**	**F2F PD**		
	OP	**OP**	**ONP**	**Total**
Regular planning time	5	3	4	7
Teacher work day(s)	8	11	13	24
Evenings or weekends	0	1	3	4
Other	6	5	7	12

Table A36 contains results from the teacher survey regarding the need for substitute teachers to cover class while teachers attend PD. Most teachers reported that substitute teachers were sometimes needed (59%) or always needed (28%) to teach their classes while they attended face-to-face PD.

Table A36. How often were substitute teachers needed to teach your class while you attended PD? (teacher survey)	**Online PD**	**F2F PD**		
	OP	**OP**	**ONP**	**Total**
Never	9	2	4	6
Sometimes	3	10	17	27
Always	7	9	8	17

Table A37 contains results from the teacher survey regarding the ease of scheduling online and face-to-face PD. Overall, teachers slightly disagreed that online PD was easier to schedule than face-to-face PD (mean = 3.0).

Table A37. Web-based PD was easier to schedule than in-person training. (teacher survey)	OP
Strongly Disagree	6
Moderately Disagree	2
Slightly Disagree	4
Slightly Agree	3
Moderately Agree	4
Strongly Agree	1
Mean	3.0

Table A38 contains results from the teacher survey regarding the extent to which online participants perceived online PD as more convenient than face-to-face PD in terms of location and travel time. Overall, online participants indicated slight agreement that online PD is more convenient than face-to-face in terms of location and travel time (mean = 4.1).

Table A38. Web based PD is more convenient than in-person PD in terms of location/travel time. (teacher survey)	OP
Strongly Disagree	3
Moderately Disagree	0
Slightly Disagree	4
Slightly Agree	3
Moderately Agree	6
Strongly Agree	4
Mean	4.1

Table A39 contains results from teacher interviews regarding barriers to attending online PD. The most common reasons mentioned were times offered (13%) and being able to get substitutes to cover classes (13%).

Table A39. Were there any other reasons why you might have had trouble attending the web training session(s) you were invited to? (teacher interview)	OP
Times offered	4
Subs/class coverage	4
Location	2
No expectation communicated	3

Table A40 contains results from interviews with training facilitators and coordinators regarding the necessity of having an instructor to deliver the PD material. None of the participants said that an instructor was needed to deliver the PD. One said that an instructor was not needed (11%), and four participants said that the necessity of having an instructor depended on the content being delivered (44%).

Table A40. Delivery Format (non-teacher interview)	N
Instructor needed	0
Instructor not needed	1
Instructor dependent on content	4

Expectations/Experiences

Interviewed teachers were asked about their thoughts about PD in general, and the results are summarized in Table A41. In general, teachers indicated that PD is important. Online participants were more likely to indicate that PD is very important (61%) than nonparticipants (32%), whereas nonparticipants were more likely to condition the importance of PD on its relevance (63%) than online participants (29%). Two online participants said that PD is usually a waste of time (6%), and four nonparticipants said that PD is usually a waste of time (21%).

Table A41. What are your thoughts related to teacher PD in general? (teacher interview)	OP	ONP	Total
Very important	19	6	25
Important when relevant	9	12	21
Usually a waste of time	2	4	6
Other	0	1	1

Interviewed teachers provided suggestions for improving PD in their district, and the results are summarized in Table A42. The most common response was better coordination, mentioned by 42% and 47%, respectively, of online participants and nonparticipants. Teacher input/choice was mentioned by 16% of the online participants and 42% of the nonparticipants. More support was mentioned frequently by the online participants (32%), and more PD days or starting PD before the start of the school year were mentioned by 26% of the nonparticipants.

Table A42. Overall, what suggestions do you have for improving professional development in your district? (teacher interview)	OP	ONP	Total
Teacher input/choice	5	8	13
Better coordination	13	9	22
More support	10	1	11
No change	0	0	0
More collaboration	4	3	7
Prior communication/planning	2	1	3
More PD days or before school year starts	2	5	7
Other	1	6	7

Table A43 contains the results of teacher interviews regarding the types of PD needed the most. Classroom management was mentioned most commonly, by 39% and 37%, respectively, of online participants and nonparticipants. Content or program specific PD was also mentioned by several teachers, 16% and 32%, respectively, of online participants and nonparticipants. Other topics mentioned included instructional strategies (19% of online participants and 16% of nonparticipants) and assessment strategies (16% of online participants), and technology (26% of nonparticipants).

Table A43. What sort of PD or PD topics do you think are most needed by you and others in your school? (teacher interview)	**OP**	**ONP**	**Total**
Classroom management	12	7	19
Instructional strategies	6	3	9
Assessment strategies	5	1	6
Engagement/motivation strategies	4	1	5
Cultural differences	2	1	3
ELL/special needs	3	2	5
Technology	2	5	7
Other	11	5	16
Content or program specific	5	6	11

Table A44 contains results from teacher interviews regarding teachers' comfort with technology. Overall, most teachers indicated a medium or high level of comfort with technology and participating in online PD, with 87% and 95%, respectively, of online participants and nonparticipants indicating a medium or high level of comfort. There did not appear to be substantial differences between online participants and nonparticipants regarding their comfort with technology.

Table A44. What is your level of comfort with technology and participating in training on the web? (teacher interview)	**OP**	**ONP**	**Total**
High	9	7	16
Medium	18	11	29
Low	3	1	4

Table A45 contains results of the teacher survey regarding teacher confidence in their ability to use a computer to learn. Like the interviewed teachers, teachers responding to the

survey indicated being moderately confident in their ability to use a computer to learn (mean = 5.2).

Table A45. I am confident in my ability to use a computer to learn. (teacher survey)	OP	ONP	Total
Strongly Disagree	0	0	0
Moderately Disagree	0	2	2
Slightly Disagree	0	1	1
Slightly Agree	7	3	10
Moderately Agree	4	9	13
Strongly Agree	10	16	26
Mean	5.1	5.2	5.2

Level of Satisfaction and Engagement

Table A46 contains results of the teacher survey regarding teachers' overall satisfaction with the quality of the PD they received. Overall, teachers were moderately satisfied with the overall quality of the face-to-face PD (mean = 5.0), and online participants were slightly satisfied with the quality of the online PD (mean = 3.8).

Table A46. Please rate your satisfaction with the overall quality of PD (teacher survey)	Online PD	F2F PD		
	OP	OP	ONP	Total
Very Dissatisfied	2	0	2	2
Moderately Dissatisfied	3	0	1	1
Slightly Dissatisfied	3	1	1	2
Slightly Satisfied	2	2	2	4
Moderately Satisfied	3	7	12	19
Very Satisfied	4	10	10	20
Not Applicable	2	1	3	4
Mean	3.8	5.3	4.8	5.0

Table A47 contains responses of interviewed training facilitators and coordinators regarding their impressions of online and face-to-face PD. Overall, they had positive impressions of online PD. Over half of the training facilitators and coordinators indicated that it has potential (67%), that it offers savings (67%) and that it offers flexibility (89%). Other common themes included that it allows teachers to participate from a safe and familiar environment (33%), and that materials are available on the web for teachers to go back and review later (22%).

Table 47. Impressions of online and face-to-face PD (non-teacher interview)	N
Web has potential	6
Web offers savings	6
Web offers flexibility	8
Web offers safe/familiar environment	3
Face-to-face built into district plan	1
Can go back and review web	2
Other	7

Tables A48-A51 contain summaries of teacher interview responses regarding the advantages and disadvantages of online and face-to-face PD. Regarding the benefits of online PD and aspects of it that teachers like (Table A48), the most common theme was that it is convenient (i.e., it saves time, travel, and money) (81%). Teachers also indicted that online PD is engaging (55%), it is informative or they liked it (45%), the use of technology is interesting/beneficial (42%), it allows teachers to communicate and share with others, both within and outside of the school/district (35%), and they can participate in the comfort/perceived safety of their own environment (32%).

Table A48. Advantages / aspects teachers like about web PD (teacher interview)	OP
Informative/liked web PD	14
Comfort of own environment/non-threatening/non-intimidating	10
Convenient, saves time, saves money	25
Engaging	17
Sharing/communicating with others	11
Technology is interesting/has benefits	13
Better than face-to-face	2

Table A49 contains teacher interview responses regarding the disadvantages and aspects of online PD that teachers disliked. The most common theme involved problems with technology and the resulting time wasted (87%). Other common themes were the lack of planning and/or prior notification (68%), the timing of the PD and that teachers were unable to get substitutes to cover classes (55%), low participation/lack of personal contact with other teachers (39%), issues with trainers (e.g., lack of trainer skill or language issues) (35%). Teachers also indicated that the

online PD was not engaging (29%), teachers needed to be trained on using the technology (16%), and that they did not like the PD or did not learn anything from it (6%).

Table A49. Disadvantages / aspects teachers do not like about web PD (teacher interview)	**OP**
Lack of planning/notification	21
Lack of substitutes/time	17
Technology issues/wasted time	27
Lack of teacher skill	5
Trainer issues	11
Low participation/lack of personal contact	12
Did not like/did not learn anything	2
Not engaging	9

In terms of the advantages of face-to-face PD and aspects of face-to-face PD that teachers liked (Table A50), the most frequently mentioned themes were that it was engaging (95%), the personal interaction/collaboration aspect (89%), and that it was informative or they liked it (84%). Several teachers also mentioned that the trainers were helpful or better able to gauge a face-to-face (63%) and the hands on/modeling aspect of face-to-face PD (47%).

Table A50. Advantages / aspects teachers like about face-to-face PD (teacher interview)	**ONP**
Informative/liked face-to-face PD	16
Engaging	18
Hands-on/modeling	9
Personal interaction/collaboration	17
Trainers helpful/better able to gauge audience	12

In terms of disadvantages and aspects of the face-to-face PD that teachers did not like (Table A51), the most common theme was that the PD was not well planned, including that the timing was not ideal and that there were issues with adequate prior notification of the training (74%).

Table A51. Disadvantages / aspects teachers do not like about face-to-face PD (teacher interview)	**ONP**
Not engaging	1
Lack of planning/timing/notification	14
Did not like/did not learn anything	2

Interviewed teachers were asked for suggestions to improve online PD, and a summary of their responses are presented in Table A52. Teachers' top suggestions were prior

planning/preparation (23%) and advance training on the technology (23%), followed by setting clear expectations (16%).

Table A52. What suggestions do you have for improving the web training? (teacher interview)	**OP**
Advance training	7
Offer in summer or earlier in year	1
Set clear expectations	5
Prior planning/preparation	7
Blended solution	1
Incorporate teacher uploads	1
Increase accountability	2
Other	5

Table A53 contains suggestions from interviews with training facilitators and coordinators for how to improve online PD. The most common theme was related to training teachers on the web environment (89%), followed by providing clear expectations (78%), and offering a blended solution, where PD starts face-to-face, then moves online (67%). Other suggestions included that accountability was needed to ensure teacher participation (44%), increased flexibility (22%), scheduling the training in advance (22%), and redesigning the training for the web rather than merely presenting the same material as would be presented face-to-face over the web (22%). It was also suggested that online PD should be offered on a broader scale, regionally or nationally (22%).

Table A53. Web Improvements (non-teacher interview)	**N**
Accountability needed	4
Increase flexibility	2
Schedule in advance	2
Provide clear expectations	7
Train on environment/involve IT	8
Offer blended solution	6
Redesign training for web	2
Offer regionally/nationally	2
Other	8

Table A54 contains results from the teacher survey regarding the perceived effectiveness of online and face-to-face PD. Overall, online participants indicated slight to moderate agreement that online PD is less effective than face-to-face PD (mean = 4.5).

Table A54. Web-based PD is less effective than in-person training. (teacher survey)	OP
Strongly Disagree	0
Moderately Disagree	3
Slightly Disagree	3
Slightly Agree	2
Moderately Agree	4
Strongly Agree	7
Mean	4.5

Table A55 contains teacher interview responses to whether they preferred or were open to online, face-to-face, or blended PD. Overall, teachers indicated that they preferred face-to-face PD, with 61% and 53%, respectively, of online participants and nonparticipants indicating that they would rather participate in face-to-face PD. Two teachers in each group indicated that they preferred online PD. One online participant (3%) and seven nonparticipants (37%) indicated that they would prefer or be open to a blended solution, in which the first session(s) of the PD were face-to-face, and then subsequent sessions would be offered online.

Table A55. Prefer/open to web, face-to-face, or blended PD (teacher interview)	OP	ONP
Web	2	2
Face-to-face	19	10
Blended (start with face-to-face, then move to web)	1	7

Table A56 contains results from the teacher survey regarding whether online participants would have preferred to have face-to-face PD. Overall, teachers indicated moderate agreement that they would rather have had face-to-face PD (mean = 5.1).

Table A56. All things considered, I would rather have had in-person training. (teacher survey)	OP
Strongly Disagree	0
Moderately Disagree	1
Slightly Disagree	1
Slightly Agree	3
Moderately Agree	4
Strongly Agree	10
Mean	5.1

Online participants interviewed were asked if the online PD format had an impact on their ability to learn the material covered in PD, and the results are presented in Table A57. Over half of the online participants indicated that the online format had no impact on their ability to

learn the material covered (52%). Of those who said it did impact their ability to learn, a common explanation was that technology issues interfered (29%).

Table A57. Do you think the fact that the training was web-based had an impact on your ability to learn the material being covered in the training? (teacher interview)	**OP**
No impact on ability to learn	16
Tech/audio distractions	9
No materials	1
Language barrier	5
Limited time	3

Table A58 contains results of the teacher survey regarding the extent to which participating in online PD enhanced teachers' desire to attend future online PD. Overall, teachers indicated that they were not interested in attending future online PD (mean = 2.7).

Table A58. Participation in web-based PD enhanced my desire to attend future training sessions. (teacher survey)	**OP**
Strongly Disagree	9
Moderately Disagree	1
Slightly Disagree	2
Slightly Agree	2
Moderately Agree	3
Strongly Agree	2
Mean	2.7

Table A59 contains results from the teacher survey regarding the extent to which online participants would recommend online PD to a colleague. Overall, teachers indicated that they would not recommend online PD to a colleague (mean = 3.2).

Table A59. I would recommend the web-based PD to a colleague. (teacher survey)	**OP**
Strongly Disagree	5
Moderately Disagree	2
Slightly Disagree	2
Slightly Agree	7
Moderately Agree	4
Strongly Agree	0
Mean	3.2

Training facilitators and coordinators interviewed were asked about teacher engagement during online PD, and the results are presented in Table A60. Four participants indicated that teachers seemed engaged in the online PD (44%). Two indicated that sharing and collaboration between teachers resulted in more engagement (22%). Three participants indicated that the small

numbers of teachers participating in online PD groups hindered teacher engagement in the PD (33%), and one indicated that technology problems hindered teacher engagement (11%).

Table A60. Engagement (non-teacher interview)	N
Seemed engaged	4
Difficult to judge	1
Technology problems hindered	1
Small numbers hindered	3
Sharing/collaboration good	2

Table A61 contains teacher interview responses regarding their level of engagement in the PD. Overall, most teachers indicated that they found the PD to be engaging or very engaging (55% and 95%, respectively, of online participants and nonparticipants).

Table A61. Did you find training to be engaging? (teacher interview)	OP	ONP	Total
Very engaging	4	5	9
Engaging	13	13	26
Not as engaging as expected	4	0	4
Not engaging	7	1	8
Not as engaging as face-to-face	2	0	2
Already had this training	1	0	1

Surveyed teachers were also asked about their level of engagement in the PD, and the results are presented in Table A62. Overall, teachers indicated moderate agreement that the PD actively engaged them in reflecting on their teaching (mean = 5.0).

Table A62. The PD actively engaged me in reflecting on my teaching. (teacher survey)	OP	ONP	Total
Strongly Disagree	1	0	1
Moderately Disagree	1	3	4
Slightly Disagree	0	0	0
Slightly Agree	2	4	6
Moderately Agree	6	11	17
Strongly Agree	11	13	24
Mean	5.1	5.0	5.0

Table A63 contains results from interviews with training facilitators and coordinators regarding their impressions of the technology in schools participating in online PD. Most participants believed that the technology available to teachers for the online PD was adequate (89%). However, there were some issues mentioned with respect to technology problems, including connectivity and login issues (56%), room configuration/phone line issues (33%),

headset/audio issues (33%), and that these issues hindered the start of the PD (22%). Four participants indicated that teachers lacked skill or comfort with the technology at first (44%), but it was also mentioned that skill and comfort improved over time (33%).

Table A63. Technology Impressions (non-teacher interview)	**N**
Technology available was adequate	8
Room configuration/phone line issue	3
Headset/hearing issue	3
Connectivity/login issue	5
Technology slowed start	2
Skills/comfort lacking	4
Skills/comfort improved over time	3
Other	2

Table A64 contains interviewed teachers responses regarding whether technology problems deterred them from attending online PD. Overall, 10% of online participants and 21% of nonparticipants indicated that technology problems prevented them from attending the online training.

Table A64. Did technology problems ever deter you from attending web training? (teacher interview)	**OP**	**ONP**	**Total**
Yes	3	4	7
Somewhat reluctant	2	0	2
No	13	3	16

Online participants were asked if they experienced any difficulties with technology during training, and the results are presented in Table A65. The most common technological problem mentioned by online participants was problems with the audio (52%). Configuration and computer equipment problems were also mentioned by 26% of the teachers, and connectivity problems were mentioned by 23% of the teachers.

Table A65. During training, did you experience any difficulties with the technology? (teacher interview)	**OP**
Configuration	5
Connectivity	7
Equipment – PC/tools	3
Equipment – Audio	16
Teacher lack of skill/comfort	2
Trainer lack of skill/comfort	1
Other	4

Online participants were also asked if the technology problems had an impact on their ability to learn, their opinion of online PD, and their likelihood of attending more online PD. Results are presented in Table A66. Overall, 29% of the online participants indicated that their ability to learn was impacted, and 23% indicated that the technology problems impacted their opinion of online PD. A slightly smaller number of teachers (16%) indicated that the technology problems impacted their willingness to participate in additional online PD.

Table A66. What impact did your technology problems have on: Your ability to learn? Your opinion of web training? Your likelihood of attending more web training? (teacher interview)	**OP**	
	Impact	**No Impact**
Ability to learn	9	6
Opinion of web training	7	8
Likelihood of attending more web training	5	8

Learning, Transfer, and Outcomes

Table A67 contains responses from teacher interviews regarding the impact of the PD. In general, teachers indicated a positive influence of the PD, with 55% and 89%, respectively, of the online participants and nonparticipants indicating being influenced positively, including new ways of teaching and new ways of learning.

Table A67. How do you think the PD you participated in has influenced you? (teacher interview)	**OP**	**ONP**	**Total**
Positively	6	5	11
New ways of teaching	8	12	20
New ways of learning	3	0	3
No influence	2	0	2

Table A68 contains teacher interview responses regarding the impact of PD on teacher knowledge in various areas of their profession. Online participants were more likely to indicate that the PD did not have an impact than nonparticipants. Online participants were most likely to indicate that the PD had an impact on addressing student misconceptions (55%) and teacher collaboration (55%), followed by use of assessment data (52%) and participation in PLCs (52%). Nonparticipants were most likely to indicate that the PD had an impact on use of assessment data

(74%) and addressing student misconceptions (74%), followed by teacher collaboration (68%) and other classroom activities (68%).

Table A68. Did the PD affect how much knowledge you have about…(teacher interview)	OP			ONP		
	Impact	No Impact	Can't Judge	Impact	No Impact	Can't Judge
The subject area you teach?	14	12	1	5	9	0
Classroom management skills?	15	15	0	12	6	0
Use of assessment data?	16	10	2	14	6	0
Addressing student misconceptions?	17	10	1	14	5	0
Any other classroom activities?	12	14	0	13	3	0
Teacher collaboration?	17	13	0	13	6	0
Professional learning communities?	16	10	1	11	5	0
Any other areas?	5	18	0	4	7	0

Table A69 contains the results of teachers interviewed regarding the extent to which they believed that implementation of the program for which they received PD would result in improved student learning. Overall, 58% and 74%, respectively, of online participants and nonparticipants indicated that they believed it would improve student learning.

Table A69. Overall, do you think your implementation of _____ has, or will, result in improved student learning? (teacher interview)	OP	ONP	Total
Improved learning	18	14	32
Improved understanding	2	0	2
Improved behavior	1	0	1
Improved performance	5	5	10
No change	3	0	3
Can't judge	5	3	8

Table A70 contains results from the teacher survey regarding the extent to which teachers believe that the PD will result in greater student learning. Overall, teachers indicated moderate agreement that the PD will result in greater student learning (mean = 5.1).

Table A70. I believe that the PD I received will eventually result in greater student learning. (teacher survey)	OP	ONP	Total
Strongly Disagree	0	1	1
Moderately Disagree	0	1	1
Slightly Disagree	0	2	2
Slightly Agree	3	5	8
Moderately Agree	7	10	17
Strongly Agree	11	12	23
Mean	5.4	4.9	5.1

Online participants interviewed were asked whether they believed that their participation in online PD would impact their ability to implement the program for which they received PD,

and the results are presented in Table A71. Of the online participants, 35% indicated that their participation in the online PD had a positive impact. Eight teachers (26%) indicated that it had no impact, and one teacher indicated that it had a negative impact, due to multiple issues with scheduling, class coverage, and technology problems.

Table A71. Do you think your participation in web-based PD for _____ impacted your ability to implement _____?(teacher interview)	**OP**
Positive impact	11
Slight impact	6
No impact	8
Can't judge	1
Negative impact	1

Table A72 contains results from the teacher survey regarding whether teachers reported implementing the skills they learned during PD. Overall, teachers agreed moderately that they had begun implementing the skills they learned during PD (mean = 5.1).

Table A72. I have begun implementing the skills I learned during PD. (teacher survey)	**OP**	**ONP**	**Total**
Strongly Disagree	1	0	1
Moderately Disagree	0	2	2
Slightly Disagree	0	0	0
Slightly Agree	3	5	8
Moderately Agree	7	9	16
Strongly Agree	10	15	25
Mean	5.1	5.1	5.1

Appendix B: Coding System for Interviews

Interviews with study subjects, including teachers, training facilitators, training coordinators, and programs leaders, were transcribed. Using software for qualitative data analysis (Muhr & Friese, 2004), responses were then categorized by applying codes to the transcribed information. Appendix B contains the list of codes for the teacher and non-teacher interviews.

Teacher Interview Codes

Background

Si.1 subject **[subject(s) taught]**
- Si.1.1 math
- Si.1.2 English

Si.2 years **[total years teaching]**
- Si.2.1 1-2 yrs
- Si.2.2 3-5 yrs
- Si.2.3 6-9 yrs
- Si.2.4 10-19 yrs
- Si.2.5 20+ yrs

Si.3 technology_comfort **[individual's general level of comfort with technology]**
- Si.3.1 prior level comfort high
- Si.3.2 prior level comfort med
- Si.3.3 prior level comfort low

Si.4 program_taught **[program taught]**
- Si.4.1 QCA/Math 1
- Si.4.2 Math Navigator
- Si.4.3 Ramp-Up Literacy

Si.5 program_PD **[PD received for program]**
- Si.5.1 yes
- Si.5.2 no

Si.6 other_PD **[PD for other programs]**
- Si.6.1 QCA/Math 1
- Si.6.2 Math Navigator
- Si.6.3 Ramp-Up Literacy
- Si.6.4 Study groups
- Si.6.5 other

Si.7 PD_received **[type of PD received]**
- Si.7.1 f2f
- Si.7.2 web
- Si.7.3 both

Online Participants

0. logistics_support **[training logistics and support]**

- 0.1. contact_email
- 0.2. contact_staff
- 0.3. contact_reminder

- 1a.1 contacted_district staff
- 1a.2 contacted_AC staff
- 1a.3 contacted_both

- 1b.1 had leadership support
- 1b.2 lacked leadership support
- 1b.3 n/a or don't recall

- 1c.1 training required
- 1c.2 training optional
- 1c.3 not sure/don't recall
- 1.c.4 recommended/encouraged

- 1d.1 colleague support
- 1d.2 no colleague support
- 1d.3 n/a or don't recall
- 1.d.4 split (some colleague support, others not)

1. notification

- 1.1. enough prior notification
- 1.2. not enough prior notification
- 1.3. don't recall
- 1.4. sometimes had enough notice

2. scheduling conflicts **[barriers to scheduling training]**

- 2.1. no subs/class coverage
- 2.2. poor notification
- 2.3. times offered
- 2.4. lack consistent schedules

3. technology deterrent **[technology deter from attending]**

- 3.1. yes
- 3.2. somewhat reluctant
- 3.3. no

4. other deterrent **[barriers to attending training]**

- 4.1. times offered
- 4.2. don't want to be out of class
- 4.3. subs/class coverage
- 4.4. location
- 4.5. no notification
- 4.6. late planning
- 4.7. no time
- 4.8. predisposed feelings (e.g., prefer f2f)
- 4.9. no expectation communicated

5. technology difficulties **[technology barriers during training]**

- 5.1. configuration (e.g., PCs not setup properly in advance)
- 5.2. connectivity
- 5.3. equip_PC/tools
- 5.4. equip_audio (e.g., no headphones, no phone line near PC—poor room configuration)
- 5.5. teacher lack skill/comfort
- 5.6. trainer lack skill/comfort
- 5.7. other (e.g., password issues, etc.)

6a.1 difficulties resolved
6a.2 difficulties not resolved
6a.3 took too long to resolve
6b.1 impacted ability to learn
6b.2 did not impact ability to learn
6b.3 impacted opinion
6b.4 did not impact opinion
6b.5 impacted retention
6b.6 did not impact retention

6. when attended **[when attended training]**
6.1. during school hours
6.2. during planning period
6.3. outside school hours
6.4. summertime or day off
6.5. varied

7. where attended **[where individual participated from]**
7.1. classroom/office
7.2. offsite facility
7.3. computer lab
7.4. had to find space
7.5. assigned space

8. number sessions **[approx number of sessions attended]**
8.1. 0-1
8.2. 1-2
8.3. 3-4
8.4. 5+

8a.1 attended one-to-one tutoring

8b.1 improve attendance (e.g., anything might have improved attendance or ability to attend)
8b.1.1 more offerings
8b.1.2 more notice
8b.1.3 subs/class coverage
8b.1.4 other (e.g., organization, expectations)

9. web opinions **[overall opinions of web training]**
9.1. informative
9.2. better than f2f
9.3. prefer f2f/hands on
9.4. comfortable/non-threat environment
9.5. didn't take time away from class
9.6. too much time wasted (e.g., tech difficulties, getting up to speed/logged on)
9.7. lacked materials (e.g., not receiving materials in advance made difficult to participate)
9.8. was not able to learn
9.9. need more flexible times
9.10. needed more participants
9.11. trainers were having difficulties
9.12. liked online training
9.13. did not like online training
9.14. other

10. web_engagement **[was web training engaging]**
10.1. very engaging
10.2. somewhat engaging
10.3. not as engaging as expected
10.4. not engaging
10.5. not as engaging as f2f
10.6. already had this training f2f

10.7. can't judge (e.g., too many problems, too few participants, too few sessions)

11. web_liked **[things liked about web training]**

11.1. not missing class
11.2. not traveling
11.3. sharing examples/ideas
11.4. access to others outside (e.g., hearing ideas, opinions, etc. from people outside my school/district)
11.5. comfort of own surroundings
11.6. less intimidating
11.7. technology interesting/adventurous
11.8. less time required
11.9. flexibility
11.10. other

12. web_didn't like **[things didn't like about web training]**

12.1. wasted time (e.g., time wasted on technology and login)
12.2. lack of options (e.g., would have liked more time options)
12.3. lack of personal/human contact
12.4. lack of attendees
12.5. missing advance materials
12.6. system not ready (e.g., computer systems/configurations not set up properly in advance)
12.7. mixed messages (e.g., poor communication—who does what, where direct questions)
12.8. language issues with trainers
12.9. sessions not long enough
12.10. other

13. web_advantages **[advantages of web training]**

13.1. own environment
13.2. more flexible
13.3. more engaging
13.4. safer (e.g., less intimidating, free to ask questions)
13.5. time/travel savings
13.6. cost savings
13.7. collaboration
13.8. great potential
13.9. afford train new TRs (e.g., web makes it possible to provide full set of training to new teachers)
13.10. record review (e.g., web affords ability to record sessions, ability to review sessions later)
13.11. try things return (e.g., web allows TRs to be trained, try it out, and return for future assistance)
13.12. individualized training

14. web_prefer f2f delivery **[would have preferred training be delivered f2f]**

14.1. prefer f2f
14.2. more intimidating
14.3. tech distractions
14.4. less flexible

15. web_improvements **[suggestions for improving web training]**

15.1. blended solution (e.g., begin with f2f training to build community, then move to web for followup)
15.2. copilot manage environment (e.g., trainer could use a copilot to help manage the tech environment)
15.3. ensure TR credit
15.4. incorporate TR uploads (e.g., allow teachers to upload videos, assignments, questions in—maybe in advance)
15.5. increase accountability (e.g., make return with assignments, attendance reports for administration)
15.6. increase collaboration
15.7. more resource links
15.8. offer regionally
15.9. schedule well advance
15.10. take program to scale (e.g., avoid implementing with "model classrooms")
15.11. advance training (e.g., have a walkthrough of technology/environment in advance of first session)
15.12. offer in summer or earlier in year
15.13. set clear expectation
15.14. other
15.15. prior planning/preparation

16. web_learning barriers **[barriers that made learning difficult or impossible]**

16.1. no impact on ability to learn
16.2. tech/audio distractions
16.3. low attendance (e.g., too few participants to be of value)
16.4. too few sessions (e.g., only held/attended one session)
16.5. no materials (e.g., materials were not received in advance of the training)
16.6. language barrier (e.g., tutors non-native English speakers)
16.7. limited time

17. web_influence **[has web training influenced participant]**

17.1. positively
17.2. new ways of teaching
17.3. new way of learning (e.g., excited for technology, online training)
17.4. no influence
17.5. varied widely

18a.1 knowledge impact
18a.2 no knowledge impact
18a.3 can't judge (e.g., too many problems, too few participants, too few sessions)

18b.1 management impact
18b.2 no management impact
18b.3 can't judge (e.g., too many problems, too few participants, too few sessions)

18c.1 data impact
18c.2 no data impact
18c.3 can't judge (e.g., too many problems, too few participants, too few sessions)

18d.1 misconcept impact
18d.2 no misconcept impact
18d.3 can't judge (e.g., too many problems, too few participants, too few sessions)

18e.1 other activities impact
18e.2 no other activities impact
18e.3 can't judge (e.g., too many problems, too few participants, too few sessions)

18f.1 collaboration impact
18f.2 no collaboration impact
18f.3 can't judge (e.g., too many problems, too few participants, too few sessions)

18g.1 PLC impact
18g.2 no PLC impact
18g.3 can't judge (e.g., too many problems, too few participants, too few sessions)

18h.1 other areas impact
18h.2 no other areas impact
18h.3 can't judge (e.g., too many problems, too few participants, too few sessions)

18. web_expert access **[extent had access to program experts outside of training]**

18.1. good access
18.2. no access
18.3. access was better last year
18.4. limited access

19. web_implementation barriers **[anything keeping them from implementing what they learned]**

19.1. lacking time
19.2. lacking knowledge (e.g., didn't learn enough during training to be useful)
19.3. lacking materials (e.g., district did not purchase materials for all)
19.4. no longer teaching program (e.g., shift in teaching responsibilities)
19.5. lacking support
19.6. student behavior issues

20. importance of implementation **[importance of fully implementing program]**

20.1. very important
20.2. skeptical (e.g., just another program)
20.3. torn (e.g., confused by lack of support, state test issues)
20.4. no expectation (e.g., lacked prior knowledge to judge)
20.5. initial infringement (e.g., initially felt was an infringement to tell me how/what to teach)
20.6. not very important

21a.1 very supportive
- 21a.1.1 provided time to attend
- 21a.1.2 provided time to implement
- 21a.1.3 provided resources

21a.2 skeptical (e.g., just another program)
21a.3 not involved enough
21a.4 poor communication
21a.5 lacked resources/support

21b.1 good fit
21b.2 not good fit
21b.3 no expectation (e.g., lacked prior knowledge to judge)
21b.4 need lower program (e.g., need program for lower performing students)

21c.1 supportive
21c.2 not supportive
21c.3 n/a or don't recall
21c.4 skeptical

21. student outcome **[impact program had/will have on students]**

21.1. improved learning
21.2. improved understanding
21.3. improved behavior
21.4. improved performance
21.5. no change
21.6. can't judge

22. web_impact ability to implement **[did participation in web training impact ability to implement]**

22.1. positive impact
22.2. slight impact
22.3. no impact
22.4. can't judge
22.5. negative impact

23. general PD perception **[general perception of PD]**

23.1. very important
23.2. important when relevant
23.3. usually a waste of time

24. improve district PD **[thoughts on improving PD within district]**

24.1. teacher input/choice (e.g., want more flexibility in choosing what PD they need)
24.2. better coordination (e.g., more thought and coordination into what have received/what need)
24.3. more support
24.4. no change
24.5. more collaboration
24.6. prior communication/planning
24.7. more PD days/before schoolyear
24.8. other

25. PD topics **[PD topics needed by teacher and colleagues]**

25.1. classroom management
25.2. instructional strategies

25.3. assessment strategies
25.4. engagement/motivation strategies
25.5. cultural differences
25.6. ELL/special needs
25.7. technology
25.8. content or program specific
25.9. other

26. web_awareness topics **[other things regarding web training we need to be aware of]**
26.1. web has potential
26.2. excited about web opportunity
26.3. TRs need to learn how to participate
26.4. experience could be tweaked
26.5. develop plan that works
26.6. flexibility in scheduling
26.7. make sure things working
26.8. R&R is working
26.9. other

Online Web Nonparticipants

np.1 np_logistics **[non-web participant training logistics and support]**
np1.1 aware
np1.2 not aware

np1a.1 contact_email
np1a.2 contact_staff
np1a.3 contact_reminder

np1b.1 contacted_district staff
np1b.2 contacted_AC staff
np1b.3 contacted_both

np1c.1 when contacted

np1d.1 enough prior notification
np1d.2 not enough prior notification
np1d.3 don't recall

np.2 scheduling conflicts **[barriers to scheduling training]**
np2.1 no subs/class coverage
np2.2 poor notification
np2.3 times offered
np2.4 lack consistent schedules

np.3 technology deterrent **[technology deter from attending]**
np3.1 yes
np3.2 somewhat reluctant
np3.3 no

np.4 leadership support **[was leadership supportive of attending web training]**
np4.1 good leadership support
np4.2 lacked leadership support
np4.3 n/a or don't recall

np4.4 training required
np4.5 training optional
np4.6 not sure/don't recall

np.5 material repeat **[was material being covered in web training info already knew]**
np5.1 yes

np5.2 no
np5.3 don't know
np5.4 f2f training was adequate

np.6 reasons not interested **[why was TR not interested in attending web training]**
np6.1 didn't need it
np6.2 topic not of interest
np6.3 didn't know topic
np6.4 it was optional
np6.5 didn't know expectation
np6.6 other

np.7 increased desire **[what would have made TR more likely to attend web training]**
np7.1 offered f2f
np7.2 more leadership support
np7.3 more colleague support
np7.4 CE credits
np7.5 other

Face-to-face

f2f.8 f2f_logistics **[non-web participant training logistics and support]**
f2f8.1 contact_email
f2f8.2 contact_staff
f2f8.3 contact_reminder

f2f8a.1 contacted_district staff
f2f8a.2 contacted_AC staff
f2f8a.3 contacted_both

f2f8b.1 when contacted

f2f8c.1 enough prior notification
f2f8c.2 not enough prior notification
f2f8c.3 don't recall
f2f8c.4 sometimes had notice

f2f.9 scheduling conflicts **[barriers to scheduling training]**
f2f9.1 no subs/class coverage
f2f9.2 poor notification
f2f9.3 times offered
f2f9.4 lack consistent schedules

f2f.10 leadership support **[was leadership supportive of attending web training]**
f2f10.1 good leadership support
f2f10.2 lacked leadership support
f2f10.3 n/a or don't recall

f2f10a.1 training required
f2f10a.2 training optional
f2f10a.3 not sure/don't recall
f2f10a.4 other

f2f.11 when attended **[when attended f2f training]**
f2f11.1 during school hours
f2f11.2 during planning period
f2f11.3 outside school hours
f2f11.4 summertime or day off
f2f11.5 varied

f2f.12 where attended **[where individual participated from]**

f2f12.1 my school
f2f12.2 another school
f2f12.3 offsite facility

f2f12.4 traveled 1-9 minutes
f2f12.5 traveled 10-19 minutes
f2f12.6 traveled 20+ minutes
f2f12.7 varied

f2f.13 f2f_number sessions **[approx number of f2f sessions attended]**

f2f13.1 0-1
f2f13.2 1-2
f2f13.3 3-4
f2f13.4 5+

f2f.14 f2f_opinions **[overall opinions of f2f training]**

f2f14.1 informative
f2f14.2 too long (e.g., session was longer than necessary)
f2f14.3 timing was off (e.g., timing of training did not fit with teaching of curriculum)
f2f14.4 was not able to learn
f2f14.5 prefer web
f2f14.6 liked it
f2f14.7 did not like it

f2f.15 f2f_engagement **[was f2f training engaging]**

f2f15.1 very engaging
f2f15.2 somewhat engaging
f2f15.3 not as engaging as expected
f2f15.4 not engaging
f2f15.5 can't judge (e.g., too many problems, too few participants, too few sessions)

f2f.16 f2f_liked **[things liked about f2f training]**

f2f16.1 modeling
f2f16.2 Interactions/sharing
f2f16.3 trainers good/helpful

f2f.17 f2f_advantages **[advantages of f2f training]**

f2f17.1 personal setting
f2f17.2 real time response
f2f17.3 easier to communicate
f2f17.4 hands-on/modeling
f2f17.5 trainers better able to gauge
f2f17.6 collaboration
f2f17.7 other

f2f.18 f2f_didn't like **[things didn't like about f2f training]**

f2f18.1 wasted time (e.g., time wasted stretching material or on tech issues)
f2f18.2 overwhelming content
f2f18.3 late start/felt rushed
f2f18.4 technology glitches
f2f18.5 other

f2f.19 f2f_needed f2f delivery

f2f19.1 yes
f2f19.2 only portion
f2f19.3 no

f2f.20 f2f_influence **[has web training influenced participant]**

f2f20.1 positively
f2f20.2 new ways of teaching
f2f20.3 new way of learning (e.g., excited for technology, online training)
f2f20.4 no influence

f2f20.5 varied widely

f2f20a.1 knowledge impact
f2f20a.2 no knowledge impact
f2f20a.3 can't judge (e.g., too many problems, too few participants, too few sessions)

f2f20b.1 management impact
f2f20b.2 no management impact
f2f20b.3 can't judge (e.g., too many problems, too few participants, too few sessions)

f2f20c.1 data impact
f2f20c.2 no data impact
f2f20c.3 can't judge (e.g., too many problems, too few participants, too few sessions)

f2f20d.1 misconcept impact
f2f20d.2 no misconcept impact
f2f20d.3 can't judge (e.g., too many problems, too few participants, too few sessions)

f2f20e.1 other activities impact
f2f20e.2 no other activities impact
f2f20e.3 can't judge (e.g., too many problems, too few participants, too few sessions)

f2f20f.1 collaboration impact
f2f20f.2 no collaboration impact
f2f20f.3 can't judge (e.g., too many problems, too few participants, too few sessions)

f2f20g.1 PLC impact
f2f20g.2 no PLC impact
f2f20g.3 can't judge (e.g., too many problems, too few participants, too few sessions)

f2f20h.1 other areas impact
f2f20h.2 no other areas impact
f2f20h.3 can't judge (e.g., too many problems, too few participants, too few sessions)

f2f.21 f2f_expert access **[extent had access to program experts outside of f2f training]**

f2f21.1 good access
f2f21.2 no access
f2f21.3 access was better last year
f2f21.4 limited access

f2f.22 f2f_implementation barriers **[anything keeping them from implementing what they learned]**

f2f22.1 lacking time
f2f22.2 lacking knowledge (e.g., didn't learn enough during training to be useful)
f2f22.3 lacking materials (e.g., district did not purchase materials for all)
f2f22.3 no longer teaching program (e.g., shift in teaching responsibilities)
f2f22.4 student behavior issues

f2f.23 f2f_importance of implementation **[importance of fully implementing program]**

f2f23.1 very important
f2f23.2 skeptical (e.g., just another program)
f2f23.3 torn (e.g., confused by lack of support, state test issues)
f2f23.4 no expectation (e.g., lacked prior knowledge to judge)
f2f23.5 initial infringement (e.g., initially felt was an infringement to tell me how/what to teach)

f2f23a.1 very supportive
- f2f23a.1.1 provided time to attend
- f2f23a.1.2 provided time to implement
- f2f23a.1.3 provided resources

f2f23a.2 skeptical (e.g., just another program)
f2f23a.3 not involved enough
f2f23a.4 poor communication
f2f23a.5 more supportive last year

f2f23b.1 good fit
f2f23b.2 not good fit
f2f23b.3 no expectation (e.g., lacked prior knowledge to judge)
f2f23b.4 need lower program (e.g., need program for lower performing students)
f2f23b.5 skeptical

f2f23c.1 very supportive
f2f23c.2 not supportive
f2f23c.3 n/a or don't recall
f2f23c.4 skeptical
f2f23c.5 split (some colleague support, others not)

f2f.24 f2f_student outcome **[impact program had/will have on students]**
f2f24.1 improved learning
f2f24.2 improved understanding
f2f24.3 improved behavior
f2f24.4 improved performance
f2f24.5 no change
f2f24.6 can't judge

f2f.25 f2f_general PD perception **[general perception of PD]**
f2f25.1 very important
f2f25.2 important when relevant
f2f25.3 can be waste of time
f2f25.4 other

f2f.26 f2f_improve district PD **[thoughts on improving PD within district]**
f2f26.1 teacher input/choice (e.g., want more flexibility in choosing what PD they need)
f2f26.2 better coordination (e.g., more thought and coordination into what have received/what need)
f2f26.3 more support
f2f26.4 no change
f2f26.5 other
f2f26.6 more collaboration
f2f26.7 prior communication/planning
f2f26.8 more PD days/before schoolyear

f2f.27 f2f_PD topics **[PD topics needed by teacher and colleagues]**
f2f27.1 classroom management
f2f27.2 instructional strategies
f2f27.3 assessment strategies
f2f27.4 engagement/motivation strategies
f2f27.5 cultural differences
f2f27.6 ELL/special needs
f2f27.7 technology
f2f27.8 other
f2f27.9 content or program specific

T1 programs change frequently

Study Group Teacher Interview Codes

Background

1 study group **[participate in which study group]**
1.1 Team roles and Responsibilities
1.2 Behavioral readiness – overview
1.3 ENGAGE (formerly known as Student Readiness Inventory)
1.4 ENGAGE Teacher Edition (formerly known as Behavioral Monitoring Scales)

1.5 EXPLORE Reports
1.6 Career Exploration and Planning

2 subject & grade levels **[subject(s) taught]**
2.1 English
2.2 history
2.3 math
2.4 science

3 years **[total years teaching]**
3.1 < 5 yrs
3.2 > 10+ yrs

4 technology_comfort **[individual's general level of comfort with technology]**
4.1 prior level comfort high
4.2 prior level comfort med
4.3 prior level comfort low

5 program_taught **[program taught or involved]**
5.1 QCA/Math 1
5.2 MNAV
5.3 RUL
5.4 Behavior Readiness Study Groups
5.5 Other

Interview Focus

1. study_group **[how did you hear about study groups]**
1a.1 facilitator (school employee)
1a.2 principal
1a.3 AC or ACT employee

1b.1 very supportive
1b.2 yes

2. Decide to attend
2.1. know what the students are doing
2.2. PD benefit for teachers
2.3. get on the same page as other teachers
2.4. required

3. Organizer responsible
3.1. multiple people
3.2. America's Choice program manager
3.3. facilitator

4. Problems attending sessions
4.1. No problems

5. Time attended sessions **[when you did you attend sessions]**
5.1. during designated team time

6. How often did you meet to talk about topic area
6.1. Yes

7. Visited COL website?
7.1. Yes
7.2. Yes, but not recently

8. Did you download materials from COL website?
8.1. materials were provided at meeting

8.2. no, hard copies
8.3. yes

8.a.1. no, prefer hard copy **[is it best to circulate materials via COL?]**
8.a.2. yes

8.b.1. getting locked out for password **[trouble obtaining study group materials from COL]**
8.b.2. no

8.c.1. online system **[if not downloaded, how were materials provided]**

9. Did you attend webinars re: study groups?
9.1. No

10. Did you interact with others via COL website
10.1. Yes
10.2. No

10.a.1. Time constraints **[What were reasons for not participating]**
10.a.2. Too many other things to do

11. What Web resources did you find helpful
11.1. create guidelines for high school only
11.2. implementing ENGAGE/ENGAGE Teacher Edition (formerly known as SRI/BMS) suggestion
11.3. blog/skype
11.4. Google docs
11.5. having a link on the district's homepage
11.6. reports available online
11.7. understanding expected outcomes/expectations
11.8. assigning each teacher a part of the study
11.9. loved teaming SG (quote)
11.10. something to disaggregate scores
11.11. time
11.12. getting materials earlier

12. What was your impression of SG materials
12.a.1.
12.b.1.
12.c.1.

13. Overall impression of SG sessions
13.1. positive feedback
13.2. negative feedback

13.a.1. have a retreat to learn them
13.a.2. high school book
13.a.3. improve facilitator training
13.a.4. individualize it
13.a.5. simplify

13.b.1. better understanding of purpose
13.b.2. yes

14. What additional study group topics would you like to see offered?
14.1. career guidance
14.2. classroom management
14.3. involving the Community
14.4. motivation behind behaviors
14.5. teacher collaboration
14.6. the ACT test
14.7. transitions

15. How did SG influence you?

15.1. accountability for other students in the school
15.2. inspired to improve
15.3. understanding R&R better
15.4. influenced way of thinking
15.5. spending more time talking with teachers

15.c.1. easy reference for what students need **[participation improved your skills – EXPLORE, ENGAGE]**
15.c.2. reference of reasons behind things
15.c.3. yes

15.d.1. yes, when we were able to implement
15.d.2. provided focus point **[participation improved your skills – career expl. & planning]**
15.d.3. helped better assess need

16. Have you used or implemented material in SGs

16.1. no, not enough time
16.2. used some, would like to use more
16.3. aware of student needs
16.4. guides conversation
16.5. yes, implementing action plans

17. To what extent did you have access to program

17.1. good access

18. Problems or barriers that kept you from applying what you learned?

18.1. no
18.2. time
18.3. yes, time and newness

19. To what extent were administrators committed to making school improvements

19.1. district should commit further by interviewing earlier
19.2. example of fully committed administration
19.3. example of lower scores
19.4. to a high extent
19.5. yes
19.6. half and half
19.7. yes- with example
19.8. yes- slowly

20. Do you think implementation of the info has, or will result in improved student learning

20.1. got off school improvement list!
20.2. comments about future implementation
20.3. yes

21. Anything else about SG we haven't discussed

21.1. no
21.2. create SG binder
21.3. too much information available

22. Thoughts about teacher PD in general?

22.1. PD is needed
22.2. some PD useful, some not

23. Suggestions about improving professional development in your district

23.1. make it mandatory
23.2. let people who want PD go to it
23.3. make it targeted to individuals
23.4. make it teacher specific
23.5. relevance with example

24. What sort of PD or PD topics do you think are most needed in your school

24.1. student engagement
24.2. classroom management
24.3. diversity training
24.4. ELL training
24.5. technology

Non-Teacher Codes

1. **Scheduling_Process**
   1.1. district determined
   1.2. posted on COL
   1.3. emailed TRs
   1.4. failed to include TRs
2. **Scheduling_Ease**
   2.1. easy
   2.2. somewhat difficult
   2.3. very difficult
3. **Scheduling_Impediments**
   3.1. lack of subs/coverage
   3.2. lack of common schedules
   3.3. lack of communication
   3.4. times offered
   3.5. other
4. **Scheduling_BiggestObstacle**
   4.1. lack of subs
   4.2. lack of communication
5. **Scheduling_Differences**
   5.1. f2f scheduled in advance
   5.2. web more to coordinate
   5.3. web unfamiliar
   5.4. web registration/attendance difficult to track
6. **Location**
   6.1. classroom/office
   6.2. computer lab/training facility
   6.3. off site location
   6.4. varied
7. **Attendance**
   7.1. most enthusiastic
   7.2. enthusiasm low
   7.3. enthusiasm/reactions mixed
   7.4. enthusiasm improved
   7.5. enthusiasm higher for f2f
   7.6. district structure impeded
   7.7. technical issues impeded
   7.8. attendance good
   7.9. attendance poor
   7.10. TRs often late/left early
   7.11. can't judge
   7.12. lacked incentive
8. **Attendance_Pressures**
   8.1. lack knowledge/expectation
   8.2. lack time/don't want to be away
   8.3. lack common time
   8.4. uncertainty/reluctance to change
   8.5. skeptical of future
   8.6. other
9. **Leadership Support**
   9.1. supportive of initiative
   9.2. failed to communicate
   9.3. skeptical of future
   9.4. leadership lacking

9.5. support varied

10. Training Requirement
- 10.1. required
- 10.2. seen as optional
- 10.3. don't know

11. District Plans
- 11.1. not in original plans
- 11.2. in original plans
- 11.3. communication plan lacking
- 11.4. TRs not always aware

12. Training Impact
- 12.1. had impact
- 12.2. had little or no impact
- 12.3. impact varied
- 12.4. can't judge

13. Format Impact Differences
- 13.1. f2f bigger impact
- 13.2. equal impact

14. Implementation Barriers
- 14.1. time constraints
- 14.2. classroom problems
- 14.3. state testing
- 14.4. other

15. Student Outcome
- 15.1. improved learning
- 15.2. hope for improvement
- 15.3. can't judge

16. Study Group Impact
- 16.1. SGs not used
- 16.2. had an impact
- 16.3. impact unknown
- 16.4. want more SGs

17. Commitment to R&R
- 17.1. TRs committed
- 17.2. TRs torn
- 17.3. TRs skeptical
- 17.4. leadership onboard but lacking
- 17.5. leadership skeptical
- 17.6. leadership lacking
- 17.7. other

18. Different Formats
- 18.1. seen as different activities
- 18.2. other

19. Engagement
- 19.1. seemed engaged
- 19.2. not as engaged as hoped
- 19.3. difficult to judge
- 19.4. tech problems hindered
- 19.5. small numbers hindered
- 19.6. sharing/collaboration good

20. Delivery Format
- 20.1. instructor needed
- 20.2. instructor not needed
- 20.3. instructor dependent on content

21. Web v F2F
- 21.1. web has potential
- 21.2. web offers savings
- 21.3. web offers flexibility
- 21.4. web offers safe/familiar environment
- 21.5. f2f built into district plan
- 21.6. f2f more familiar to TRs
- 21.7. other

21.8. can go back and review web

22. Technology Impressions

22.1. technology available was adequate
22.2. IT setup lacking
22.3. room configuration/phoneline issue
22.4. headset/hearing issue
22.5. connectivity/login issue
22.6. technology slowed start
22.7. skills/comfort lacking
22.8. skills/comfort improved over time
22.9. other

23. Web Improvements

23.1. accountability needed
23.2. increase flexibility
23.3. schedule in advance
23.4. provide clear expectations
23.5. train on environment/involve IT
23.6. offer blended solution
23.7. redesign training for web
23.8. offer regionally/nationally
23.9. other

R1. schedules or coordinated web-based PD
R2. followed up with teachers after training
R3. delivered or observed web-based PD

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