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Examining the Effects of New Teacher Induction

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Executive Summary

SRI International and its partners, the Consortium on Chicago Schools Research and the Illinois Education Research Council, have been studying new teacher induction in Illinois school districts for the past 4 years. This culminating report examines the effect of the State-Funded Mentoring and Induction Program in 39 funded sites and is based on an analysis of teacher and mentor surveys, case studies, and extant data on the programs, teacher retention, and student achievement. This examination of teacher induction builds on definitive research demonstrating that teacher expertise is a powerful contributor to student learning. The report documents the variations in the entities that provide induction support, the strategies used to support beginning teachers, and the outcomes of those strategies.

Overall, we found important contributions to increasing the effectiveness of beginning teachers who participate in these induction programs. Further, the potential of these programs has not been fully realized because they are still in the early stages of development. More significantly, however, this research raises concerns about the current conception of new teacher induction as an isolated program and calls for a more comprehensive approach linking teacher induction with whole school improvement.

Specific findings are as follows.

Not all programs are meeting the required minimum hours of weekly support. Although all programs are expected to provide each beginning teacher with at least 1.5 hours of mentoring support per week, more than half the participating beginning teachers reported that they received less frequent support. This appears to be a result of the mentors' lack of awareness of expectations, new teachers' beliefs that they do not need formal mentoring support, program directors' lack of careful monitoring, and other demands on the mentors' time. In addition, **mentors and mentees infrequently engaged in activities with high potential for improving instructional practice.** Beginning teachers reported that they rarely had opportunities for their mentor to observe their teaching or for them to observe their mentor's teaching.

Besides orientation, supports other than mentoring are offered infrequently. New teachers benefit from induction supports other than mentoring, such as new teacher workshops, professional networks, and meetings with principals. However, for a majority of new teachers, such supports occurred infrequently. Participating in these activities was especially challenging for teachers in rural areas, which are long distances from the regional offices of education running the induction programs.

The school context exerts the greatest influence on beginning teachers' success. The most powerful influences on beginning teachers' success are the conditions and circumstances of the school in which they teach. Supportive school leadership, good collegial relationships, adequate supplies and materials, opportunities for planning and learning, and a reasonable workload are more likely to influence the career trajectory of a beginning teacher than the quality of the induction program.

The induction support individual teachers received and the school conditions they were working in are related to teacher outcomes. Teachers whose induction focused strongly on instruction, who experienced a variety of induction activities, and who worked in supportive school contexts had higher levels of teacher efficacy. Likewise, induction was related to teacher-reported growth. Teachers who received more intensive mentoring, whose induction had a strong focus on instruction, who received a variety of induction supports, and who worked in supportive school contexts reported greater improvement in their instructional practice.

The association between induction and teacher retention and student achievement was less clear. Only school context was associated with teacher retention in the school and the district. Given the poor economic climate and reductions in force, however, it is unlikely that teachers are making decisions about continued employment primarily on the basis of their induction programs. Further, in our analysis of student achievement in Chicago, we found no significant differences in mean student achievement in reading or math between teachers who reported participating in any induction program and those who reported no induction. However, we faced many challenges in the student achievement analysis. Specifically, the number of teachers for whom we were able to obtain complete data was quite small, limiting the power of our analysis. Our original design was to contrast student achievement for teachers who experienced high- and low-intensity induction, but this distinction was clouded. And to increase the number of teachers included in the analysis, we sacrificed survey responses that provided us with teacher background characteristics and thus could not control for them in our final models.

We identified factors that contribute to characteristics of strong induction programs. Programs that have more control over their mentors—those that have more stringent requirements for mentor selection, provide more training and ongoing support, and hold mentors accountable for their mentoring—provide more intense mentoring and a strong focus on instruction, two contributors to positive teacher outcomes. This finding suggests that programs can improve their induction support by focusing on the mentors. Also, programs with full-time release mentors and single-district programs were more likely to have more intense mentoring and a stronger focus on instruction. Although these designs are not practical or even feasible for all programs, this finding suggests that programs relying on full-time teachers as mentors and those that serve multiple districts should pay closer attention to the mentoring and other supports provided.

In all, this research suggests that teacher induction does make important contributions to new teachers' sense of efficacy and their professional growth. However, the induction of new teachers cannot be left to individual mentors if the goal of induction is to raise student achievement, nor can induction be a discrete program. Rather, the induction of new teachers needs to be a school-wide effort and the collective responsibility of a school faculty.

I. Introduction

Researchers have come to a consensus that teachers make a difference in student learning (Rivkin, Hanushek, & Kain, 2001; Sanders & Rivers, 1996). Research also has shown that teachers new to the profession are less effective in boosting student learning than their more experienced colleagues (Murnane & Phillips, 1981; Raymond, Fletcher, & Luque, 2001; Rivkin, Hanushek, & Kain, 2001), and too many of these less experienced teachers leave the classroom before developing the professional skills necessary to help students learn to their potential. According to national data, 11% of beginning teachers leave the profession after 1 year of teaching, and another 16% change schools (Smith & Ingersoll, 2003).

Policymakers have increasingly sought to offer interventions to support new teachers' entry into the profession, with the concurrent goals of improving their teaching and retaining them in the profession (Mutchler, 2000). Between the 1990–91 and 1999–2000 school years, the proportion of beginning public school teachers who participated in an induction or mentor program increased from 51% to 83% (Smith & Ingersoll, 2003). Advocates for induction programs argue that teachers in their early years are especially receptive to learning experiences and therefore that induction programs can make teachers considerably more effective—both during and after the induction period (Fideler & Haselkorn, 1999).

Yet the empirical evidence of the effect of induction support for new teachers on both effectiveness and retention is uneven (Lopez et al., 2004). For example, an analysis of a national dataset showed that beginning teachers who were provided with multiple supports were more likely to remain in their school and in the teaching profession (Ingersoll & Smith, 2004), suggesting positive outcomes for induction. In contrast, a recent randomized controlled study found no statistically significant differences between the standardized achievement test performance of students whose teachers received intensive induction support and those whose teachers received less intensive induction support, suggesting that induction may not contribute to desired outcomes (Isenberg et al., 2009).

Moreover, as Ingersoll and Kralik (2004) indicate, the literature provides minimal guidance on which components of an induction program are most important in influencing particular outcomes. Program activities may include orientation meetings, workshops or classes, regular meetings or networks of other beginning teachers, assignment of a mentor, classroom observation of or by a beginning teacher, portfolio development for a beginning teacher, and reduced duties, such as limiting the number of students assigned to the beginning teacher or decreasing the number of classes to prepare. At one extreme, an induction program may last only a short time and consist solely of orientation meetings. At the other extreme are multifaceted programs that combine several elements to create a much more comprehensive induction experience. With all this variation, research is needed to help identify what types of supports produce positive results in different school environments.

That is the objective of this research: to explore comprehensively the effect of induction on new teachers. Through a mixed-method design, we are examining both the inputs of induction

(e.g., the types of support provided new teachers, its content, and frequency) and a variety of outcomes (i.e., teacher efficacy, teacher-reported growth, teacher retention, and student achievement). We also are paying particular attention to the school context in which new teachers teach because our previous research identified school context as an important factor in induction supports and outcomes (Wechsler, Caspary, & Humphrey, 2008).

Research Context

The focus for this research was the state-funded induction programs in Illinois. In 2006, the state of Illinois established the State-Funded Mentoring and Induction Program, funding 10 pilot programs to provide targeted support to first- and second-year teachers. Since then, the state has supported 63 new teacher induction programs (funded by 67 individual grants) that collectively serve more than 4,500 first- and second-year teachers in over 1,500 schools statewide (Illinois New Teacher Collaborative, 2010). A variety of organizations including school districts, regional offices of education, colleges and universities, and other professional development organizations operate these induction programs.

The programs in Illinois provide a package of supports for new teachers. According to the Illinois School Code and administrative rules governing state-funded induction, each program must include the following:

- A mentor, who is an experienced teacher and who has received training on how to be a mentor, for both first- and second-year teachers
- Professional development for the new teachers, as well as for their mentors and administrators who have a role in the program
- Formative assessment of new teachers' performance aligned with the relevant content-area standards and the Illinois Professional Teaching Standards (Illinois State Board of Education, 2009).

In addition to these regulations, in 2008 the Illinois Induction Program Standards were approved by the Illinois State Teacher Certification Board to guide the development and implementation of induction programs. The standards address nine areas that together provide a comprehensive, research-based framework for induction programs: induction program leadership, administration, and support; program goals and design; resources; site administrator roles and responsibilities; mentor selection and assignment; mentor professional development; development of beginning teacher practice; formative assessment; and program evaluation. In February 2010, the Illinois State Board of Education published the Illinois Induction Program Continuum that describes program development for each standard across four levels: establishing, applying, integrating, and systematizing (Illinois State Board of Education, 2010). Through these standards documents, the state provides induction programs with clear guidance on building strong programs.

Within the specific guidelines and guidance offered by the state, however, induction providers are granted flexibility in how they design their programs, including the specific types of support they provide teachers, the content of the professional development, how they select and train

mentors, what accountability requirements are set for teachers and mentors, and how they include administrators, among other design components. The variation across induction programs is illustrated in the following brief descriptions of actual programs:

- In Program A, run by a school district, full-time teachers serve as mentors for the novice teachers. Other supports include a 4-day orientation before the start of the school year on curriculum, instruction, and district culture; six district support meetings for novice teachers and their mentors; quarterly meetings of novices, their mentor, and principal; and release time for professional development and observations.

- Program B is run by a regional office of education and serves 26 school districts across a three-county area. Mentoring is provided by a full-time teacher. Other supports include a 1-day orientation before the school year and optional new teacher networking meetings. New teachers are required to attend 4 days of professional development of their choice, be observed by their mentors three times over the course of 2 years, and conduct an analysis of student work and write a reflection on their practice.

- Program C is run by a university that is partnered with 12 districts. Rather than directly providing mentoring or induction, this program is building induction capacity in the local districts through administrator, teacher, and mentor training.

- Program D is run by a nonprofit organization in collaboration with a school district. Full-time released master teachers provide mentoring to first- and second-year teachers. In addition, participants receive district-led orientation, and they are encouraged to participate in monthly professional development workshops.

As the four examples illustrate, Illinois induction programs may be run by different entities, supports may come from part-time or full-time mentors, and new teachers may participate in a variety of support activities in addition to mentoring. However designed, though, the purposes of these supports are twofold: to reduce teacher attrition and to improve new teachers' effectiveness. The research presented here explores the variation, describing in depth the components of induction and how they vary both across and within programs and examining the contributions of various induction supports to new teachers.

Overview of the Report

In the next section of this report, we detail the methodology for this research. Section 3 describes the induction supports provided to new teachers across the state-funded programs. Section 4 describes the effect of induction supports on teacher efficacy, teacher-reported growth, teacher retention, and student achievement. Section 5 explores factors tied to strong support for new teachers. Section 6 concludes with the implications of the findings for policymakers and program providers.

II. Research Methodology

This research is based on data collected from 39 programs across the state: the first cohort of 9 programs initially funded in fall 2006[1] and the second cohort of 30 programs initially funded in winter 2008.[2] We used a mixed-methods approach that included surveys, case studies, and analyses of teacher retention and student achievement data.

Surveys

We conducted teacher and mentor surveys in spring 2009 in all 39 state-funded induction and mentoring programs. We surveyed the full population of teachers and mentors in the programs, which comprised 2,670 teachers and 1,746 mentors. The overall response rates were 75% for the teacher survey and 78% for the mentor survey. The final teacher respondent sample used in this report consisted of 1,940 teachers, which excluded respondents who identified themselves as speech pathologists, librarians, counselors, and nurses.

The teacher survey solicited information on

- Teacher demographics and background—certification, educational background, prior education-related and non-education-related work experience, gender, and race/ethnicity
- School context—principal instructional leadership, principal support, teaching environment, teacher professional community, and availability of materials
- Induction supports received—type of support (e.g., orientation, workshops, release time, mentoring), frequency of support, and focus of support (e.g., instructional techniques, classroom management, use of data)
- Outcomes—self-reported progress on various dimensions of teaching and efficacy.

The mentor survey measured

- Mentor background and experience—years of teaching experience, years of mentoring experience, and requirements for becoming a mentor
- Mentor training—length of initial training, ongoing supports, and focus of training
- Support provided to teachers—frequency of mentoring activities, types of mentoring activities, and focus of mentoring
- Workload and other responsibilities—number of mentees
- Outcomes for teachers—perceived growth of mentees in various dimensions of teaching.

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[1] Originally, 10 programs were funded, but one did not pursue continued funding after its initial grant.
[2] The report does not include data from the 28 programs funded in spring 2009.

Case Studies

We conducted case studies of six programs across Illinois. Case study programs were selected to represent policy-relevant examples of induction programs. They included a range of programs in terms of the number of teachers they served, urbanicity, structure (i.e., single district or consortium), administrative center (i.e., district, regional office of education, university), program design, and geography. Case studies were conducted in spring 2009 and consisted of a series of interviews with key program officials, principals, mentors, and first- and second-year teachers and document review.

Interviews with key program officials (e.g., program director, individuals directly responsible for program design and implementation, district personnel, union leaders) covered program goals, program components and learning opportunities provided, local and state contexts, alignment with district curriculum and state standards, challenges faced, and evidence of program effectiveness. New teacher interview topics were type, frequency, and content of the induction experiences; perceptions of the quality of the induction program; workplace conditions and professional community; administrator support; perceived growth as a result of the induction; and connections between instructional strategies and abilities and the induction program. Principals were interviewed about the school culture, professional community, induction program and training provided to the principal, and perceptions of the new teachers' effectiveness in the classroom. Mentor interviews covered the school context, content and frequency of the mentoring provided, training the mentor received, and perception of the novice teachers' effectiveness in the classroom. By asking multiple stakeholders similar questions, we were able to understand different perspectives on various components of the program and the context in which it operates.

To complement the interviews, we also collected and examined documents related to the programs, including written program descriptions, workshop syllabi for new teachers or their mentors, recruitment and selection procedures for mentors, and any existing evaluations or evidence of effectiveness and retention data.

Retention Data

In fall 2009 we collected employment data provided by the program directors. The data indicated which teachers participating in the induction programs in 2008–09 returned to their schools or districts the following school year. To account for the economic downturn in 2008 and 2009, which forced some districts to lay off teaching staff for the 2009–10 school year, we also collected information about whether teachers left as a result of reductions in force.

Student Achievement Data

To examine the effects of new teacher induction on student achievement, we compared mean student test scores for teachers in Chicago Public Schools who reported participating in an induction program with those of teachers who experienced no induction. We focused on Chicago Public Schools because we were able to link students' test scores to teachers in the

district. The analysis was limited to fourth- through eighth-grade teachers in self-contained classrooms for whom we were able to obtain complete data. We used students' 2008 tests scores as well as their grade level and race; their teachers' participation in induction during the 2008–09 school year; school characteristics such as racial composition, concentration of poverty and socioeconomic status of the student body, and crime in the area; and school-level faculty feature measures[3] such as trust between teachers and the principal and the level of collaboration and reflective dialog among school staff to predict students' spring 2009 test scores. We used a hierarchical linear model with students at Level 1, teachers at Level 2, and schools at Level 3. We conducted separate analyses to examine the relationship between teachers' participation in induction and their students' mathematics and reading scores.

Using these various data sources, we were able to construct a picture of induction and its effects. We turn to these findings next.

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[3] These measures come from the 2009 Consortium on Chicago School Research Elementary Teacher Survey.

III. Supports Provided to New Teachers

All Illinois state-funded induction programs are required to provide mentoring by an experienced teacher, professional development, and formative assessment. Yet across the programs we found considerable variation in the duration, frequency, intensity, and focus of the supports novice teachers receive. In this chapter, we provide an overall picture of the supports new teachers received statewide.

Mentoring

Mentoring is a universal component of induction in Illinois and was at the heart of all 39 programs under study. Nearly all (96%) of teachers reported that they were formally assigned a mentor through their induction program.

State requirements stipulate that mentors and new teachers have at least 1.5 hours of contact per week but not all new teachers received this level of mentoring (Exhibit 1). Forty-six percent of new teachers reported that they interacted with their mentor less than once a week, with 13% reporting that they interacted with their mentors only a few times or less over the course of the school year. Even those who met with their mentor weekly did not always meet the state's minimum requirement, as case study data indicated that meetings between mentors and their new teachers were often much shorter. It is therefore likely that the actual percentage of new teachers who received less than the state requirement is probably over 50%.[4] On the positive side, 15% of new teachers reported interacting with their mentor daily.

Exhibit 1
**Frequency of Interactions with Mentors**

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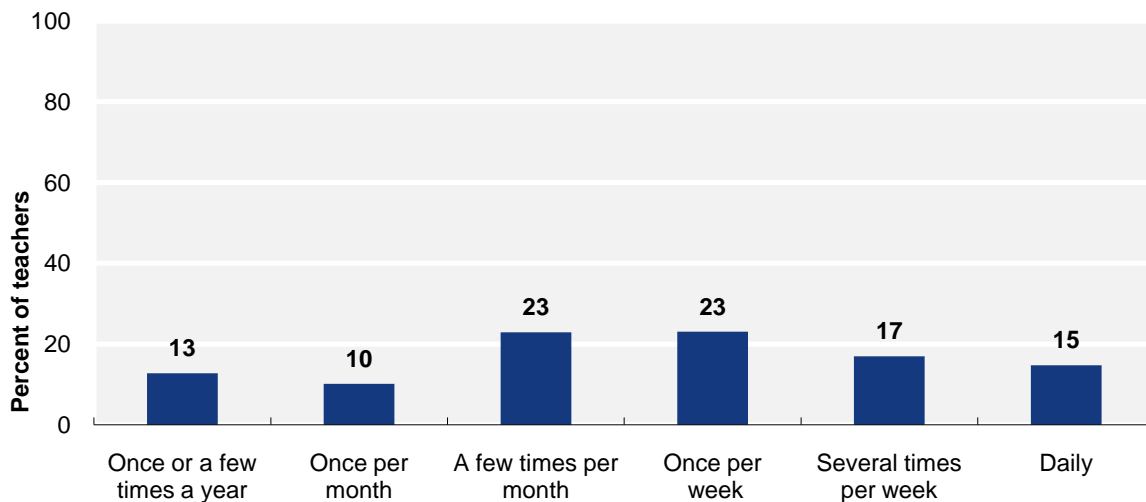
[4] Some mentors may meet with their new teachers for an average of an hour and a half weekly, even if they do not meet weekly. However, case study data suggest that this is the case for only a small number of teachers.

Interview data suggested several reasons for the infrequent meetings between some mentor and new teacher pairs. Some mentors were unaware of the expectations for meeting with their mentees, whereas others were overwhelmed with other obligations. Some mentor/mentee matches suffered from personality conflicts and purposely avoided contact with each other. In addition, some mentees did not feel they needed formal mentoring because they received support from other colleagues who taught the same grade or content area. Regardless of the reasons behind the less-than-expected contact time between mentors and mentees, this finding suggests the need for stronger program-level monitoring of the experience of all participants along with the appropriate intervention when problems arise.

During their time together, mentors engaged in a wide range of activities with their new teachers (Exhibit 2). One new teacher described the range of support she received from her mentor: "She finds resources, helps with planning, we analyzed test scores together last week…. She helps with creating my workshop [structure], provides encouragement…. She has helped a bit with instructional strategies and management, [for example, she] scripted my conversation with my ADHD boys so I could ask them better questions." The most common mentoring activities included discussing instructional issues and problems (experienced by 48% of new teachers at least monthly), talking about the strengths and/or needs of specific students (experienced by 40% of new teachers at least monthly), and providing the new teacher with materials (experienced by 33% of new teachers at least monthly). The fact that only a fraction of beginning teachers reported having weekly discussions about such core topics as instructional problems and student needs should raise concerns for program directors.

Exhibit 2
Frequency of Mentoring Activities
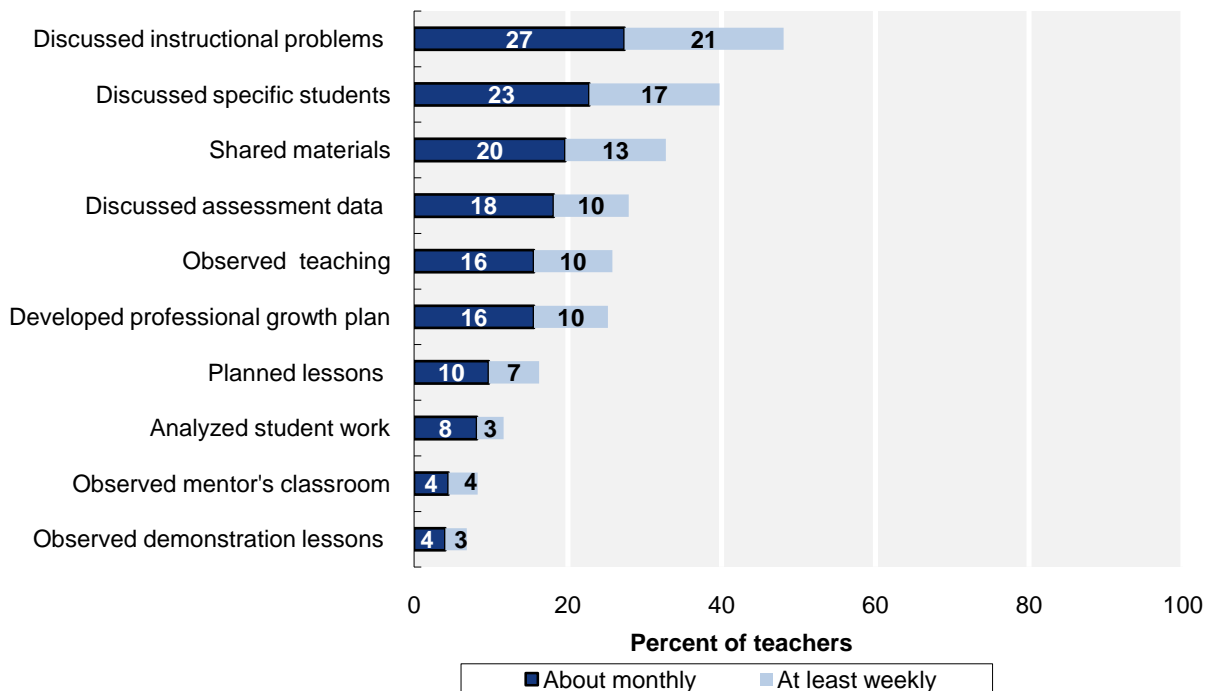
In addition to the low percentages of new teachers reporting regular participation in the activities in Exhibit 2, a considerable number of new teachers never experienced some mentoring activities (Exhibit 3). Notably, the activities the fewest number of teachers experienced were those meant to expose teachers to different models of teaching. Specifically, 63% of the new teachers reported that their mentor never demonstrated a lesson for them in the new teachers' classrooms, and 52% reported that their mentors never invited them to observe the mentors' classrooms.

Exhibit 3
Mentoring Activities Never Experienced

Percent of teachers
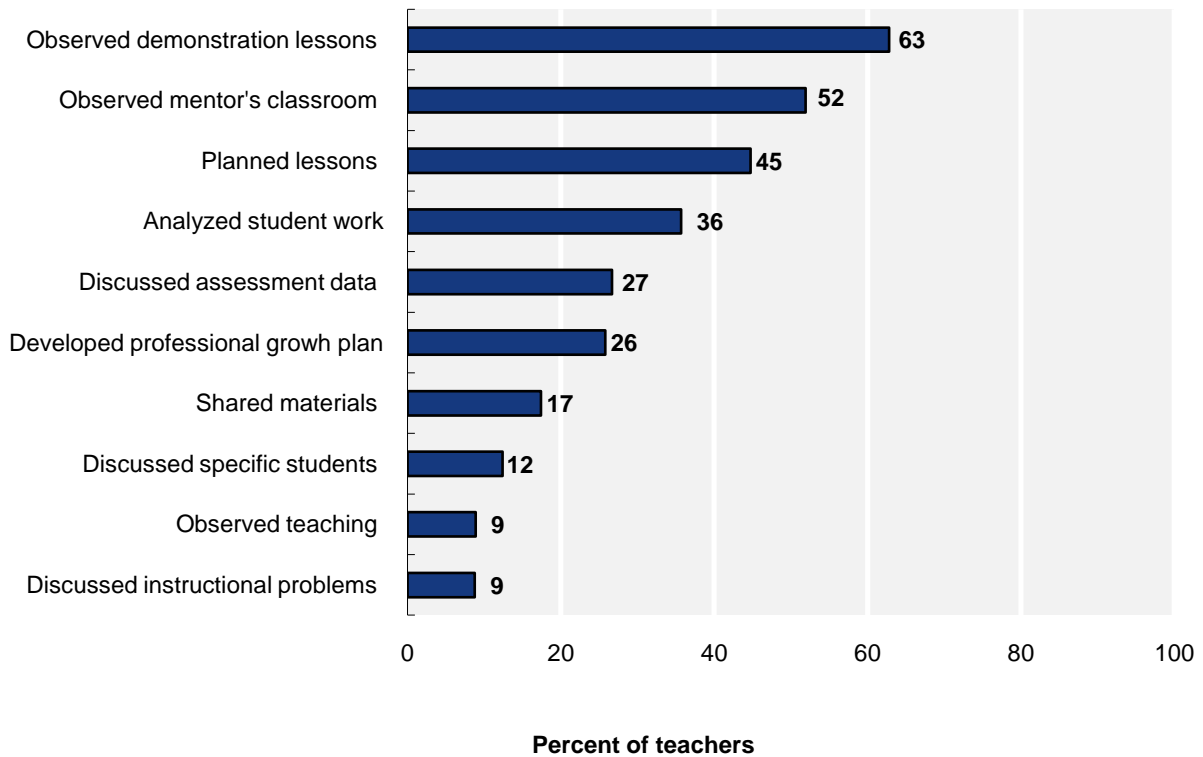
These results, particularly the large percentage of beginning teachers who never had the opportunity to see their mentors demonstrate lessons, observe their mentor's teaching, or jointly plan lessons, suggest a lack of mentor/mentee activities with high potential for improving instructional practice among a considerable number of beginning teachers. Case study data indicated that this was largely a result of the failure of school leaders to provide for such opportunities. Too often, school schedules did not allow for adequate release time during the school day for mentors and mentees to work together on real-time exposure to instructional problems and strategies for improvement. One program has addressed this by allocating mandatory release time (Exhibit 4).

Exhibit 4
Supporting Mentoring Through Release Time

One induction program supports regular interaction between mentors, who are full-time teachers, and mentees by providing the pairs 1.5 hours of mandatory release time every other week. Each mentor/mentee pair determines how to use the time. New teachers described the variety of activities they engaged in during this time, including teaching their own class and being observed by their mentors, observing their mentor conduct a demonstration lesson in the new teacher's classroom, observing their mentors teaching in the mentor's classroom, and observing other teachers in the school or in other district schools. A substitute teacher is available to make the release time possible, and release time across mentor/mentee pairs in a school is coordinated by a staff member at the school. This flexible set-up enables each mentor/mentee pair to request a release time that may vary from week to week so they can observe different class periods or subject areas. Combined with prep periods, the release time creates valuable time for new teachers and their mentors to observe one another in the classroom and to focus new teacher support on real-time classroom situations.

Mentoring, by design, is supposed to be individually tailored to the new teachers' needs; yet, new teachers typically need support in similar areas such as instructional techniques and classroom management. Even so, the mentoring support received varies tremendously across new teachers, both in terms of time and the types of activities mentors/mentees engage in. Clearly, state regulations alone are insufficient to bring some sense of evenness. Program administrators and school administrators need to play an active role to ensure that mentoring is even occurring and that mentoring activities are the types that can support instructional improvement.

Other Induction Supports

Although mentoring often serves as the crux of induction programs, induction comprises other supports, such as new teacher orientations, workshops or other professional development opportunities, and principal meetings for new teachers. Throughout Illinois, new teachers did have a range of such supports as part of their induction programs. Nearly three-quarters of program participants attended an orientation specifically for new teachers: 65% attended an orientation before the start of the school year and 6% attended one after the start of the school year. For a majority of the teachers attending an orientation, it was a multiday event: 15% reported that it lasted 1 week or more and 47% reported that it was multiday but less than a week. Only 38% reported that the orientation lasted 1 full day or less.

In terms of ongoing supports during the school year, 85% of new teachers had the opportunity to attend workshops, seminars, or classes for new teachers, with over one-third (36%) attending this type of professional development at least monthly (Exhibit 5). Another type of support provided is a professional network specifically for new teachers. Nearly two-thirds (62%) of new teachers participated in such networks, 22% at least monthly. Many teachers

(79%) had the opportunity to attend new teacher meetings with their principal, but such meetings occurred infrequently. Only 17% of teachers attended such meetings at least monthly; 62% attended such meetings only once or a few times. The infrequency of new teacher meetings with principals may suggest a potential downside of establishing an induction program—busy principals may assume that the new teachers' needs are being met by others.

Exhibit 5
Supports Other Than Mentoring Provided New Teachers
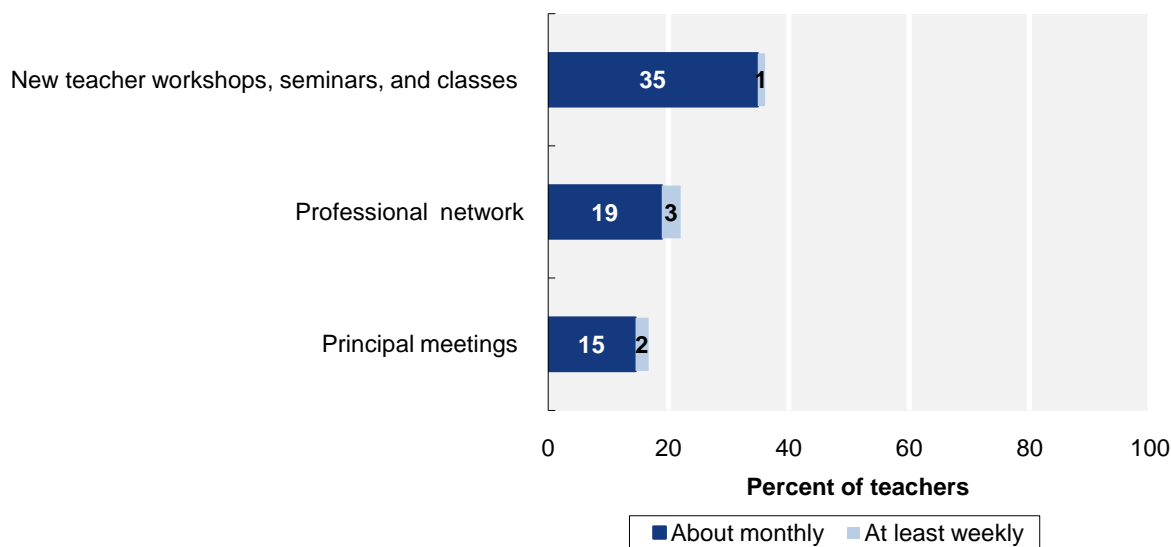
These activities provide new teachers with different types of supports than mentoring. New teacher workshops provide the opportunity to teach content that is necessary for all new teachers. For example, one program focuses new teacher workshops on the district's framework for evaluating teachers. A professional network provides the camaraderie that new teachers seek. It provides a forum for new teachers to share instructional ideas, as well as to voice their successes and share their fears. Principal meetings can forge better working relationships. In interviews, new teachers reported that they felt comfortable going to the principal for information and assistance because they developed strong relationships with him or her during the new teacher meetings. As one new teacher described: "[I] feel really supported by [my principal]. I've gone to her for parent issues and she has really good advice. She is not so intimidating that I don't want to seek her advice, and her criticisms during observations are always positive."

Each of these other induction activities supports new teacher development; yet for a majority of new teachers, they occurred infrequently. For teachers in rural areas, attending workshops and network activities can be a challenge due to the distances between schools and the regional offices of education that run the induction programs. Still, they are important sources of support. Offering a variety of induction supports is within the control of the induction

programs and should not be overshadowed by the mentoring component of induction programs.

Content of Induction

Through all aspects of their induction programs—mentoring, orientation, and other supports—teachers learned about the various aspects of their jobs. Although the content of induction supports varied across new teachers, some topics were more prevalent than others (Exhibit 6). More than two-thirds of new teachers across the state reported that their induction focused on instructional techniques appropriate for the grade level or subject matter they taught (71%), evaluating and reflecting on their teaching practices (70%), creating a positive learning environment (67%), and classroom management techniques (67%). The topics least frequently addressed in the induction programs were instructional techniques to meet the needs of students from diverse cultural backgrounds and instructional techniques to meet the needs of English language learners, experienced by 37% and 22% of new teachers, respectively. This finding has been persistent over the past 3 years (Humphrey, Wechsler, Bosetti, Park, & Tiffany-Morales, 2008; Wechsler, Caspary, & Humphrey, 2008). New teachers report that they are not getting the help they need to meet the needs of diverse students and English language learners.

Exhibit 6
Content of Induction

Topic	Moderately addressed	Extensively addressed
Instructional techniques	46	25
Reflection on teaching practices	42	28
Creation of a positive learning environment	43	24
Classroom management	41	26
Subject matter taught	40	24
Adaptation of instruction for varying academic levels	42	17
Lesson planning	40	17
Use of data	33	13
Use of curricular materials	31	13
Adaptation of instruction for students with IEPs	29	13
Adaptation of instruction for diverse backgrounds	27	10
Instructional techniques for ELLs	15	7

Percent of teachers

■ Moderately addressed ■ Extensively addressed

Programs have a variety of induction activities (e.g., mentoring, orientation, new teacher workshops) to help new teachers with development in a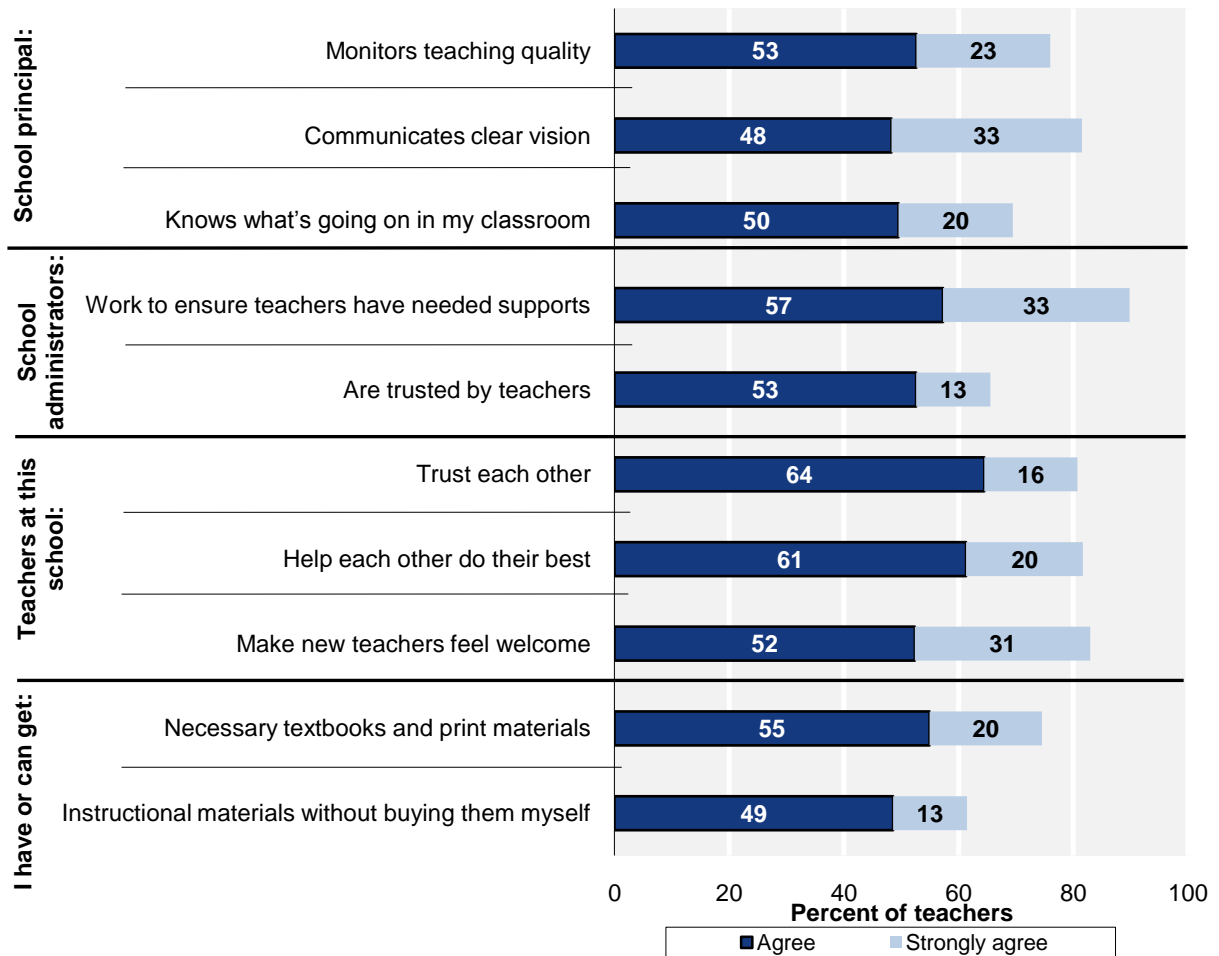 number of areas. But this will happen only with coordination among the activities, which rarely occurs. In nearly all programs we visited, for example, mentors received little direction about what content to cover or how to determine what content to cover. In fact, in most programs the content of mentoring was never discussed beyond the mentor/mentee pair. There is no way to be certain all important content is addressed without such communication. On the other hand, communication and coordination across induction activities can help ensure that induction writ large addresses the many needs of new teachers and does not omit important areas such as differentiating instruction.

School Context

Although generally not considered part of an induction program, a school's context (e.g., level of administrative and faculty support, availability of materials) affects new teachers in profound ways (Humphrey, Wechsler, & Hough, 2008; Wechsler, Caspary, & Humphrey, 2008). Teachers in the induction programs worked in a variety of school contexts—from schools characterized by supportive teaching environments, a supportive administration, and sufficient materials and supplies to schools characterized by unsupportive administrations, unsupportive teaching environments, and a lack of materials and supplies. Therefore, school context and its influence on new teachers—particularly how it contributes to or detracts from teachers' professional growth—must be considered.

Across the programs, 81% of new teachers reported that their principals communicate a clear vision for the school, but only 70% reported that their principal knows what is going on in their classrooms. While nearly all (90%) of new teachers reported that their school administrators work to ensure teachers have the supports they need to be successful, only 66% of new teachers reported that teachers in their school trust the school administration. Many new teachers (83%) reported that the faculty in their schools consciously tries to make new teachers fell welcome, but 17% do not work in such welcoming environments. Only 62% of new teachers reported that they can get instructional materials such as math manipulatives and classroom library books without buying them with their own money. These are just a few of the many aspects of school context, each of which affects teachers on a day-to-day basis. Teachers in weak school contexts have different needs from teachers in strong school contexts and different supports and materials available to them outside the induction program (Exhibit 7).

Exhibit 7
School Context

Category	Statement	Agree	Strongly agree
School principal:	Monitors teaching quality	53	23
	Communicates clear vision	48	33
	Knows what's going on in my classroom	50	20
School administrators:	Work to ensure teachers have needed supports	57	33
	Are trusted by teachers	53	13
Teachers at this school:	Trust each other	64	16
	Help each other do their best	61	20
	Make new teachers feel welcome	52	31
I have or can get:	Necessary textbooks and print materials	55	20
	Instructional materials without buying them myself	49	13

Percent of teachers

■ Agree ■ Strongly agree

Likewise, the professional communities of teachers in schools varied. Research has shown that participation in teacher professional communities can positively affect teachers' skills and knowledge (Vescio, Ross, & Adams, 2008). More than three-quarters of induction participants worked in schools where teachers sought and shared advice about instructional issues and more than half worked together to develop instructional materials or activities at least monthly (Exhibit 8). Fewer induction participants had monthly opportunities to work with their peers to discuss assessment data to make instructional decisions, analyze student work together, or observe each other teaching.

Exhibit 8
Teacher Professional Community

Percent of teachers

■ About monthly ■ At least weekly
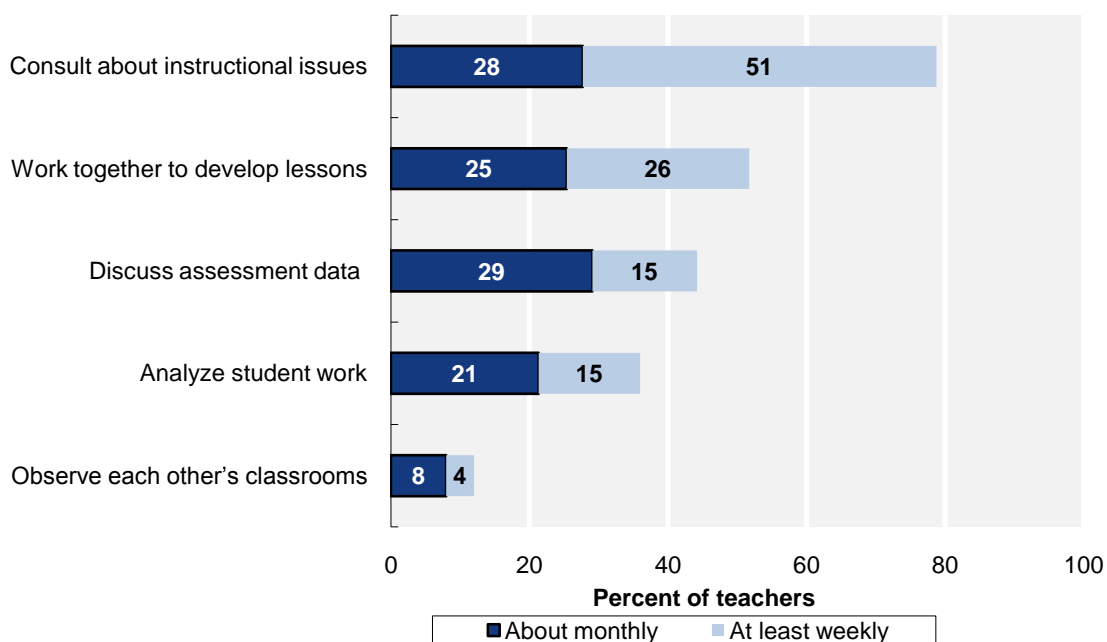
Even within a single school, teachers' experience microcontexts that can vary from supportive to challenging. Consider the cases of Ms. D and Mrs. M, two teachers interviewed for this study. Both Ms. D and Mrs. M were first-year teachers in the same urban elementary school, Manor Elementary.[5] Manor Elementary was struggling to emerge from a long history of low student achievement, had a new principal, and was in the habit of hiring three or four new teachers each year. Both Ms. D and Mrs. M were participating in the district's induction program and had the same mentor. Mrs. K, the mentor, had been teaching for more than 20 years, the last 5 at Manor in second grade. Interviews with Ms. D, Mrs. M, and Mrs. K revealed how much individual teacher's induction experiences can vary even within the same program, in the same school, and with the same mentor.

Ms. D was the youngest teacher in the school and the only African American on the staff. She had graduated from a nearby university where she earned a degree in English and a teaching credential. Although the university's teacher preparation program was highly regarded by Manor's principal and district officials, Ms. D described her preparation experience as unremarkable. Ms. D was a last-minute hire at Manor and missed the district's summer orientation meeting for new teachers. Arriving to the school a few days before the start of the school year, she was assigned to teach a fifth-grade class and directed to an empty classroom in the basement at the end of a long hallway. When asked about the mentoring she received, Ms. D reported that she met with Mrs. K only a few times over the course of the school year. Mrs. K

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[5] Although these are real examples from our case study work, we have changed the teachers' initials and Manor Elementary is a pseudonym.

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concurred and acknowledged that she should have done more to help Ms. D but could not help with the fifth-grade curriculum. Mrs. K also reported that Ms. D's room was far away from hers and that they rarely saw each other. Ms. D reported that she complained to the principal about the lack of support she was receiving, but nothing had been done to improve the situation. Ms. D told us she was applying for a teaching job in a different school and would consider moving to another district.

In contrast, Mrs. M was coming to teaching after a brief career in business and 10 years of raising a family. She earned her credential from the same local university as Ms. D but believed that she had been extraordinarily well trained. She reported that her great advantage was that she had an extended student teaching experience in Mrs. K's classroom followed by a stint as a part-time aide at Manor. In June, Mrs. M was hired as a full-time teacher and spent much of the summer preparing her classroom and planning her curriculum. Mrs. M was assigned to teach second grade and was given a classroom next door to Mrs. K. Both Mrs. M and Mrs. K reported that they have hourly informal contact and regular daily meetings after school to debrief on the day and plan together. The school principal told us that Mrs. M was the strongest beginning teacher he had encountered.

Because of the location of her classroom and her particular teaching assignment, Mrs. M became part of a strong professional community enhanced by her induction program. For the very same reasons, Ms. D found herself isolated and unable to access the support of her mentor. Their individual microcontexts provided very different learning opportunities. At a school level or an individual level, context matters and needs to be included in any equation of induction inputs.

Summary of Supports Provided to New Teachers

As the quantitative and qualitative data illustrate, the induction provided to new teachers is variable. Some teachers engage in worthwhile activities such as having a mentor observe their instruction and provide feedback, but others do not. In fact, many new teachers do not even meet with their mentor on a regular basis, falling far short of the state's requirement for mentor support. While some new teachers have access to a range of supports including workshops or principal meetings, others do not. While some teachers' induction covers such topics as how to adapt instruction to various student populations, other teachers' induction does not. Furthermore, some teachers work in schools with positive contexts characterized by strong professional community and supportive administrators, and others work in challenging environments with little support from the faculty or administration. Even within the same school, teachers' microcontexts range considerably. The question raised, then, is whether these differences in induction and context matter to teachers and their outcomes. We turn to this question next.

IV. Outcomes Related to Teacher Induction

As explained in Section III, the induction experiences of new teachers varied considerably relative to the frequency and activities of mentoring, the availability of additional induction supports, and the overall content of induction. In addition, the school contexts in which they worked ranged from extremely supportive to extremely challenging. Of interest is which of these factors influenced outcomes for induction participants.

From the spring 2009 teacher survey, we created several composite indicators of induction inputs, including the intensity of mentoring and the extent to which induction focused on instruction.[6] We also examined the variety of induction activities other than mentoring—new teacher meetings with the school principal; workshops, seminars, or classes for new teachers; release time to see other teachers teach; and participation in a professional network specifically for new teachers—comparing teachers who participated at least once in each of these induction activities with those who did not. Further, we created a composite measure of school climate that integrated instructional leadership, principal support, teaching environment, and the availability of materials.

We analyzed the contribution of these inputs to the outcomes of teacher efficacy, reported growth, and retention. We used ordinary least squares regression to examine the relationship between the outcomes of teacher efficacy and teacher-reported growth and the induction inputs of intensity of mentoring, the focus on instruction, the variety of induction supports, and teachers' school context. We used logistic regression models to examine the variation in district and school retention by induction and context inputs.[7] All analyses controlled for teacher background characteristics: demographic factors (gender and ethnicity), assignment (secondary or elementary school teacher, dedicated English language learner or special education teacher, and percentage of students the teacher reported created serious behavior problems in class), and preparation and experience (alternative certification, highest degree earned, previous classroom and other experience, and year in the induction program). We conducted a separate analysis of student achievement, described later.

Intensity of mentoring and focus on instruction were positively correlated, and there were smaller positive correlations between school context and these factors[8]; therefore, we constructed a baseline model with only teacher characteristic and assignment variables and the school context factors and then entered the intensity of mentoring and focus on instruction factors into the models separately to understand their individual contributions to the outcomes. We also created one model with all the school context and program variables to understand the cumulative effect of participation in induction. The models compared outcomes

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[6] For more information about the creation of measures, see Appendix A.

[7] The full results of these regression models are presented in Appendix B.

[8] The Pearson's correlation between intensity of mentoring and focus on instruction was r = .60 in the nonmissing sample of 1,585 teachers. School context had a Pearson's correlation of r = .32 with focus on instruction and .25 with intensity of mentoring

for teachers[9] in strong and weak school contexts compared with those in average school contexts; they also compared the outcomes of teachers who received strong mentoring and those who received weak mentoring, of teachers whose induction activities had a strong as opposed to a weak focus on instruction,[10] and teachers who had a variety of induction supports as opposed to those without a variety of supports. Below, we present the analysis for each of the outcome variables.

Teacher Efficacy

One outcome variable we analyzed was teachers' self-efficacy, a teacher's belief in his or her ability to be effective, a characteristic that is important to foster early in the career (Darling-Hammond, Chung, & Frelow, 2002). Reviewing the literature on teacher efficacy, Tschannen-Moran, Hoy, and Hoy (1998) reported that self-efficacy has been found to be related to student achievement, motivation, and students' sense of efficacy.

We found relatively high levels of teacher efficacy (Exhibit 9). Nearly all teachers (99%) reported having confidence in their ability to teach. Nearly all teachers also were confident in their classroom management skills (96%) and their ability to redirect students who become disruptive and noisy (96%). Teachers were least confident in their ability to address the needs of English language learners (57%), although this percentage was higher when we considered only those teachers who had English language learners (ELL) in their classes.

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[9] The teacher demographic, assignment, and preparation and experience variables were grand-mean centered so that the intercept derived from the regression model represents the predicted mean for the average teacher in the sample on each of these factors.

[10] We also compared predicted outcomes for teachers in the top and bottom quartiles on these composite measures; for all outcomes and models, the sign and significance level of the main effects for school context and all induction supports were identical to those presented here.

Exhibit 9
Teacher Efficacy

Teacher reports being able to:

Category	Agree	Strongly Agree
Teach effectively	53	46
Handle challenging student behavior	57	39
Redirect disruptive students	60	36
Address needs of diverse backgrounds	55	39
Adapt instruction for varying academic levels	62	31
Assess appropriateness of assignment difficulty level	69	24
Reach unmotivated students	60	29
Increase students' retention of material	67	21
Address needs of special education students	58	24
Address needs of ELL students	43	14

Percent of teachers

■ Agree   ■ Strongly Agree

We created a composite measure of teacher self-efficacy that included items addressing efficacy in instruction and classroom management and excluded items addressing efficacy in meeting the needs of specific student populations (e.g., special education and ELL students) or different racial/ethnic groups.[11] In the models for teacher efficacy, we included a composite measure of how much support teachers reported needing over the entire school year in a variety of areas as a baseline measure of their sense of need.

A focus on instruction and a variety of induction activities, as well as school context, were associated with teacher self-efficacy (Exhibit 10). The mean self-efficacy score in the regression analysis sample was 3.23 on a scale of 1 (strongly disagree) to 4 (strongly agree). Without considering the receipt of any induction supports, a teacher in a strong school had a predicted mean efficacy score of 3.52, while a teacher in a weak school had a mean predicted score of 3.11, after controlling for teacher background demographics, assignment, preparation, experience, and reported initial level of need.[12] A focus on instruction also was associated with higher levels of teacher self-efficacy. Teachers who reported that their induction activities including mentoring had a strong instructional focus had a mean predicted self-efficacy level of 3.38, compared with 3.16 for teachers who reported a weak focus on instruction across all their

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[11] See Appendix A for items included in the measure.
[12] $F = 85.31$, $df_{num} = 1$, $df_{den} = 1568$, $p < .01$

induction supports.[13] Similarly, teachers who reported participating in a variety of induction activities other than mentoring reported slightly higher levels of self-efficacy than those who did not, with a mean score of 3.27 compared with 3.21, respectively.[14] The predicted mean self-efficacy score for a teacher who received strong mentoring was 3.33, compared with 3.24 for one who received weak mentoring, a difference that was marginally significant.[15]

Exhibit 10
Predicted Mean of Teacher Self-Efficacy
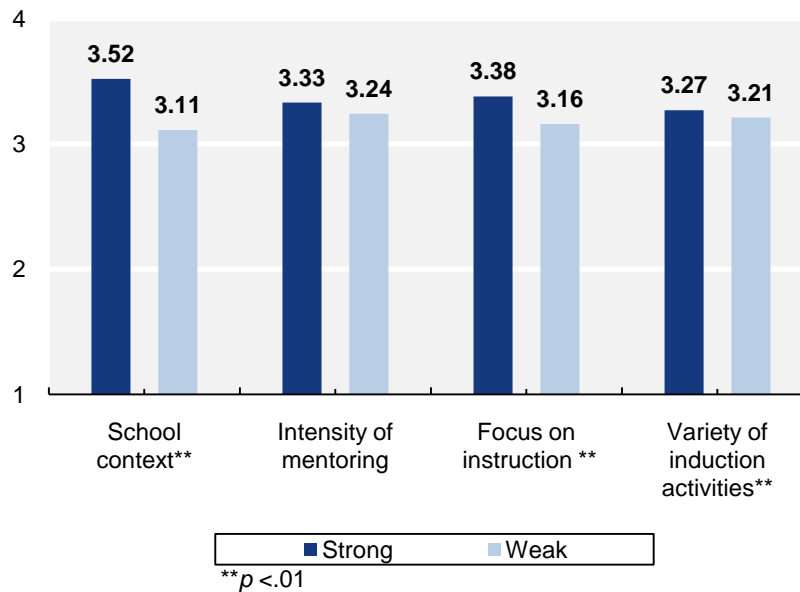
Reported Growth

We also analyzed teachers' self-reports of professional growth, another indicator of the contributions of induction. We asked about growth in their instructional and assessment techniques, classroom management, subject-matter knowledge, and their ability to meet the instructional needs of special student populations. Obviously, there are limitations to self-reports, but they do provide insights into what the participants believe they gained from their induction programs. In general, teachers indicated that the induction supports they received improved their knowledge and skills (Exhibit 11). Specifically, more than two-thirds of the teachers reported that their induction supports increased to a moderate or great extent their ability to evaluate and reflect on their own teaching practices (67%), their knowledge of instructional techniques appropriate for their teaching assignment (66%), and their ability to create a positive learning environment (66%). The areas in which the fewest teachers reported growth were in their ability to meet the instructional needs of students from diverse cultural

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[13] $t = 5.37, p < .01$
[14] $t = 3.19, p < .01$
[15] $t = 1.93, p = .054$

backgrounds (38%) and their ability to meet the instructional needs of English language learners (25%).

Exhibit 11
Teacher-Reported Growth
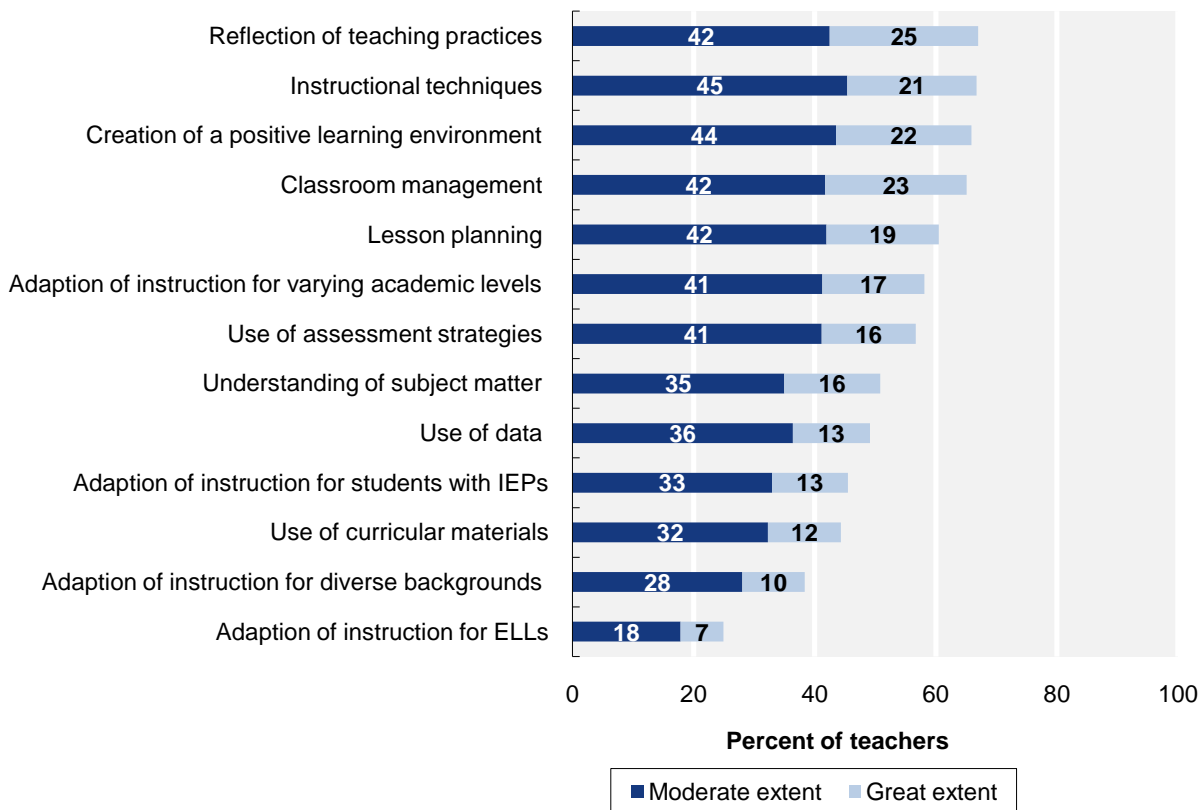
We created a composite measure of reported growth that included items addressing growth related to general instructional competencies and excluded those addressing skills for meeting the needs of particular student populations or interacting with parents.[16]

Teachers working in positive, strong school contexts and those who reported receiving a variety of induction supports reported greater improvement in their instructional practice (Exhibit 12). The mean reported level of growth in the regression analysis sample on the composite measure was 2.64 on a scale of 1 (not at all) to 4 (great extent). In strong school contexts, the mean predicted growth score was 3.09, compared with 2.22 for weak school contexts.[17] Similarly, the mean predicted growth score for a teacher who reported strong mentoring was 3.10 compared with 2.18 for one who received weak mentoring.[18] The contrast was the greatest for teachers who reported a strong focus on instruction across all their induction supports compared with

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[16] See Appendix A for items included in the measure.
[17] $F = 125.86$, $df_{num} = 1$, $df_{den} = 1569$, $p < .01$
[18] $t = 11.96$, $p < .01$

those who reported a weak focus: 3.37 and 1.65, respectively.[19] Finally, the mean predicted level of growth was higher for teachers who received a variety of induction supports at least once (2.80) compared with those who did not (2.54).[20]

Exhibit 12
Predicted Mean of Teacher Growth
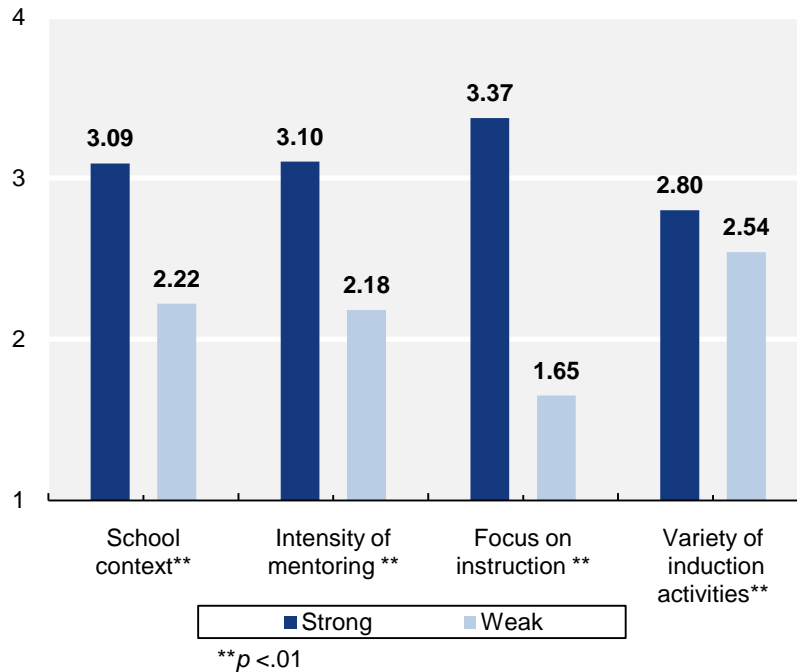
Retention

A third outcome we analyzed was teacher retention. We tracked retention at the district and school levels from fall 2008 to fall 2009. Of the 2,700 teachers who participated in the 39 Illinois induction programs in 2008–09, 2,079 were still teaching in the same school in fall 2009 and 2,268 were still teaching in the same district.

Budget cuts resulting from the economic downturn that intensified through the end of 2008 and into 2009 forced some districts to lay off teaching staff for the 2009–10 school year. In an effort to account for these circumstances, we requested information about whether teachers left as a result of reductions in force. There was considerable variation among programs in whether their participants experienced layoffs, with 16 programs reporting no reductions in force and one program reporting that all their beginning (first-, second-, third-, and fourth-year teachers) were notified in spring 2009 that they had been laid off or possibly released for the next school year.[21] Across all 39 programs, 160 participating teachers were laid off (6%),

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[19] $t = 28.17$, $p < .01$
[20] $t = 7.18$, $p < .01$
[21] Eight of the 27 teachers (29.6%) in this induction program were subsequently retained.

although five programs were not able to distinguish consistently between teachers who left because of reductions in force and those who left for other reasons. We calculated separate school and district retention rates that excluded teachers who had been laid off from both the numerator and denominator. Excluding these layoffs, 82% of participating teachers returned to the same school and 84% remained teaching in the same district, with school retention at or above 69% for all programs and district retention at or above 73% for all programs.

We modeled school retention and district retention separately. The sample of 1,585 beginning teachers excludes teachers for whom we did not have all the variables in the models and those who were laid off.

School context was a significant predictor of a teacher's remaining at the same school. The predicted odds of teachers remaining at the same school were 2.05 times higher if they were working in a strong school context as opposed to an average school context and 4.65 higher if they were working in a strong school context as opposed to a weak school context. None of the induction program measures, on their own or in combination, emerged as significant predictors of school retention.

School context was also a significant predictor of a teacher's remaining in the same district. We use this as an imprecise proxy for staying in the field of teaching, recognizing that in this formulation teachers who move to teaching positions in other districts are combined with those who leave teaching altogether. The predicted odds of teachers remaining in the district were 2.96 times higher if they were working in a strong school context than an average school context and 6.71 times higher if they were working in a strong school context as opposed to a weak school context. Again, none of the induction program measures predicted district retention.

These findings on retention need to be considered in light of the economic climate in Illinois. With the unemployment rate up to 11.1% (Illinois Department of Employment Security, 2010), it is hard to imagine that teachers are making decisions about continued employment primarily on the basis of their induction programs. In fact, even though induction program inputs did not emerge as predictors of teacher retention, the overall teacher retention rate in this study is higher than that in cites in other research. Analyzing 35 years of state data from Illinois, DeAngelis and Presley (2007) found that 27% of new teachers left teaching in Illinois public schools and did not return. In contrast, only 16% of teachers in our study did not return to their same district, and it is possible that they moved to another district but remained in the teaching profession. We do not know whether these higher retention rates are due to the economic climate or to an aspect of induction that we were not able to measure. Nonetheless, the higher retention rates do suggest this is an area that merits further exploration.

Student Achievement

To examine the effects of new teacher induction on student achievement, we compared mean student test scores for teachers in Chicago Public Schools who reported participating in an induction program with those of teachers who experienced no induction. We focused on

Chicago Public Schools because we were able to link students' test scores to teachers in the district.

Our examination of the link between induction support and student achievement may be more informative about the logistical challenges of an analysis of student achievement than about the effectiveness of new teacher induction. First, building a dataset that enabled us to link teachers' participation in induction to their students' test scores proved difficult: The number of novice teachers for whom we were able to obtain complete data was smaller than expected, limiting the power of our analysis. Second, we were unable to validate our classifications of high- and low-intensity induction, causing us to rethink our original analysis design. We had planned to compare teachers participating in the Chicago New Teacher Center (CNTC) induction program with teachers participating in other induction programs in the district. CNTC provides first- and second-year teachers with full-time, trained coaches who work with them in their classrooms; monthly professional development aligned with the needs of beginning teachers; networking events; content-specific professional development; and online forums. We assumed that teachers in this model received more intensive induction than teachers in other induction programs. This distinction was muddled, however, when considering teacher support from other sources, too, as described below. Third, to increase the number of teachers we could include in the analysis, we sacrificed the survey responses that provided us with teacher background characteristics, such as their level of education and prior experience, and thus could not control for these factors in our final models.

Data Challenges

Building a dataset that would allow us to examine the relationship between teachers' participation in induction and their students' growth as measured by their gain scores from 2008 to 2009 on the Illinois Standards Achievement Test was a challenging undertaking.

Sample size. Although there were more than 1,000 first- and second-year teachers in Chicago Public Schools during the 2008–09 school year, only a small fraction could be included in the analysis of student achievement—novice teachers in self-contained fourth through eighth grade classrooms who responded to the Consortium on Chicago School Research (CCSR) Elementary School Teacher survey and provided the room number information needed to link their responses to their students' tests scores.

The Illinois Standards Achievement Test (ISAT) is administered only in grades 3 through 8, so we limited our analysis to teachers in grades 4 through 8 to allow for the inclusion of test scores from the previous year. In addition, we included only teachers in self-contained classrooms of 10 to 40 students. We relied on teachers' responses to the 2009 CCSR Elementary School Teacher Survey to classify their participation in induction, but only about half of the respondents to this survey provided the room number information needed to link their survey responses to their students' scores. Initially, this left us with only 15 teachers who reported

participating in induction run by CNTC to include in the analysis.[22] Because we had planned to compare teachers participating in high-intensity induction, defined as CNTC-run induction, with those in low-intensity induction, we obtained roster data directly from CNTC to augment this number. Even with the CNTC data, we were left with 175 novice teachers, 165 of whom reported participating in induction; 99 of them were in CNTC induction. After we had excluded all teachers missing data on any of the variables used in the analysis, our sample was reduced to just under 100 novice teachers, only 10 of whom reported that they did not participate in induction in the 2008–09 school year. These small numbers hampered our ability to detect any true underlying effects of induction.

Classification of induction. In our original research design, we had planned to contrast student achievement for teachers who experienced high- and low-intensity induction, with high-intensity induction defined as participation in induction offered by the CNTC and low-intensity induction defined as participation in other induction programs or no induction in the 2008–09 school year. However, several factors clouded this distinction. First, CPS has invested heavily in induction over the past few years, with the goal of increasing the intensity of all supports for new teachers districtwide. In addition, CNTC has become a much more visible and significant provider in Chicago Public Schools since 2006. Not only does it support beginning teachers across the city, but it also trains many of the mentors in other induction programs in the district. Consequently, not much variation may exist between the supports that CNTC provides its beginning teachers and those for beginning teachers mentored by non-CNTC coaches. Indeed, our efforts to validate this categorization suggest that the distinction may not be so clear.

Although we had no way to directly compare the intensity of mentoring or other supports experienced by CNTC induction participants and by teachers who received other induction, we did examine the percentage of teachers in each group who reported receiving mentoring from *any* source (not necessarily from their induction program), as reported on the 2009 CCSR Elementary Teacher survey.[23] Within the sample of 175 teachers described above, we found no significant differences between the percentage of CNTC teachers (our original high-intensity category) who reported receiving support from a mentor, coach, or master teacher compared with teachers who participated in other induction or no induction (our original low-intensity category); 85% of CNTC teachers compared with 84% of other induction participants reported receiving this kind of support (Exhibit 13).

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[22] The 2009 CCSR Elementary Teacher Survey referred to CNTC as the Chicago New Teacher network rather than the Chicago New Teacher Center, which may have resulted in teachers misclassifying their induction program.

[23] This corresponds to item spt22q06 on the 2009 CCSR Elementary Teacher Survey, http://ccsr.uchicago.edu/ downloads/2009/Elementary_Teacher_Survey_09Cdbk_8-6.pdf.

Exhibit 13 New Teachers Receiving Support from a Mentor, Coach, or Master Teacher: CNTC v. Other or No Induction					
	CNTC	**Other or No Induction**	**Total**	**χ**	**p**
N	40	73	113	0.04	.84
Received support from mentor, coach, or master teacher	85%	84%	84%		
Did not receive support from mentor, coach, or master teacher	15%	16%	16%		

We observed a greater contrast between the percentage of teachers in any induction program who reported receiving mentoring compared with those in no induction program: 88% compared with 40%, respectively (Exhibit 14). Because no strong evidence supported our distinction between high- and low-intensity induction, we focused on comparing student achievement for teachers who participated in any induction program compared with those receiving no induction. We used a parallel model contrasting high- and low-induction as originally conceived and found no differences in mean student achievement.

Exhibit 14 New Teachers Receiving Support from a Mentor, Coach, or Master Teacher: Any Induction v. No Induction					
	Any Induction	**No Induction**	**Total**	**χ**	**p**
N	103	10	113	15.91	<.01
Received support from mentor, coach, or master teacher	88%	40%	84%		
Did not receive support from mentor, coach, or master teacher	12%	60%	16%		

Although the contrast of any with no induction appears to more accurately distinguish between the actual level of mentoring (if not other supports) received by new teachers, this alternative classification is not without its difficulties. Because Chicago Public Schools is supposed to provide induction support for all its novice teachers, this small group of first- and second-year

teachers who reported that they received no induction support is puzzling. Possibly, they were more experienced teachers who incorrectly checked that they were in their first or second year on the survey, or they were indeed novice teachers but were deemed not to need induction support for some reason, such as extensive experience as a teacher's aide. It would be interesting to compare these groups on such factors as prior experience, but we do not have the data for this analysis.

Teacher-level factors. In an effort to increase the number of CNTC teachers in the analysis, we requested data directly from CNTC that would enable us to include novice teachers it serves even if they had neither responded to the Elementary Teacher survey nor provided the room number information needed to link their responses to their student test scores. While these administrative data did augment the number of CNTC teachers we could link to their students' test scores, the increased number came at a cost. Because we do not have CCSR survey data for these additional CNTC novices, we were no longer able to include teacher-level background variables such as prior experience and level of education in our models predicting mean student achievement. It is plausible that some of these teacher background characteristics would be associated with both intensity of induction, defined by induction program participation, and with student outcomes, in which case their omission would bias our estimates.

Results

Our final models used students' 2008 tests scores as well as their grade level and race, their teachers' participation in induction during the 2008–09 school year, school characteristics such as concentration of poverty and crime, and school-level faculty features such as trust between teachers and the level of collaboration on the staff to predict students' spring 2009 test scores. We found no significant differences between mean student achievement in either mathematics or reading for teachers who reported participating in any induction program and for those who reported no induction. We also contrasted mean student achievement for teachers participating in CNTC and for those receiving other or no induction, our original analysis design, and found similar results. See Appendix C for complete results of this analysis for mathematics scores.

Summary of the Outcomes

Exhibit 15 summarizes the results of this examination of the relationship of school context and various elements of the induction programs with the outcomes of teacher self-efficacy, reported growth, and teacher retention.

Exhibit 15 Summary of Significant Predictors by Outcome				
	Teacher Self-Efficacy	Reported Growth	District Retention	School Retention
School context	X	X	X	X
Intensity of mentoring		X		
Focus on instruction	X	X		
Other induction activities	X	X		

Note: Student achievement is excluded from this summary table because the student achievement analysis was conducted using a secondary database and could not be tied to the input variables summarized in the table.

This research strongly suggests that teacher induction, as practiced in the 39 programs in Illinois, makes important contributions to new teachers' sense of efficacy and their professional growth. However, we did not find a link between the Illinois induction programs and improved teacher retention. Further, we did not find a statistically significant difference in student achievement gains among beginning teachers receiving any induction and beginning teachers receiving no induction.

V. Creating Strong Support for New Teachers

This research has demonstrated that strong induction programs—those characterized by intense mentoring, a strong focus on instruction, and a variety of supports—can positively affect new teacher's self-efficacy and their reported growth. It also has shown that school context can support or interfere with teachers' growth and that school context, not induction supports, influences teacher retention—at least in bad economic conditions. These findings raise two important questions: What contributes to strong induction programs? and What else needs to be done to provide strong support for new teachers?

Creating Strong Induction Programs

We found that programs that have more control over their mentors, programs with full-time release mentors, and single-district programs are more likely to have more intense mentoring and a stronger focus on instruction—two contributors to the positive outcomes of teacher efficacy and teacher-reported growth. We describe these findings here. Note, however, that we are not suggesting that all programs should have full-time release mentors or be single district. Rather, we suggest that programs that are not organized in these ways should pay more attention to creating the conditions for strong new teacher support. This idea is discussed more below.

Mentor Controls

Induction programs may influence the quality of mentoring for new teachers through three controls: mentor selection, training and ongoing support, and accountability. We examined the relationship between these program controls and the intensity of mentoring provided to new teachers and the focus on instruction.

Mentor Selection. The process for selecting mentors varies considerably across programs. One induction program, for example, which relies on full-time release mentors, has a competitive application process that requires short essay responses, a principal recommendation, a minimum of 5 years of experience, tenured status, and an "excellent" rating on the most recent teacher evaluation. In contrast, another program has no requirements; instead, individuals either volunteer to be mentors or they are recommended by their principals. Across Illinois, to become mentors 41% had to have a minimum number of years of teaching, 40% had to complete a mentor training program, and 30% had to formally apply (Exhibit 16). The least frequently reported requirements for becoming a mentor were observation of the would-be mentor's classroom (13%) and an interview (13%).

Exhibit 16
Mentor Selection Requirements

Requirement	Percent of mentors
Minimum number of years teaching	41
Mentor training program prior to selection	40
Formal application	30
Recommendation	22
Classroom observation	13
Interview	13
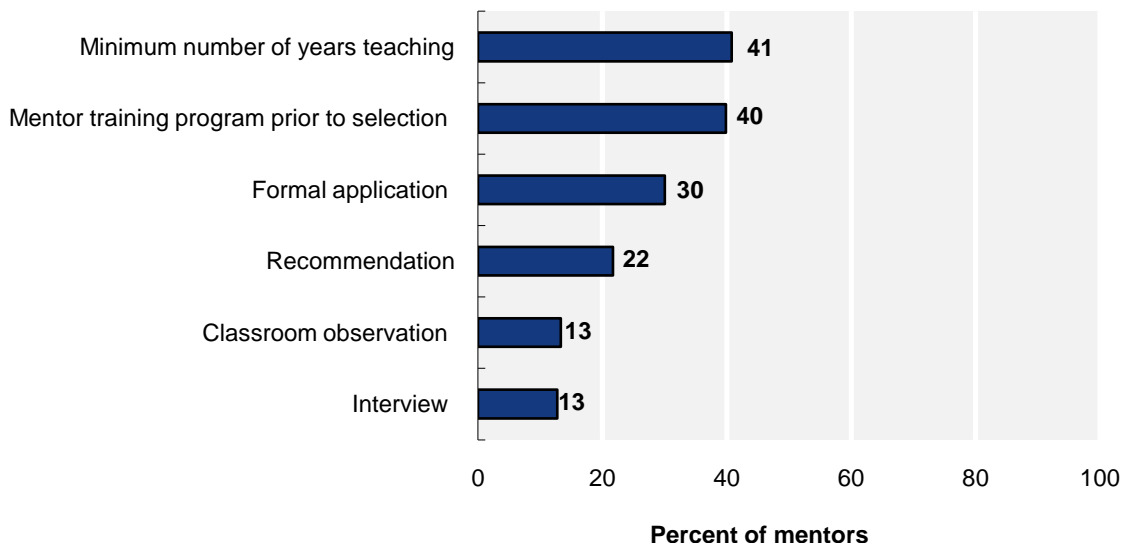
We differentiated between a selective process that involved some kind of formal application or review of the candidate mentor's qualifications and a less selective process whereby teachers were tapped to serve as mentors. We classified the mentor selection process as high if mentors reported that they were required to do at least two of the following: formally apply, be interviewed, have their classroom observed, submit a recommendation, or successfully complete a mentor training program. Across all mentors, only one-third (33%) experienced selective mentor requirements.

Mentor training. The training mentors receive likewise varies. Nearly all mentors (92%) attended an initial training session to be a mentor. The timeliness of this training varied, however. Of those who received training, only 57% were trained before they met their mentees. The intensity of the training also varied (Exhibit 17). The majority of mentors (67%) attended an initial training that was longer than a day. The other 33% attended an initial training that was a day or less. After the initial training, most mentors received ongoing training and support throughout the school year in the form of workshops, meetings, or consultations. Although more than half of the mentors (56%) received ongoing support only once or a few times, 35% received such support at least monthly. Ten percent, however, never received any ongoing support.

Exhibit 17
Mentor Training and Ongoing Support
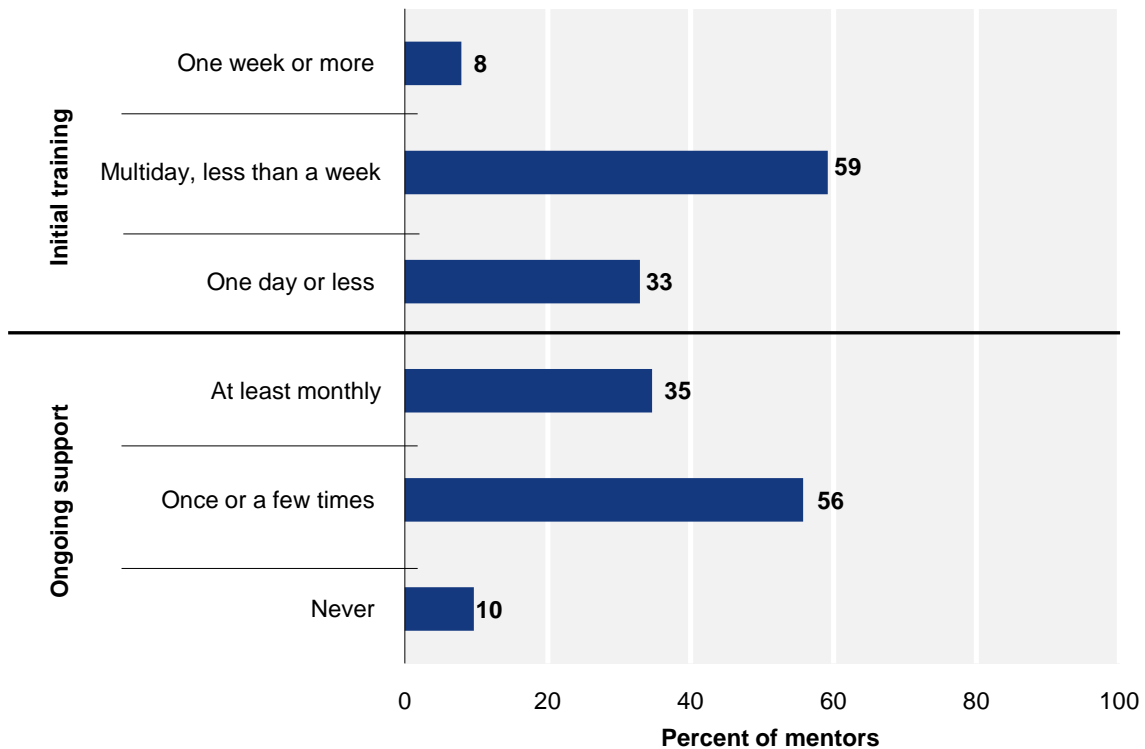
We distinguished between mentors who received initial training of more than a few hours and some ongoing support and those who received less initial training and support. We classified mentors' training and support as high if they attended an initial training session of more than 4 hours that occurred either before or at the same time as they met their beginning teacher and if they received additional ongoing support for their mentor role at least a few times over the course of the year. Only one-quarter (25%) of all mentors received a high level of training and ongoing support.

Mentor accountability. The third aspect of mentor control is accountability, the formal mechanisms through which mentors communicate to program administrators about their mentoring activities. In general, few mentors are held tightly accountable for their work (Exhibit 18). Across all mentors, 35% are required to submit logs of hours spent with their beginning teachers at least monthly, and 28% are required to submit written summaries of meetings with their mentees at least monthly. Even less prevalent are submitting a written summary of goals for mentoring and submitting written formative evaluations of the new teachers, required at least monthly for 11% and 9% of mentors, respectively.

Exhibit 18
Mentor Accountability Requirements

Percent of mentors

■ About monthly   ■ At least weekly

	About monthly	At least weekly
Log of mentoring hours	21	14
Summaries of mentoring meetings	18	10
Summary of mentoring goals	10	1
Formative evaluation	8	1
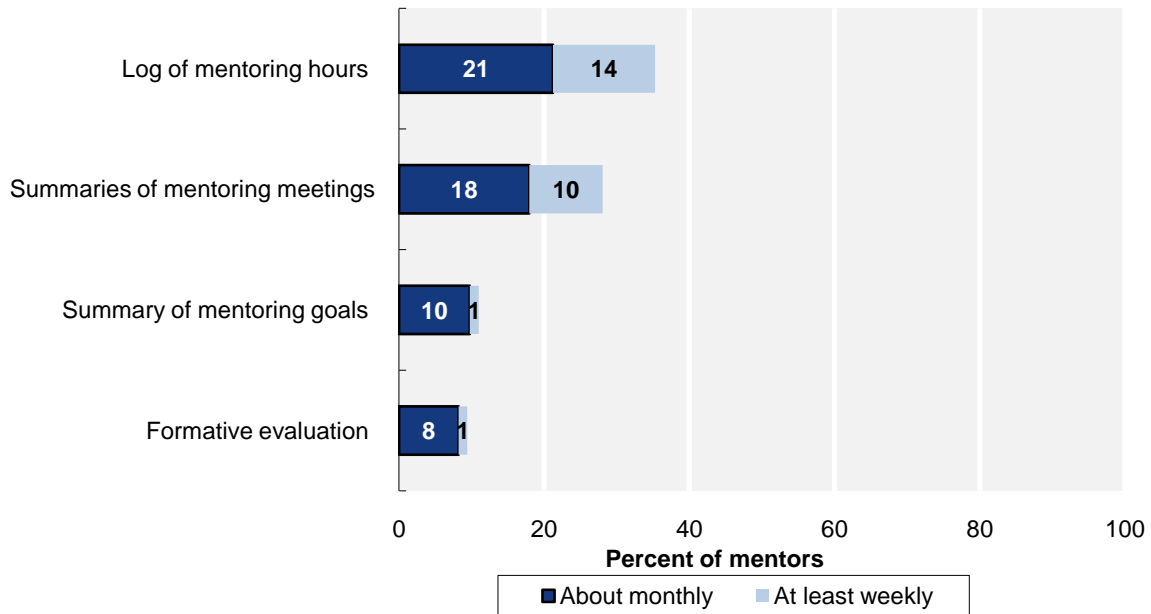
We distinguished between mentors who submitted some kind of initial documentation of their plan for the year and follow-up documentation of their mentoring activities and those who did not. We classified mentors' accountability as high if they reported submitting a formative evaluation or summary of goals for their beginning teacher at least once *and* a log of hours or meeting summary at least a few times. Half (50%) of mentors had high accountability requirements.

Effect of mentor controls on mentoring. Each of the three mentor controls affects induction. The aspects of induction we examined—intensity of mentoring and focus on instruction—are parallel to measures from the teacher survey presented in Sections II and III but are reported here from the perspective of the mentor.

We found that the mean intensity of mentoring reported varied by the three program controls (Exhibit 19). The mean intensity of mentoring on a scale of 1 (never) to 5 (at least weekly) was 2.96. Mentors who went through a more selective process had a mean intensity of mentoring score of 3.14, whereas mentors selected through a less rigorous process had a mean score of 2.87. The mean intensity of mentoring score for mentors with a high level of training and support was 3.22, compared with 2.87 for those who received a low level of training and support. Mentors who reported that they had high accountability requirements had a mean intensity of mentoring score of 3.12, compared with 2.80 for mentors who reported low accountability requirements.

Exhibit 19
Mean Intensity of Mentoring by Program Control

*p <.05
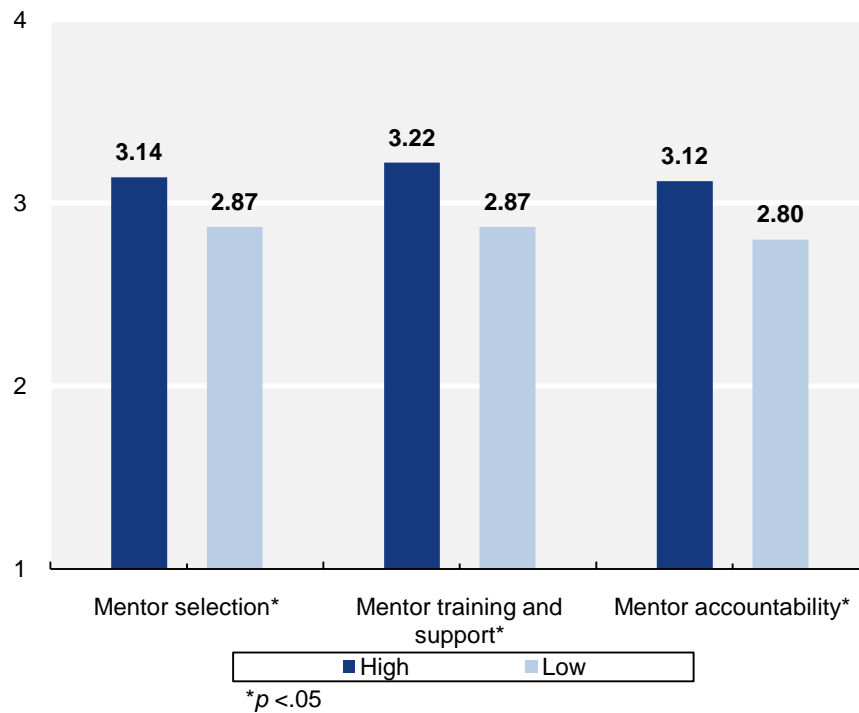
Similarly, mentors who were classified as high on the program controls also reported a greater focus on instructional issues than those who were classified as low (Exhibit 20). The mean focus on instruction on a scale of 1 (not addressed) to 4 (extensively addressed) was 2.90. Mentors who went through a highly selective process had a mean focus on instruction score of 3.08, compared with 2.81 for mentors who were not selected through a rigorous process. Similarly, the mean focus on instruction score for mentors who received high training and support was 3.14 compared with 2.82 for those who did not. The mean focus on instruction score was higher for mentors with high accountability than for mentors with low accountability requirements, 3.00 and 2.70, respectively.

Exhibit 20
Mean Focus on Instruction by Program Control

*p <.05
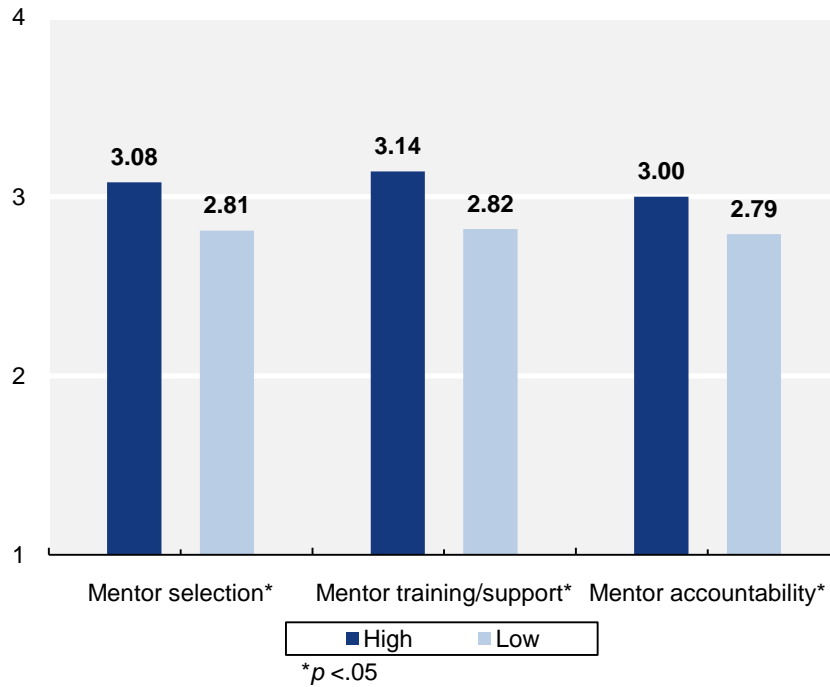
In sum, mentors who reported going through a selective process, who received more training and support, and who were more accountable for communicating with program administrators about their mentoring activities also reported, on average, greater intensity of mentoring and more focus on instruction—two of the factors that create strong induction programs.

Mentor Model

No two induction programs are identical, but they do fall into either the full-time release model or teacher-as-mentor model. In the full-time release model, teachers are relieved of their teaching duties to serve as mentors; in the teacher-as-mentor model, full-time teachers are relied on to serve as mentors. The full-time release model is not always feasible or advantageous, but beginning teachers in full-time release model induction programs experienced higher intensity mentoring and a stronger focus on instruction compared with beginning teachers in teacher-as-mentor models. The mean intensity of mentoring for teachers in full-time release models was 2.92, compared with 2.71 for teachers in teacher-as-mentor models (Exhibit 21). Likewise, the mean intensity of mentoring for teachers in full-time release models was 2.98, compared with 2.72 for teachers in teacher-as-mentor models.

Exhibit 21
Comparison of Full-Time Release and Teacher-as-Mentor Models

*p <.05
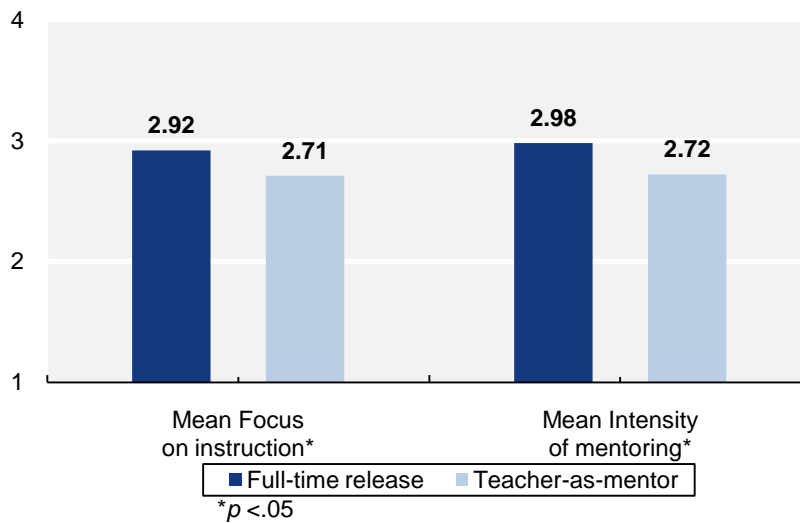
In addition to having dedicated time to work with new teachers, which explains the more intense mentoring provided, we found that full-time release mentors received more training and ongoing support than full-time teachers serving as mentors. The difference in training may explain their heightened focus on instruction. Nearly two-thirds of full-time release mentors (62%) reported receiving high levels of training and ongoing support, using the definition provided above. In contrast, only 29% of full-time teachers serving as mentors received such high levels of training. Again, the high levels of training for full-time release mentors may be possible because they are released from classroom duties and therefore time is built in to their weekly schedule to allow for more training.

Program Operator

Another way programs vary is in their administrative center. In Illinois, programs can be administered by a single district or a consortium—either a regional office of education or a university. We found that single-district programs tend to provide more intense mentoring and a greater focus on instruction. Specifically, the mean intensity of mentoring provided in single-district programs was 2.72, compared with 2.60 in programs serving multiple districts (Exhibit 22). The mean focus on instruction was 2.71 for single-district programs and 2.60 for programs serving multiple districts. Programs serving multiple districts face several challenges, which may explain the less intense mentoring and focus on instruction. Many such programs serve large geographic areas, making it difficult to provide supports other than mentoring. Further, program operators have little authority or influence over the local school administrators who may not support the program.

Exhibit 22
Comparison of Single-District and Multiple-District Programs

	Mean Focus on instruction*	Mean Intensity of mentoring*
Single-district program	2.71	2.72
Multiple-district program	2.60	2.60

p <.05
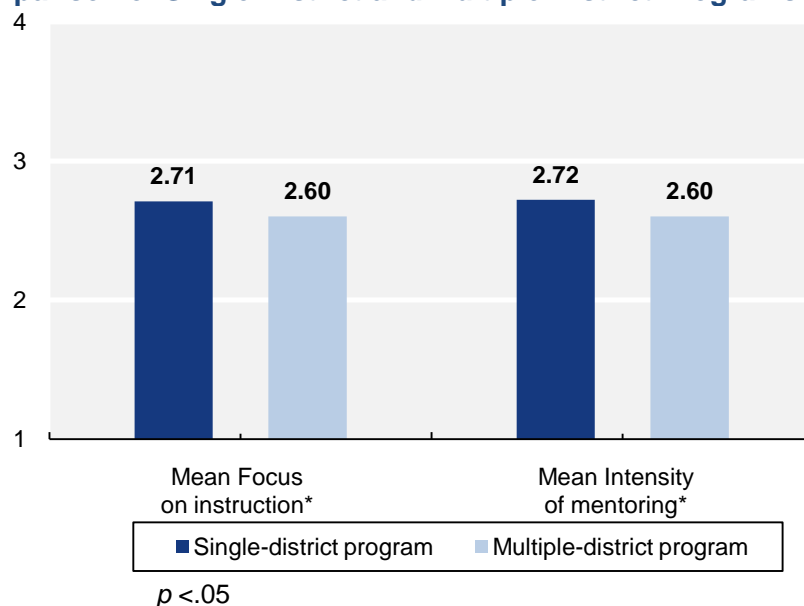
These findings illuminate the contributors to strong induction programs. Some of them are controllable by the programs, particularly the mentor controls. Some are not. It is neither feasible nor appropriate for all induction programs to adopt the full-time release model. Nor is it appropriate to have only single-district programs. But where the teachers-as-mentors model is in place, program administrators should now know that they need to pay attention to the intensity and content of mentoring actually provided to teachers. Likewise, multiple-district program administrators now know that they, too, must find ways to increase the intensity of mentoring provided and the focus on instruction.

Even if all programs had intense mentoring and a strong focus on instruction, however, the research shows that these alone are not adequate to achieve the teacher outcomes desired. What else needs to be done? We turn to the issue of the school context next.

Addressing the School Context

This and previous SRI reports of the Illinois induction program have highlighted the critical effect of the school context in new teacher development and retention (see, for example, Wechsler, Caspary, & Humphrey, 2008). For beginning teachers in schools with a combination of strong school leadership, collegial professional relationships, adequate supplies and equipment, and a positive and supportive climate among all adults, we found better retention, efficacy, and self-reported improvements than for teachers who worked in schools without these features.

This report emphasizes some of the ways that a good school context, or the lack of it, affects the induction programs. The surveys and our case studies strongly suggest that schools with weak leadership and little support undermine induction programs by limiting opportunities for

mentors and beginning teachers to meet, be released to observe each others' teaching, plan together, analyze student work, and generally attend to the challenges of improving instructional practice. A poor school context also appears to increase the likelihood that the mentor/mentee relationship focuses on emotional support for making it through the school year instead of concentrating on improving instructional practice.

The case studies also revealed how the integration of an induction program with the larger school improvement efforts under way can make beginning teachers successful early in their careers (Exhibit 23).

Exhibit 23 Integrating Induction with School Improvement
During a tour of Washington Elementary School[24] led by the principal, we began to notice that every classroom offered students an interesting and engaging environment. Student work was carefully displayed, along with elaborate presentations of student art. Bulletin boards were used to introduce learning centers that featured interdisciplinary themes. For example, one classroom had a large papier-mâché whale hanging in the back and walls covered with writing assignments, science projects, and social studies lessons related to the ocean. Unlike in other schools, we could not identify the beginning teachers' classrooms.
In subsequent interviews, the principal, the teachers union representative, a school counselor, three mentors, and three beginning teachers described a school that had grown into a close professional community. Although the induction program resulted in formally assigned mentors, the induction of new teachers into Washington was the responsibility of many. The principal explained that grade-level teams of teachers were charged with planning curriculum and decorating classrooms with the beginning teachers. The principal reported that she spent some time in the beginning teachers' classrooms every day. The beginning teachers reported that they valued the help from their mentors but noted that they learned as much or more about how to organize their classrooms from their grade-level colleagues, the principal, and the school counselor.
We make no causal claim, but Washington has made impressive achievement gains during the period in which the school began to fully integrate its induction efforts for new teachers with the larger school improvement efforts. The percentage of students that met or exceeded standards on the Illinois Standards Achievement Test increased steadily from 73% in 2002 to 92% in 2009.

Washington Elementary School, in the example in Exhibit 23, exemplifies how merging an induction program with school improvement efforts can contribute to promising results. A broader vision of integration would require embedding induction into school and district efforts to clearly define what constitutes effective teaching, refine how teaching is measured, and improve how information on teaching practice is used in induction and other teacher support programs. By considering it as part of more comprehensive school improvement efforts, induction would no longer function in isolation and be so affected by the school context.

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[24] Washington Elementary School is a pseudonym.

Instead, improving the school context, supporting teachers, and improving student achievement would be integrated and mutually reinforcing endeavors.

This idea is not new. In 1999, Dr. Terry Dozier, Director of the Center for Teacher Leadership at Virginia Commonwealth University School of Education and former teacher-in-residence at the U.S. Department of Education, made the following critique of formal induction programs:

> It is critical that we support beginning teachers. However, I'm not convinced that the best way is through a formal mentoring program. In too many cases, the mentor does not have training, support, or interest in mentoring. …I would like to try to move our nation's schools in the direction of whole school mentoring, which embeds opportunities for all teachers to learn and grow in the day-to-day work they do. …During my first years of teaching, had you asked me what I was doing for professional development, it wouldn't have occurred to me to say, "Well, it's the school structure that's providing professional development for me." I would have said, "Oh, yes, my principal sent me to a reading conference." But while that was true, it was those day-to-day opportunities to interact and problem solve with my colleagues that led to my growth as a teacher. And if you had asked me if I was mentoring others, I probably would have said, "No, I'm not a mentor. I'm a brand new teacher. How can I be mentoring somebody?" But in fact I was. Certainly I shared ideas with my team, and we worked together planning curriculum and sharing information and concerns about our students (Dozier, 1999).

Dr. Dozier's cautions about formal induction programs were not entirely welcomed by advocates of formal induction programs. Yet given the overwhelming effect of school context on new teachers—for better or for worse—her insights are worth revisiting. It does not make sense to consider induction in isolation; it must be considered in context, and the context must be considered as a key factor influencing the retention and skills of new teachers.

VI. Conclusion

This research strongly suggests that teacher induction, as practiced in the 39 programs in Illinois, makes important contributions to new teachers' sense of efficacy and their professional growth. However, this research did not reveal a link between the Illinois induction programs and improved teacher retention or between induction and student achievement. Further, the influence of school context was ubiquitous.

Some may consider these findings troubling. After all, the two most widely cited goals of induction are to increase teacher retention and improve teacher skills and thereby ultimately improve student outcomes. The results presented in this report are striking, but they must not be overstated. Understanding teacher retention is difficult in the current economic climate, and the student achievement analysis presented has many acknowledged weaknesses.

Nonetheless, the conclusions from this research must not be ignored. These findings suggest that it is time to rethink teacher induction. Our research demonstrates that individual mentors in well-designed induction programs can benefit beginning teachers. Yet dramatically raising student achievement gains at the program level is more than can be expected of individual mentors—whether veteran teachers down the hall or full-time release master teachers—without complementary efforts to improve the whole school.

As our research shows, the variation in what beginning teachers receive from their mentors depends on a variety of factors. Some are within the control of induction programs, such as the training provided for the mentors and the extent to which mentors are held accountable. At the same time, many factors are more difficult to control, such as the proximity of the new teacher to the mentor, how well the new teacher and mentor get along, and the level of professional community among all teachers in a school. The variation in induction treatment is largely determined by the school context.

Given these findings, we posit that teacher induction can no longer be conceptualized as a discrete program. Rather, inducting a new teacher takes a professional community. While mentoring and other induction supports are important in supporting the professional growth of new teachers, as our findings demonstrate, relegating sole responsibility for teacher induction to a mentor fails to draw on the set of skills and knowledge of the entire faculty and school administration. Further, it fails to recognize the contributions that new teachers can make to their schools and peers, whether by bringing their own knowledge to the group or serving as the impetus for others to reflect on their own practices as they support the new teacher.

State and local policymakers tend to focus on the program—to provide a prescriptive set of requirements for the number of contact hours between mentor and beginning teacher, a curriculum for new teacher improvement, or requirements for mentor training. Although some of these regulations matter greatly for new teacher growth and efficacy, they are not sufficient because such policy does not consider the implications of school context for the design of effective induction programs. This study strongly suggests that it is time to move away from unidirectional models. The emphasis has been on mentors delivering guidance to beginning

teachers instead of collective learning and a school-wide effort and collective responsibility for the growth of new teachers.

Notably, the Chicago New Teacher Center has acknowledged the importance of addressing the school context factors that impede the success of beginning teachers by assigning senior accomplished teachers to work with school principals to improve the induction of new teachers. This is an important step, but as our student achievement analysis suggests, it is probably not enough to create the student achievement gains desired.

What would it take to raise the achievement gains of students in the classroom of beginning teachers? For Illinois, this analysis suggests that induction standards should address the whole school's role. At the school and district level, a reconceptualization of induction begins with transforming induction programs into a seamlessly integrated part of school improvement. This might include extensive professional development for principals and veteran teachers on just how the induction of beginning teachers can be a catalyst for whole school improvement.

This research suggests that relying on traditional approaches is likely to disappoint those focused on student achievement outcomes, but policymakers should not underestimate the demonstrated value of the induction programs for beginning teachers. Clearly, the induction programs have resulted in a variety measures that matter to the day-to-day work of teachers. But the research also makes clear that efforts to dramatically raise student achievement gains among the students of beginning teachers will have to rely less on the efforts of individual mentors and more on whole school efforts that fully engage the entire school staff. This research suggests the ability of beginning teachers to raise student learning beyond traditional expectations is ultimately about changing the culture of teaching and is the responsibility of the entire school community.

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APPENDIX A

Survey Questions and Associated Scales

Survey Questions and Associated Scales

The measures used in this report were confirmed using principal components analysis, a method of factor analysis. All items included in each measure had factor loadings of .6 or greater unless otherwise indicated. The summary here shows the items included in each factor, as well as the Cronbach's alpha for unstandardized responses. These reliability indicators are greater than .70 for all the measures used and greater than .80 in most cases. For ease of interpretation, composite variables were calculated by averaging the responses for each respondent across the items that compose each scale, unless otherwise noted.

Teacher Survey

Exhibit A-1 **Teacher Survey Descriptive Statistics and Composite Variables**								
Variable	**N**	**Missing**	**Mean**	**SD**	**10th Percentile**	**90th Percentile**	**Minimum**	**Maximum**
Initial need	1,932	8	2.09	0.51	1.40	2.78	1.00	4.00
School context	1,940	0	3.04	0.49	2.40	3.64	1.00	4.15
Intensity of mentoring	1,903	37	2.66	0.86	1.56	3.78	1.00	5.00
Focus on instruction	1,932	8	2.69	0.67	1.80	3.60	1.00	4.00
Teacher efficacy	1,924	16	3.25	0.42	2.86	4.00	1.00	4.00
Reported growth	1,918	22	2.64	0.72	1.60	3.60	1.00	4.00

Outcomes

Teacher Efficacy[25] *(7 items) α = .86*
55% of variance explained

To what extent do you agree or disagree with each of the following statements?
(Strongly disagree, Disagree, Agree, Strongly agree)

1. I am confident in my ability to teach effectively.
2. I can handle a range of challenging classroom management and discipline situations.
3. If a student in my class becomes disruptive and noisy, I know techniques to redirect him/her quickly.
4. If I really try hard, I can get through to even the most difficult or unmotivated students.
5. If a student did not remember information I gave in a previous lesson, I would know how to increase his/her retention in the next lesson.
6. If one of my students couldn't do a class assignment, I would be able to accurately assess whether the assignment was at the correct level of difficulty.
7. I am able to adapt instruction so that I meet the needs of students at varying academic levels equally well.

Teacher-Reported Growth *(10 items) α = .94*
64% of the variance explained

Think about all the new teacher supports you have received during the 2008-09 school year (including the summer of 2008). Please indicate the extent to which these supports have improved your knowledge and skills in the following areas.

The new teacher supports I received this year have…
(Not at all, Minimal extent, Moderate extent, Great extent)

1. Deepened my grasp of the subject matter I teach.
2. Increased my knowledge of instructional techniques appropriate for the grade level/subject matter I teach.
3. Improved my classroom management.
4. Increased my effectiveness in using textbooks or other curricular materials/instructional programs.
5. Improved my ability to use data (e.g., analyzing student work or student test scores) to plan instruction.
6. Improved my ability to adapt instruction to meet the needs of students at varying academic levels.
7. Improved my ability to plan lessons and design instruction.
8. Increased my ability to create a positive learning environment.
9. Increased my effectiveness in using informal and formal assessment strategies.
10. Improved my ability to evaluate and reflect upon my own teaching practices.

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[25] Based in part on Hoy and Woolfolk's Personal Efficacy Scale, short form. For more information see http://www.coe.ohio-state.edu/ahoy/Teacher%20Efficacy%2010.pdf

Induction Supports

Intensity of Mentoring *(9 items) α = .86*
47% of variance explained

Indicate how often your mentor or consultant has engaged with you in each activity listed below during the 2008-09 school year.
(Never, Once, A few times, About monthly, At least weekly)

1. Observed me teaching and provided feedback.[26]
2. Worked with me to develop a professional growth plan.
3. Demonstrated lessons for me in the classroom.
4. Gave me materials.
5. Planned lessons with me.
6. Analyzed samples of my students' work.
7. Talked with me about the strengths and/or needs of specific students.
8. Discussed instructional issues and problems.
9. Discussed student assessment data to make decisions about instruction.

Focus on Instruction *(10 items) α = .91*
56% of variance explained

Thinking about all the supports you have received during the 2008-09 school year, to what extent have they addressed the following topics?
(Not at all addressed, Minimally addressed, Moderately addressed, Extensively addressed)

1. The subject matter I teach.
2. Instructional techniques appropriate for the grade level/subject matter I teach.
3. Classroom management techniques appropriate for the students I currently teach.
4. The use of textbooks or other curricular materials for my current position.
5. The use of data (e.g., analyzing student work or student test scores) to plan instruction.
6. Adapting instruction to meet the needs of students at varying academic levels.
7. Planning lessons and designing instruction.
8. Creating a positive learning environment.
9. The use of formal and informal assessment strategies.
10. Evaluating and reflecting upon my own teaching practices.

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[26] Factor loading for this item is .55.

Need for Support *(10 items) α = .87*
47% of variance explained

Thinking about the 2008-09 school year, indicate the level of support you have needed in the following areas.
(No support needed, Minimal support needed, Moderate support needed, Extensive support needed)

1. The subject matter I teach.
2. Instructional techniques appropriate for the grade level/subject matter I teach.
3. Classroom management techniques appropriate for the students I currently teach.[27]
4. The use of textbooks or other curricular materials for my current position.[28]
5. The use of data (e.g., analyzing student work or student test scores) to plan instruction.
6. Adapting instruction to meet the needs of students at varying academic levels.
7. Planning lessons and designing instruction.
8. Creating a positive learning environment.
9. The use of formal and informal assessment strategies.
10. Evaluating and reflecting upon my own teaching practices.

Other Induction Supports

The measure of other induction supports is a dichotomous variable not developed using factor analysis. The measure of other induction supports was coded as 1 if the beginning teacher reported participating in each of these four activities at least once and was coded 0 if the teacher reported never participating in one or more of these four activities.

Think about the services and support you have received during the 2008-09 school year (including the summer of 2008) through your new teacher support program. How often have you received the following supports?
(Never, Once, A few times, About monthly, At least weekly)

1. New teacher meetings with the principal at your school.
2. Workshops, seminars or classes for new teachers (excluding an initial orientation).
3. Release time to see other teachers teach.
4. Participation in a professional network specifically for new teachers.

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[27] Factor loading is .57.
[28] Factor loading is .55.

School Context *(5 subscales) α = .74*
53% of variance explained
*Asterisk indicates items from the Consortium on Chicago School Research Teacher Survey, http://ccsr.uchicago.edu/content/index.php

Factor scores for each subscale were calculated separately by averaging the items within each subscale, and then an overall school context measure was created by taking the mean of the five subscales. In this final higher order factor, the factor loading for "teacher collaboration around instruction" subscale is .50; all others are greater than .60.

Principal Instructional Leadership[29] *(7 items) α = .93*
71% of variance explained

Please mark the extent to which you disagree or agree with the following statements about the principal at your school.

The principal at this school:
(Strongly disagree, Disagree, Agree, Strongly agree)

1. Makes clear to the staff his or her expectations for meeting instructional goals.*
2. Sets high standards for teaching.*
3. Communicates a clear vision for the school.*
4. Understands how children learn.*
5. Sets high standards for student learning.*
6. Knows what's going on in my classroom.*
7. Actively monitors the quality of teaching in this school.*

Supportive Administration *(4 items) α = .87*
72% of variance explained

To what extent do you agree or disagree with each of the following statements?
(Strongly agree, Somewhat agree, Somewhat disagree, Strongly disagree)

1. Teachers in this school trust the school administration.
2. Enforces school rules for student conduct and backs me up when I need it (SASS).[30]
3. Works to ensure that teachers have the supports they need to be successful.
4. Is supportive and encouraging toward school staff (SASS).[30]

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[29] Developed by the Consortium on Chicago School Research at the University of Chicago. S.E. Sporte with S. Luppescu & K. Nanjiani (2004). *Key Measures of School Development*. Web Report. Chicago: Consortium on Chicago School Research. For more information, see http://ccsr.uchicago.edu/web_reports/keymeasures/measlists/measure-tables1/inst.html

[30] From the National Center for Education Statistics Schools and Staffing Survey (SASS), http://nces.ed.gov/surveys/sass/

Supportive Teaching Environment *(4 items) α = .83*
66% of variance explained

To what extent do you agree or disagree with the following statements about your school? Please choose the response that best reflects your experience at your current school.
(Strongly disagree, Disagree, Agree, Strongly agree)

1. Teachers in this school trust each other.*
2. I feel supported by colleagues to try out new ideas.
3. Teachers in this school feel responsible to help each other do their best.*
4. A conscious effort is made by faculty to make new teachers feel welcome here.*

Teacher Collaboration Around Instruction *(5 items) α = .81*
57% of variance explained

How often do you do each of the following activities with teachers in your school other than your mentor teacher?
(Never, Once, A few times a year, At least monthly, At least weekly)

1. Analyze samples of work done by your students.
2. Work together to develop teaching materials or activities for particular classes.
3. Seek each other's advice about instructional issues and problems.
4. Observe each other's classrooms to offer feedback and/or learn strategies (excluding observation for purpose of formal evaluation).
5. Discuss student assessment data to make decisions about instruction.

Availability of Materials *(3 items) α = .75*
67% of variance explained

To what extent do you agree or disagree with the following statements about your school? Please choose the response that best reflects your experience at your current school.
(Strongly disagree, Disagree, Agree, Strongly agree)

1. I have the necessary textbooks and print resources to teach.
2. I can get instructional materials (e.g., lab supplies, math manipulatives, classroom library books) without buying them myself.
3. I can get the classroom supplies (e.g., paper, pencils, staples, tape) I need without buying them myself.

Mentor Survey

Exhibit A-2 Mentor Survey Descriptive Statistics and Composite Variables							
Variable	**N**	**Missing**	**Mean**	**SD**	**50th Percentile**	**Minimum**	**Maximum**
Intensity of mentoring	1,356	7	2.96	0.72	2.89	1.00	5.00
Focus on instruction	1,354	9	2.90	0.60	2.90	1.00	4.00
Teacher efficacy	1,347	16	3.38	0.42	3.33	1.00	4.00
Reported growth	1,347	16	3.09	0.62	3.10	1.00	4.00

Outcomes

***Mentor Efficacy*[31]** *(9 items) α = .92*
60% of variance explained

To what extent do you agree or disagree with each of the following statements:
(Strongly disagree, Disagree, Agree, Strongly agree)

1. I can easily articulate the beliefs that underlie my teaching practices when I talk with beginning teachers.
2. I am able to use my knowledge of the developmental stages of new teachers to support beginning teachers.
3. I know how to analyze a beginning teacher's lesson plan to identify areas in which he/she needs growth.
4. I am well prepared to mentor beginning teachers.
5. I have the necessary skills to be an effective mentor.
6. When I observe a beginning teacher's lesson, I am able to assess his/her strengths and weaknesses.
7. I am able to promote beginning teachers' own problem solving through the use of targeted questioning.
8. When a beginning teacher has a concern about classroom management, I can offer specific strategies and advice.
9. When my beginning teacher has concerns about students, I am able to facilitate his/her problem solving.

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[31] Adapted from Riggs Mentor Efficacy Scale, I. M. Riggs (1998). *The Impact of Training and Induction Activities upon Mentors As Indicated Through Measurement of Mentor Self-Efficacy.* Paper presented at the International Conference of the Association for the Education of Teachers in Science, Minneapolis.

Mentor-Reported Teacher Growth *(10 items) α = .93*
63% of variance explained

Indicate the extent to which your target teacher has improved since the beginning of the year as a result of your mentoring.
(Not at all, Minimal extent, Moderate extent, Great extent)

1. Deepened his/her grasp of the subject matter he/she teaches.
2. Increased his/her knowledge of instructional techniques appropriate for the grade level or subject matter he/she teaches.
3. Improved his/her classroom management.
4. Increased his/her effectiveness in using textbooks or other curricular materials.
5. Improved his/her ability to use data (e.g., analysis of student work or student test scores) to plan instruction.
6. Improved his/her ability to adapt instruction to meet the needs of students at varying academic levels.
7. Improved his/her ability to plan lessons and design instruction.
8. Increased his/her ability to create a positive learning environment.
9. Increased his/her effectiveness in using informal and formal assessment strategies.
10. Improved his/her ability to evaluate and reflect upon his/her own teaching practice.

Mentoring

Intensity of Mentoring *(9 items) α = .85*
 46% of variance explained

Indicate how often you engaged with your target teacher in each activity listed below during the 2007-08 school year.
(Never, Once, A few times, About monthly, At least weekly)

1. Observed his/her teaching and provided feedback.[32]
2. Helped him/her to develop a professional growth plan.[33]
3. Demonstrated lessons in his/her classroom.[34]
4. Gave materials to him/her.
5. Helped him/her to plan lessons.
6. Analyzed samples of his/her students' work.
7. Talked about the strengths or needs of specific students in his/her class.
8. Discussed instructional issues and problems.
9. Discussed student assessment data to make decisions about instruction.

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[32] Factor loading for this item is .55.
[33] Factor loading for this item is .59.
[34] Factor loading for this item is .54.

Focus on Instruction *(10 items) α = .90*
52% of variance explained

Thinking about all your interactions with your target teacher during the 2008-09 school year, to what extent have you addressed the following topics?
(Not at all addressed, Minimally addressed, Moderately addressed, Extensively addressed)

1. The subject matter he/she teaches.
2. Instructional techniques appropriate for the grade level or subject matter he/she teaches.
3. Classroom management techniques appropriate for the students he/she currently teaches.
4. The use of textbooks or other curricular materials for his/her current position.
5. The use of data (e.g., analysis of student work or student test scores) to plan instruction.
6. Adapting instruction to meet the needs of students at varying academic levels.
7. Planning lessons and designing instruction.
8. Creating a positive learning environment.
9. The use of formal and informal assessment strategies.
10. Evaluating and reflecting upon his/her own teaching practices.

Program Levers

The measures for program levers are dichotomous variables not developed using factor analysis.

Mentor Selection
Selection was coded 1 if the mentor reported being required to do at least two of these and 0 if the mentor reported being required to do one or fewer.

To become a mentor for this new teacher induction program, were you required to:
(Yes, No)

1. Formally apply
2. Be interviewed
3. Have your classroom observed
4. Submit a recommendation (from your principal or peers) or provide references
5. Successfully complete a mentor training program PRIOR to being selected

Mentor Training

Training was coded 1 for mentors who reported attending an initial training of more than 4 hours either before or at the same time that they met their beginning teachers.

Q4: Did you attend an initial training session to be a mentor for this program?
Yes, this training occurred before I met my mentee.
Yes, I met my mentee(s) around the time as the training.
Yes, this training occurred after I met my mentee.
No, I received no initial training.

Q5: How long did this initial training session last?
Part day (4 hours or less)
One full day (5 to 8 hours)
Multiday, less than a week (more than 8 hours but less than 40 hours)
One week (40 hours)
More than 1 week (more than 40 hours)

Mentor Accountability

Accountability was coded 1 for mentors who reported submitting a formative evaluation or summary of goals at least once AND who reported submitting a log of hours or submitting a meeting summary at least a few times.

As part of the requirements of the new teacher induction program, how often did you or your beginning teacher submit the following to the program's administration during the 2008-09 school year?
(Never, Once, A few times, About monthly, At least weekly)

1. Formative evaluation of target teacher
2. Summary of goals for mentoring
3. Log of the hours you spent with you beginning teacher(s)
4. Summaries of you meeting with your beginning teacher(s)

APPENDIX B

Regression Models

The baseline regression models for this report included the following variables:

- Teacher characteristics
  - Gender (coded 1 for male, 0 for female)
  - Three dummy variables representing race/ethnicity (African American, Latino, other, with White as the reference group)
- Teacher assignment
  - Secondary school teacher (coded 1 for a middle or high school teacher, 0 for an elementary teacher)
  - Dedicated English language learner teacher
  - Dedicated special education teacher
  - Proportion of students who create serious behavior problems in the classroom, as reported by the teacher
- Teacher background and preparation
  - Alternative certification (coded 1 if the teacher is enrolled in an alternative certification program, 0 otherwise)
  - Master's degree or higher (coded 1 for a master's degree, a master's degree + 15 credits, or a doctorate)
  - Teaching experience (coded 1 for teachers with more than 1 year of teaching experience, 0 for those in their first year)
  - Other experience (coded 1 for teachers who reported at least 1 year of previous work experience, 0 for those with none)
  - Second year in the program (coded 1 for teacher in their second year of the induction program, 0 for those in their first year)

School context was represented by two dummy variables, one for those in the top tenth on each measure and the other for those in the bottom tenth. The reference category is "average" schools that fall between the first and ninth decile (i.e., between the 10th and 90th percentile).

- Strong school context and weak school context

The study variables of intensity of mentoring and induction focus on instruction were represented by two dummy variables—one for those in the top tenth on each measure and the other for those who fell between the first and ninth decile (i.e., between the 10th and 90th percentile). The reference category is the bottom 10% of teachers on each measure.

- Strong mentoring and average mentoring
- Strong instructional focus and average instructional focus

- Intensity of induction (The dummy variable was coded 1 if the teacher reported participating in all four of the other induction activities at least once.)

Finally, the model predicting teacher efficacy included a measure of teachers' self-reported level of need over the course of the school year as a baseline indicator of sense of need. This measure was included in the model as two dummy variables representing the strong and weak need (top and bottom decile) with the average as the reference category.

- Strong need for support and weak need for support

The two measures from the survey, teacher efficacy and reported growth, were modeled using ordinary least squares regression. Retention data were obtained from the program administrators, and these binary outcomes were modeled using logistic regression.

The models below show the results of these regressions with all the variables representing teacher characteristics, teacher assignment, teacher preparation, and school context in Model 1. Models 2 through 4 examine the study variables of intensity of mentoring, focus on instruction, and intensity of induction entered after school context. Model 5 shows all the background and induction variables in one model. Because the correlation between intensity of mentoring and instructional focus is more than .5 (Pearson's correlation of .60), we present the results of the models with each induction variable entered separately (see Exhibits B-1 through B-4). Exhibits B-1 and B-2 display the results of the linear regression models. Exhibits B-3 and B-4 show the results of the logistic regression models, with the column header OR denoting the estimated odds ratios.

Exhibit B-1
Teachers' Self-Reported Progress

	Model 1		Model 2		Model 3		Model 4		Model 5	
R-squared	.12		.19		.42		.15		.44	
Adjusted R-squared	.11		.19		.42		.14		.43	
	Beta	*SE*	**Beta**	*SE*	**Beta**	*SE*	**Beta**	*SE*	**Beta**	*SE*
Intercept	2.63	0.02	2.18	0.05	1.65	0.04	2.54	0.02	1.57	0.05
Male	-0.08	0.04	-0.08	0.04	-0.07*	0.03	-0.08	0.04	-0.08*	0.03
African American	0.35**	0.06	0.29**	0.06	0.16**	0.05	0.34**	0.06	0.15**	0.05
Latino	-0.13	0.10	-0.08	0.09	-0.01	0.08	-0.11	0.10	0.00	0.08
Other race/ethnicity	-0.01	0.08	0.00	0.07	0.00	0.06	0.01	0.08	0.01	0.06
Secondary school teacher	-0.11**	0.04	-0.09*	0.03	-0.07*	0.03	-0.11**	0.03	-0.07*	0.03
Dedicated special education	-0.09	0.05	-0.05	0.05	-0.06	0.04	-0.09	0.05	-0.05	0.04
Dedicated English language learner	0.15	0.09	0.09	0.09	0.04	0.07	0.12	0.09	0.01	0.07
Percent of students with behavior problems	0.00*	0.00	0.00	0.00	0.00	0.00	0.00*	0.00	0.00	0.00
Alternative certification	0.28*	0.10	0.27*	0.10	0.18*	0.08	0.28*	0.10	0.18*	0.08
Master's degree or beyond	-0.10*	0.04	-0.10*	0.04	-0.07*	0.03	-0.09*	0.04	-0.06	0.03
Previous classroom experience	-0.08	0.04	-0.06	0.04	-0.07*	0.03	-0.07	0.04	-0.06	0.03
Other prior work experience	0.05	0.04	0.06	0.04	0.07*	0.03	0.06	0.04	0.07*	0.03
Second year in program	-0.03	0.04	-0.03	0.04	-0.02	0.03	-0.02	0.04	-0.02	0.03
Strong school context	0.45**	0.06	0.39**	0.05	0.28**	0.05	0.38**	0.06	0.24**	0.05
Weak school context	-0.41**	0.06	-0.35**	0.06	-0.20**	0.05	-0.36**	0.06	-0.17**	0.05
Strong mentoring			0.92**	0.08					0.28**	0.07
Average mentoring			0.46**	0.06					0.09	0.05
Strong instructional focus					1.72**	0.06			1.59**	0.07
Average instructional focus					1.02**	0.04			0.97**	0.05
All other supports (1 time+)							0.26**	0.04	0.11**	0.03

Note: *N* = 1,585; * *p <.05*; **p <.01

B-4

Exhibit B-2 Teachers' Self-Efficacy										
	Model 1		**Model 2**		**Model 3**		**Model 4**		**Model 5**	
R-squared	.17		.18		.19		.18		.20	
Adjusted R-squared	.17		.17		.18		.17		.19	
	Beta	*SE*	**Beta**	*SE*	**Beta**	*SE*	**Beta**	*SE*	**Beta**	*SE*
Intercept	3.23	0.01	3.24	0.03	3.16	0.03	3.21	0.01	3.19	0.04
Male	-0.01	0.02	-0.02	0.02	-0.01	0.02	-0.02	0.02	-0.02	0.02
African American	0.11**	0.03	0.10**	0.03	0.09*	0.03	0.11**	0.03	0.08*	0.03
Latino	0.09	0.06	0.09	0.06	0.10	0.06	0.10	0.06	0.10	0.06
Other race/ethnicity	-0.06	0.04	-0.07	0.04	-0.06	0.04	-0.06	0.04	-0.06	0.04
Secondary school teacher	-0.07**	0.02	-0.07**	0.02	-0.06**	0.02	-0.07**	0.02	-0.06**	0.02
Dedicated special education	0.15**	0.03	0.15**	0.03	0.15**	0.03	0.15**	0.03	0.15**	0.03
Dedicated English language learner	0.02	0.05	0.02	0.05	0.01	0.05	0.02	0.05	0.01	0.05
Percent of students with behavior problems	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Alternative certification	0.08	0.06	0.08	0.06	0.07	0.06	0.08	0.06	0.08	0.06
Master's degree or beyond	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Previous classroom experience	0.04	0.02	0.04	0.02	0.04	0.02	0.04	0.02	0.04	0.02
Other prior work experience	0.00	0.02	0.00	0.02	0.00	0.02	0.01	0.02	0.00	0.02
Second year in program	0.01	0.02	0.00	0.02	0.01	0.02	0.01	0.02	0.01	0.02
Need	-0.23**	0.02	-0.23**	0.02	-0.24**	0.02	-0.23**	0.02	-0.25**	0.02
Strong school context	0.29**	0.03	0.27**	0.03	0.26**	0.03	0.27**	0.03	0.24**	0.03
Weak school context	-0.12**	0.03	-0.11**	0.03	-0.09**	0.03	-0.10**	0.03	-0.09*	0.03
Strong mentoring			0.09*	0.05					-0.01	0.05
Average mentoring			-0.03	0.03					-0.06	0.03
Strong instructional focus					0.23**	0.04			0.22**	0.05
Average Instructional focus					0.07*	0.03			0.07*	0.03
All other supports (1 time+)*							0.07**	0.021	0.05*	0.021

Note: *N* = 1,585; *p <.05*; **p <.01

	Model 1			Model 2			Model 3			Model 4			Model 5		
	Beta	*SE*	OR	Beta	*SE*	OR	Beta	*SE*	OR	Beta	*SE*	OR	Beta	*SE*	OR
Intercept	1.79	0.08		1.89	0.24		1.82	0.22		1.82	0.10		1.90	0.28	
Male	-0.18	0.18	0.84	-0.18	0.18	0.84	-0.17	0.18	0.85	-0.17	0.18	0.84	-0.16	0.18	0.85
African American	0.24	0.27	1.27	0.25	0.27	1.28	0.19	0.27	1.21	0.24	0.27	1.27	0.21	0.27	1.23
Latino	0.51	0.44	1.66	0.50	0.44	1.65	0.50	0.44	1.66	0.50	0.44	1.66	0.50	0.45	1.65
Other	-0.66*	0.27	0.52	-0.66*	0.27	0.52	-0.68*	0.27	0.51	-0.66*	0.27	0.52	-0.68*	0.27	0.51
Secondary	0.34*	0.15	1.40	0.34*	0.15	1.40	0.36*	0.15	1.43	0.34*	0.15	1.40	0.35*	0.15	1.43
Dedicated English language learner	-0.13	0.20	0.88	-0.13	0.20	0.87	-0.13	0.20	0.88	-0.13	0.20	0.88	-0.14	0.20	0.87
Dedicated special education	-0.60	0.34	0.55	-0.59	0.34	0.55	-0.60	0.34	0.55	-0.59	0.34	0.55	-0.58	0.35	0.56
Percent of students with behavior problems	-0.01**	0.00	0.99	-0.01**	0.00	0.99	-0.01**	0.00	0.99	-0.01**	0.00	0.99	-0.01**	0.00	0.99
Alternative certification	0.20	0.43	1.22	0.21	0.43	1.23	0.19	0.43	1.21	0.20	0.43	1.22	0.20	0.43	1.22
Master's degree or beyond	0.25	0.18	1.29	0.25	0.18	1.29	0.24	0.18	1.28	0.25	0.18	1.28	0.24	0.18	1.27
Teaching experience	-0.22	0.18	0.80	-0.22	0.18	0.80	-0.22	0.18	0.80	-0.22	0.18	0.80	-0.23	0.18	0.80
Other experience	-0.02	0.15	0.98	-0.02	0.16	0.98	-0.03	0.16	0.97	-0.02	0.15	0.98	-0.03	0.16	0.97
Second year in the program	0.25	0.18	1.29	0.25	0.18	1.29	0.27	0.18	1.31	0.25	0.18	1.29	0.27	0.18	1.30
Strong school context	0.72*	0.30	2.05	0.72*	0.30	2.06	0.64*	0.31	1.90	0.74*	0.31	2.09	0.68*	0.31	1.98
Weak school context	-0.82**	0.20	0.44	-0.83**	0.20	0.43	-0.80**	0.21	0.45	-0.84**	0.21	0.43	-0.83**	0.21	0.44
Strong mentoring				-0.14	0.33	0.87							-0.33	0.36	0.72
Average mentoring				-0.10	0.25	0.91							-0.09	0.26	0.91
Strong instructional focus							0.57	0.36	1.76				0.71	0.38	2.03
Average instructional focus							-0.09	0.23	0.92				-0.04	0.24	0.97
All other supports (1 time+)										-0.08	0.15	0.93	-0.09	0.16	0.91

Exhibit B-3
School Retention

Note: *N* = 1,585; *p <.05*; **p <.01

	Exhibit B-4 District Retention														
	Model 1			**Model 2**			**Model 3**			**Model 4**			**Model 5**		
	Beta	*SE*	OR	**Beta**	*SE*	OR	**Beta**	*SE*	OR	**Beta**	*SE*	OR	**Beta**	*SE*	OR
Intercept	2.26	0.10		2.19	0.27		2.09	0.24		2.20	0.12		2.07	0.31	
Male	-0.30	0.20	0.74	-0.30	0.20	0.74	-0.29	0.20	0.75	-0.30	0.20	0.74	-0.30	0.20	0.74
African American	0.34	0.34	1.40	0.32	0.34	1.38	0.29	0.34	1.34	0.33	0.34	1.39	0.29	0.34	1.33
Latino	0.13	0.50	1.14	0.13	0.50	1.14	0.15	0.50	1.16	0.14	0.50	1.15	0.16	0.50	1.17
Other	-0.18	0.36	0.83	-0.18	0.36	0.83	-0.19	0.36	0.83	-0.17	0.36	0.84	-0.18	0.36	0.84
Secondary	0.01	0.18	1.01	0.02	0.18	1.02	0.02	0.18	1.02	0.01	0.18	1.01	0.02	0.18	1.02
Dedicated English language learner	-0.22	0.23	0.80	-0.21	0.23	0.81	-0.21	0.23	0.81	-0.22	0.23	0.81	-0.21	0.23	0.81
Dedicated special education	-0.26	0.45	0.77	-0.27	0.45	0.76	-0.28	0.45	0.75	-0.28	0.45	0.75	-0.30	0.45	0.74
Percent of students with behavior problems	-0.01*	0.00	0.99	-0.01*	0.00	0.99	-0.01*	0.00	0.99	-0.01*	0.00	0.99	-0.01*	0.00	0.99
Alternative certification	0.41	0.56	1.50	0.40	0.56	1.49	0.37	0.56	1.45	0.40	0.56	1.49	0.37	0.56	1.45
Master's degree or beyond	0.27	0.22	1.31	0.27	0.22	1.31	0.28	0.22	1.32	0.28	0.22	1.32	0.28	0.23	1.33
Teaching experience	-0.24	0.21	0.79	-0.23	0.21	0.79	-0.24	0.21	0.79	-0.23	0.21	0.79	-0.23	0.21	0.79
Other experience	0.22	0.19	1.25	0.23	0.19	1.25	0.23	0.19	1.25	0.23	0.19	1.26	0.23	0.19	1.26
Second year in the program	0.57*	0.22	1.77	0.57*	0.22	1.78	0.57*	0.22	1.78	0.58*	0.22	1.78	0.58*	0.22	1.78
Strong school context	1.09*	0.43	2.96	1.07*	0.43	2.92	1.04*	0.43	2.83	1.04*	0.43	2.82	1.00*	0.43	2.72
Weak school context	-0.82**	0.23	0.44	-0.80**	0.24	0.45	-0.77**	0.24	0.46	-0.78**	0.24	0.46	-0.75**	0.24	0.47
Strong mentoring				0.21	0.41	1.24							0.04	0.44	1.04
Average mentoring				0.07	0.28	1.07							0.00	0.29	1.00
Strong instructional focus							0.44	0.40	1.55				0.38	0.43	1.46
Average instructional focus							0.17	0.25	1.18				0.14	0.26	1.15
All other supports (1 time+)										0.18	0.19	1.19	0.15	0.19	1.16

Note: *N* = 1, 585; *p <.05*; **p <.01

APPENDIX C

Student Achievement Analysis

Student Achievement Analysis

The goal of this analysis was to examine the extent to which Chicago Public School first- and second-year teachers who received induction support have higher student achievement gains compared with beginning teachers receiving no induction support. The guiding research question for this exploratory analysis was, Do novices who participate in induction have higher student gains on standardized test scores than those who do not participate?

Sample

To heighten the power of the analysis, our sample included all teachers (including nonnovices) with room numbers and test score data available in the 2009 CCSR dataset and CPS Master File. Given our interest in using student achievement data, our sample was limited to teachers who worked in grades 4–8 (ISAT grades) in self-contained classrooms of 10 to 40 students with legitimate room numbers. We used teachers' responses to the 2009 CCSR Elementary teacher survey to identify first- and second-year teachers in the Chicago Public Schools in 2008–09. We augmented these data with roster data obtained directly from CNTC for teachers participating in CNTC-led induction. Observations with missing data were excluded from the analysis.

The final sample used in the analysis, excluding teachers with missing data for any covariates, comprised 657 teachers, with just under 100 novice teachers, 13 who reported receiving no induction, 33 who participated in CNTC induction, and 59 who participated in other CPS induction programs. The descriptive statistics for this sample are provided in Exhibits C-1 through C-3.

Exhibit C-1 Level-1 Descriptive Statistics: Student-Level Data					
Variable Name	**N**	**Mean**	**SD**	**Minimum**	**Maximum**
READ09	30,934	221.68	27.42	124.00	358.00
MATH09	30,934	233.56	29.34	120.00	379.00
READ08	30,934	210.33	29.17	120.00	351.00
MATH08	30,934	219.54	29.25	120.00	355.00
RETAINED	30,934	0.01	0.11	0.00	1.00
DWHITE	30,934	0.08	0.27	0.00	1.00
DBLACK	30,934	0.45	0.50	0.00	1.00
DOTHER	30,934	0.03	0.17	0.00	1.00
DLATINO	30,934	0.44	0.50	0.00	1.00
GR4	30,934	0.34	0.47	0.00	1.00
GR5	30,934	0.29	0.45	0.00	1.00
GR6	30,934	0.20	0.40	0.00	1.00
GR7	30,934	0.09	0.29	0.00	1.00
GR8	30,934	0.09	0.28	0.00	1.00

Exhibit C-2 Level-2 Descriptive Statistics: Teacher Treatment-Level Data					
Variable Name	***N***	**Mean**	***SD***	**Minimum**	**Maximum**
NOVICE	657	0.15	0.36	0.00	1.00
NONNOV	657	0.87	0.34	0.00	1.00
INDUC	657	0.14	0.35	0.00	1.00
CNTC	657	0.05	0.22	0.00	1.00
OTHER IND	657	0.09	0.29	0.00	1.00
NOINDUC	657	0.02	0.14	0.00	1.00
FIRSTYR	657	0.09	0.28	0.00	1.00
SECNDYR	657	0.06	0.24	0.00	1.00
FIRSTIND	657	0.05	0.23	0.00	1.00
SECYEARIND	657	0.05	0.22	0.00	1.00
SECYEARCNTC	657	0.02	0.13	0.00	1.00

Exhibit C-3 Level-3 Descriptive Statistics: School-Level Data					
Variable Name	***N***	**Mean**	***SD***	**Minimum**	**Maximum**
PREDAA	255	0.43	0.50	0.00	1.00
PREDLAT	255	0.18	0.39	0.00	1.00
INTEG	255	0.10	0.30	0.00	1.00
MIXED	255	0.06	0.24	0.00	1.00
PREDMIN	255	0.22	0.41	0.00	1.00
SOCIALIZATION	255	6.40	0.72	4.66	8.34
COLLABORATION	255	6.30	0.79	4.32	9.04
TCHRINFLUNCE	255	5.71	0.84	3.32	8.69
INNOVATION	255	6.39	0.80	3.95	8.88
T-P TRUST	255	6.48	1.01	2.95	8.92
T-T TRUST	255	5.50	0.59	4.10	7.50
SES	255	-0.30	0.63	-1.95	1.92
CONC. OF POVERTY	255	0.28	0.62	-1.41	1.76
CRIME	255	-2.86	0.52	-4.20	-1.49

Methods

We used a three-level hierarchical linear model (HLM) to predict students' 2009 math and reading test scores. At Level 1, we included student test scores from the previous year, grade level, whether the student was retained, and student race/ethnicity. All the Level 1 variables in the model are centered on their respective grand-means; therefore, the intercept can be

interpreted as the adjusted mean student test score gain for the average novice teacher in the average CPS classroom. At Level 2, we included a dummy variable representing induction participation. A dummy variable also is included for nonnovice teachers so that the reference group consists of novices who are not in induction. At Level 3, we controlled for school-level features such as racial/ethnic composition, concentration of poverty and socioeconomic status of the student body, and crime in the area. We also included school organizational or "faculty features" such as trust between teachers and with the principal and the level of reflective dialog and collaboration on the staff. This category also included measures for collaboration, innovation, teacher socialization, and teacher influence on decision making. These variables have been correlated with student achievement as well as novice teacher's decisions to stay in teaching; their inclusion helps to isolate the effect of induction to the best extent possible with this data.

A modified version of the full three-level model used in this analysis is shown below. The model has been modified here to show the categories (rather than each of the variables) that were included in this model.

Level-1 Model (student)

$$\text{MATH 09}_{ijk} = P_{0jk} + P_{1jk}*(\text{MATH08}_{ijk}) + P_{2jk}*(\text{STUDENT GRADE}_{ijk}) + P_{3jk}*(\text{STUDENT RACE/ETHNICITY}_{ijk}) + P_{4jk}*(\text{RETAINED}_{ijk}) + E_{ijk}$$

Level-2 Model (teacher)

$$P_{0jk} = B_{00k} + B_{01k}*(\text{INDUCTION PARTICIPATION}_{jk}) + B_{02k}*(\text{NONNOVICES}_{jk}) + R_{0jk}$$

$$P_{1jk} = B_{10k}$$

$$P_{2jk} = B_{20k}$$

$$P_{3jk} = B_{30k}$$

$$P_{4jk} = B_{40k}$$

Level-3 Model (school)

$$B_{00k} = G_{000} + G_{001}(\text{RACIAL COMPOSITION OF STUDENT BODY}_k) + G_{002}(\text{FACULTY FEATURES}_k) + G_{003}(\text{CONCENTRATION OF POVERTY}_k) + G_{004}(\text{SOCIOECONOMIC STATUS}_k) + G_{005}(\text{CRIME}_k) + U_{00k}$$

$$B_{01k} = G_{010}$$

$$B_{02k} = G_{020}$$

Results

This analysis examined the overall effects of induction participation on student achievement. We examined the gains for novices who received any form of induction compared with novices who did not receive any formal induction support. Exhibit C-4 presents the results for four models. The unconditional model has no covariates and serves as a baseline from which to calculate the variance explained by the addition of explanatory variables. Models 1 through 3 include the dummy variable indicating induction participation as well as the one identifying

non-novice teachers and then add an increasing numbers of covariates. Model 1 includes only prior achievement (2008 math ISAT scores) in additional to the Level 2 variables. Model 2 includes all the covariates at Level 1, including the 2008 math scores, the race/ethnicity variables, the grade level variables and a retained flag. Model 3 includes all these Level 1 and 2 covariates and also introduces the full complement of Level 3, school-level demographic and organizational features outlined above. We examined novice gains for both math and reading scores. Because similar results were revealed in both areas, only the results for math scores are reported here. All the models were gradually built up to the full model, but only key findings at each level are presented below.

The induction coefficient represents the mean student gain scores of teachers participating in induction. The result in the final model and its corresponding t ratio indicate that test scores of teachers receiving induction support are not significantly different from the test scores of novice teachers who are not participating in induction (noted by the value of intercept).

	Exhibit C-4							
	Induction Effects on 2009 Math ISAT Scores							

Fixed Effects

	Unconditional Model		Model 1		Model 2		Model 3	
			With treatment		With student-level controls		With school-level controls	
	Coeff (*SE*)	*t* ratio	Coeff (*SE*)	*t* ratio	Coeff (*SE*)	*t* ratio	Coeff (*SE*)	*t* ratio
Intercept	233.47 (.34)	664.94	233.24 (.35)	661.54	233.45 (.33)	712.60	233.45 (.30)	787.73
Induction (treatment coefficient)			.30 (1.10)	0.27	-1.64 (1.25)	-1.31	-.93 (1.19)	-0.78

Variance Components

	Unconditional Model		Model 1		Model 2		Model 3	
			With treatment		With student-level controls		With school-level controls	
E (Level 1, student scores)								
Standard deviation	12.74		12.82		12.77		12.77	
Variance component	162.42		164.36		163.156		163.15	
R_O (Level 2, teacher and classroom-level)								
Standard deviation	6.21		7.11		6.09		6.03	
Variance component	38.51		50.67		37.13		36.39	
Df	402		400		400		400	
Chi-square	4711.42		6226.57		4602.32		4611.20	
p Value	.000		.000		.000		.000	
U_{00} (Level 3, school-level)								
Standard deviation	3.13		2.70		2.86		2.11	
Variance component	9.82		7.31		8.19		4.48	
Df	254		254		254		240	
Chi-square	414.74		352.51		395.15		334.04	
p Value	.000		.000		.000		.000	

Note: p <.10; *p <.05; **p <.01

The differences in coefficients in Models 2 and 3 in Exhibit C-4 once school-level controls are introduced in the model suggest that school-level factors have a significant influence on student test scores. We also contrasted mean student achievement for teachers who participated in CNTC induction and those who reported receiving no induction and found similar, nonsignificant results in both math and reading.