INSTRUCTIONAL COACHING:
A MODEL FOR PROFESSIONAL DEVELOPMENT IN THE COMMON CORE ERA

James B. Harrell
Terri N. Watson
City University of New York—The City College of New York

Abstract

While there is extensive research on effective professional development, there is little on instructional coaching as a professional development model. This study endeavored to determine the effectiveness of instructional coaching, specifically to improve implementation of the Common Core State Standards in an urban charter school. Seven teachers spent the 2013-2014 school year working with a coach to implement new learning standards. These teachers were surveyed to determine the effectiveness of instructional coaching in improving their instructional practice. The study concluded that instructional coaching is an effective model for professional development. Elements of an optimal coaching model are offered for today's school leaders.

INTRODUCTION

Since the Common Core State Standards (CCSS) have been adopted by 44 U.S. states, and with CCSS-aligned assessments forthcoming, no issue in education can fail to connect to the CCSS (Sloan, 2010). These *de facto* national standards represent a wide-ranging shift in American education, with an impact that reaches all segments of the education sector, from the U.S. Department of Education through state legislatures, state departments of education, local school districts, and specific school sites.

In this context, communicating new standards and handling the curricular, pedagogical, and organizational shifts they require has challenged policymakers on a grand scale (Center on Education Policy [CEP], 2013a). Stakeholders report that they have a firm grasp on the content, complexity, and change represented by the CCSS (CEP, 2013b; MetLife, Inc., 2013). The more difficult challenge presented by the shift to the CCSS is in their implementation (CEP, 2013a; CEP, 2013b; Jenkins & Agamba, 2013; Loveless, 2013; MetLife, Inc., 2013). The problem with implementation does not appear to be related to the complexity of the task—the experiences of a number of states abound with success stories (Darling-Hammond & McLaughlin, 2011; Jenkins & Agamba, 2013; Marrongelle, Sztajn, & Smith, 2013; Rothman, 2013). Rather, stakeholders at the school level report consternation at implementing the standards in classrooms, citing a need for continued professional development on how to adapt teaching and curriculum to implement the CCSS with fidelity (MetLife, Inc., 2013). This concern is felt most powerfully in schools that serve high-need populations.

STATEMENT OF THE PROBLEM

The CCSS provides the foundation for a fully comprehensive change in American education. Because of the increased rigor of the standards, the demands of implementing them require considerable change in lesson planning, instruction, school operations, and the measurement of student progress (Hirsh, 2012; Sloan, 2010). When teaching CCSS-aligned lessons, teachers cannot rely on previously established curricular materials and lesson plans. Instead, teachers will need to develop the content and pedagogical knowledge necessary to execute lessons that require students to explore, debate, criticize, and create (Hirsh, 2012). In addition, teachers will need to develop assessments to track students' progress towards meeting the standards spelled out by the CCSS, along with the ability to effectively use assessment data to improve and focus instruction. The CCSS requires nothing short of a radical shift in the way a typical teacher plans and executes lessons.

In response, states have gone to great lengths to implement the CCSS (CEP, 2013a). In a survey of 40 states that have adopted the CCSS, the Center for Education Policy reports that instruction is aligned to the CCSS in all or parts of three-fourths of those states (2013a). Nearly all of the states are offering an array of professional development materials and opportunities for teachers (CEP, 2013b; Jenkins & Agamba, 2013; Rothman, 2013). As a result of these efforts, in an extensive study of teachers and school leaders, ninety percent of teachers and principals report that a high level of knowledge of the CCSS exists in their schools and teachers have the academic abilities and skills to teach the new standards (MetLife, Inc., 2013). In spite of these efforts at the state and district levels, the effects of the CCSS are most keenly felt in the classrooms. This dissonance between the point of adoption and the point of effect for reform creates obvious difficulties for implementation, as the communication of policy priorities at the

state and district level must be translated into action in classrooms (Loveless, 2013; Rothman, 2013; Spillane, 2004).

While state departments of education have made significant efforts to bridge the divide, substantial work remains in meeting the challenges presented in implementing the CCSS with fidelity in everyday classrooms, particularly in high-need communities (CEP, 2013a; Hirsh, 2012; MetLife, Inc., 2013). Though teachers have begun aligning instruction to the CCSS, there remains considerable concern from all stakeholders about how to implement the standards in classrooms (Jenkins & Agamba, 2013; Loveless, 2013; MetLife, Inc. 2013). The Center on Education Policy (2013b) reported that, while 22 of the 40 states reported that a majority of their teachers have received professional development on the CCSS, only 10 states reported that more than 75% of their teachers had received professional development. The same study reported that 34 states indicated that finding the resources needed to implement the CCSS was a challenge, while 26 states responded that developing curriculum was a challenge (CEP, 2013a). Finally, the same survey of state education agency officials found that "it was a major challenge to provide professional development and other supports for teachers in sufficient quantity and quality" (CEP, 2013b, p. 2). Twenty-four states indicated that it was a challenge to provide every teacher with state-sponsored professional development. Teachers and principals echoed the CEP's findings: approximately two-thirds reported that implementing the standards is challenging for school leaders (MetLife, Inc., 2013). Because the CCSS is (explicitly) not a curriculum, there is concern that the implementation of the standards will be uneven at best, inequitable at worst (CCSSI, 2010a; Loveless, 2013).

The picture that emerges of the CCSS is one of a set of standards that educators embrace, but for which they are (four years after adoption) by and large unprepared to execute in their classrooms. Teachers and principals still require in-depth, detailed understanding of the CCSS and how best to meet these standards in their schools (Hirsh, 2012; Jenkins & Agamba, 2013). While teachers have been educated in the CCSS as a set of standards, the translation of such abstract standards to the practices central to teaching and learning is far from complete (Spillane, 2004). Therefore, there is a need for professional development for teachers and school leaders in response to the CCSS (Hirsh, 2012; Jenkins & Agamba, 2013; Marrongelle et al., 2013; Rothman, 2013; Spillane, 2004). In response to the CCSS, teachers must substantially alter their practice and curriculum. States and districts have gone to great lengths to provide information, resources, and training to teachers; however, the reach of such efforts has not sufficiently extended into teachers' classrooms. Of the types of supports teachers report needing most, rigorous real-world curricular materials, aligned assessment exemplars, data tools for tracking students, and strategies and coaching for implementation rank the highest (MetLife, Inc., 2013). With this in mind, this study has been set to explore professional development in the form of an instructional coaching model, as an appropriate, effective way to develop teachers' capacity to implement the CCSS in their classrooms.

LITERATURE REVIEW

What constitutes "professional development" ranges from formal workshops and learning, to peer coaching and professional learning communities, to teacher discussions over lunch (Parise & Spillane, 2010). While there is a preponderance of research on the types, qualities, and content of professional development as it relates to teacher knowledge and practice, there is little evidence of the direct effects of professional development on student

achievement (Guskey & Yoon, 2009). Current research on professional development and teacher change concludes that:

- Teacher content and pedagogical knowledge is correlated with student achievement.
- Professional development can change and improve teacher practice.
- The elements of successful professional development (*vis a vis* teacher practice) are well known.

Since teachers' knowledge of teaching and learning is correlated with student success, policies and practices that enhance teacher knowledge have been and should be pursued on this basis (Darling-Hammond, 2000). Additionally, in an environment in which teachers are required to fundamentally change their day-to-day practice *en masse*, it is essential that teachers be provided the opportunity to reflect critically on their practices, develop new knowledge and beliefs about how to improve student achievement, and revise their efforts (Darling-Hammond & McLaughlin, 2011; Marrongelle et al., 2013;).

Under the right conditions, professional development—including both formal and on-the-job learning opportunities—has a significant effect on teacher practice. Parise and Spillane (2010) argue that, while millions of dollars are spent yearly on formal staff training and development, some of the most enduring and effective learning is done in the workplace, when teachers have an opportunity to work together to discuss the challenges they face in their classrooms. Importantly, this finding echoes others in the literature: authentic, enduring, and impactful teacher learning occurs when teachers have the opportunity to work together to reflect on the intersection of their practice and students' learning and achievement (Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009; Darling-Hammond & McLaughlin, 2011; Garet, Porter, Desimone, Birman, & Yoon, 2001; Jenkins & Agamba, 2013; Marrongelle et al., 2013).

In particular, there is some evidence that quotidian structures can encourage these elements of staff development and effect teacher change, which means on-the-job development can be quite effective towards improving teacher practice (Garet et al., 2001; Parise & Spillane, 2010). This finding is particularly relevant in the era of the Common Core, when teachers' day-to-day practice needs to be scrutinized through data analysis and altered to raise student outcomes in meeting rigorous national standards (Hirsh, 2012; Jenkins & Agamba, 2013; Marongelle et al., 2013). A granular focus on teacher practice may include a focus on discourse and questioning, development of rigorous contextualized performance tasks, content-specific pedagogic strategies, use of data to track student progress, and student thinking and cross-content literacy (Garet et al., 2001; Marongelle et al., 2013; Marsh, McCombs, & Martorell, 2010). This intense focus on classroom work is reported by teachers to be most important in developing and refining instructional practices to meet students' needs (Darling-Hammond et al., 2009; MetLife, Inc., 2013).

In addition to ensuring that professional development is located at the nexus of practice and student achievement, there are two organizational aspects of professional development that have been shown to have a significant effect on teacher practice: sustained duration and follow up. Research has concluded that professional development should include at least 30 hours of contact over six to ten months (Darling-Hammond et al., 2009; Garet et al., 2001; Guskey & Yoon, 2009). In all of these hours of development, it is essential that supervisors follow up and support teachers in their new learning and practice. The most effective professional development

is that which includes observation and refinement of new practices (Darling-Hammond et al., 2009; Garet et al., 2001).

Instructional Coaching

To summarize, research indicates that three aspects of professional development are crucial to improving teacher practice: 1) placing development in the classroom context, 2) providing opportunities for teacher reflection, and 3) consistently following up. Instructional coaches work closely with teachers in their classrooms to: focus on research-based instructional strategies; provide opportunities for teacher reflection and refinement of instructional techniques, and follow-up with teachers about particular topics of inquiry (Blachowicz, Buhle, Ogle, Frost, Correa, & Kinner, 2010; Gibson, 2005; Heineke, 2013; Ippolito, 2010). This tailored approach to teacher development provides an opportunity for schools to embed professional development in teachers' daily and weekly routines, while ensuring that teachers improve content and pedagogical knowledge through a cycle of reflection, practice, and feedback.

An instructional coach is a faculty member who works closely with teaching staff to improve their efficacy in the classroom. Very often, instructional coaches are content experts who help teachers understand and execute proven instructional practices in their classrooms (Eisenberg & Medrich, 2013). Dole (2004), in citing Joyce and Showers' (1995) seminal text on instructional coaching, explained that instructional coaches provide tailored support to teachers along five dimensions:

- *Theory*: coaches provide research, readings, and discussion to help teachers understand the rationale behind best instructional practices.

- *Demonstration*: coaches provide teachers the opportunity to observe particular techniques firsthand or through video analysis.

- *Practice*: coaches provide opportunities for teachers to see what happens when they implement particular strategies or techniques in front of colleagues or small groups of students.

- *Feedback*: coaches provide teachers feedback on observations in their classrooms.

- *In-class coaching*: coaches collaborate with teachers to improve daily classroom practice through observation and reflection on practice.

Coaches are not traditionally charged with evaluating teachers; rather, instructional coaches provide a kind of "lifeline" for teachers to reflect upon and refine practice (Blachowicz et al., 2010). Early research indicated that coaching was most effective when it included all five aspects of the coaching model, especially the "feedback" and "in-class coaching" components (Dole, 2004). Early studies also resounded current research, finding that the opportunity to practice and receive instant feedback on classroom practice increased teachers' likelihood of changing their practice (Dole, 2004; Hartman, 2013; Kohler, Crilley, Shearer, & Good, 1997; Marsh et al., 2010). Coaches often take on additional roles in their schools or departments, including: data management, student tracking, writing assessments, administrative planning, providing

professional development workshops, and working with students (Denton & Hasbrouck, 2009; Heineke, 2013; Marsh et al., 2010). Though many coaches take on a multiplicity of roles, there is no predominant, research-based operational model for coaches (Blachowicz et al., 2010; Denton & Hasbrouck, 2009).

Instructional coaching is a relatively new trend in American schools, and there is little research on its effectiveness. The bulk of current research on instructional coaching is qualitative and/or focuses on particular aspects of coaching practice in localized contexts (Biancarosa, Bryk, & Dexter, 2013; Garcia, Jones, Holland, & Mundy, 2013; Gibson, 2005; Hartman, 2013; Heineke, 2013; Ippolito, 2010). Additionally, the scant quantitative research into the effects of instructional coaching on student outcomes suffers structural flaws (Biancarosa et al., 2010). In a meta-analysis of 20 years of research on the effects of coaching on teacher practice, Kretlow and Bartholomew (2010) found 13 out of 457 research articles that met basic quality standards of research design. There is some quantitative evidence that instructional coaching can improve student outcomes, but the limitations of that research provide important caveats (Biancarosa et al., 2010; Garcia et al., 2013; Lockwood, McCombs, & Marsh, 2010). To wit, though research cited here was the result of experimental design—the research in Biancarosa et al. (2013) is particularly compelling—it is difficult to disentangle the effects of coaching from other factors (e.g. aspects of curriculum) that may affect student outcomes. As Kretlow and Bartholomew (2010) indicated however, there is evidence from the last 20 years that embedded professional development through instructional coaching, along with more traditional forms of professional development, leads to lasting teacher adoption of research-based practice and improved student outcomes.

In connecting the research literature, the argument for instructional coaching in response to the CCSS flows naturally. Indeed, there is a clear need for professional development to improve and align instruction to the CCSS. It is well established that the most effective form of professional development: 1) is contextualized to teachers' specific practices, 2) provides opportunity for teacher reflections, and 3) involves a routine feedback cycle. An instructional coaching model provides these elements; what's more, because the CCSS demands daily rigor and creativity in lesson planning, site-based professional development is a worthy strategy. Thus, established, competent instructional coaches could be key actors in transitioning teachers and schools to the CCSS.

Research Questions

This research study addressed the following questions:

1) Does instructional coaching in an urban charter school improve teachers' understanding and implementation of curricular materials?

2) Does instructional coaching in an urban charter school improve alignment of teacher practices to the Common Core State Standards?

This study also sought to determine what aspects of the coaching model are effective in relation to teacher practice.

METHODOLOGY

This study took place in a charter middle school in a large, Northeastern, American city. For the purpose of anonymity, we will refer to the school as New Hope Charter Middle School (New Hope). The school resides in one of the city's lowest performing districts. The population of the school includes 243 students in grades six through eight, distributed (approximately) equally between the grades. Relevant demographic facts about the student body are included in Table 1.

Table 1	
Student Demographics at New Hope Charter School	
Demographic	Percentage
Eligible for Free Lunch	78
Eligible for Reduced Lunch	10
Limited English Proficient	1
Black or African American	90
Hispanic or Latino	8
White	1
Multiracial	1
Note: Demographic information is given for the entire K-10 students population of New Hope. Data are for the 2010-2011 school year, the last year for which data is available. The data categories are those established by the city's Department of Education.	

Because of their primacy as annually tested subjects, mathematics and English language arts (ELA) classes are provided 90-minute periods each day.

The state in which New Hope resides transitioned to CCSS-aligned assessments in the 2012-2013 school year. New Hope routinely posted proficiency rates on the state exam in the 70 to 80 percent range before the transition to CCSS-aligned assessments. After the transition to the CCSS-aligned assessments, students' proficiency ratings on the mathematics assessments were 46% (sixth grade), 39% (seventh), and 19% (eighth). Though students at New Hope outperformed their peers in the local district, they underperformed students citywide. In response to the relatively poor showing on the state exams in mathematics, New Hope responded with two major initiatives: purchasing a new mathematics curriculum and hiring an instructional coach for mathematics to supervise and elevate the quality of instruction in daily classrooms. A description of the math coach follows, with special attention paid to his roles in the school.

The math coach is a former high school teacher, with four years of experience teaching high school mathematics at New Hope High School. The math coach is the primary supervisor for the mathematics department, which consists of ten teachers/teaching assistants (TAs). He is responsible for completing performance evaluations of the mathematics faculty in every phase of

practice. The math coach is also responsible for data collection and analysis, and he collaborates with teachers to ensure effective interventions. He also performs routine, informal observations of each teacher in the department, providing feedback and suggestions for improving practice. The math coach meets with each member of the department weekly to discuss plans, interventions, data, and recent observations. In these meetings, the coach and teacher examine the specific classroom context in which the teacher works, affording the teacher an opportunity to reflect on and refine instructional practice. In addition, the math coach writes lesson plans, performs professional development with the department and the entire faculty, and routinely assists with activities and small group instruction in mathematics classrooms. The math coach performs a number of administrative roles beyond his coaching responsibilities. He supervises the math teachers in the department, holding them accountable for meeting the day-to-day obligations of their work, including timely submission of lesson plans. In addition, the math coach takes part in administrative meetings regarding student progress, including students with special needs, and hires new faculty. These aspects of the position sometimes preclude coaching-related work.

Regarding the faculty at New Hope, there were 33 teachers and teacher's aids working in the middle school in the 2013-2014 academic year, with similar distributions across the three grades. Of the 33 teachers on staff, less than 25% (two math teachers and nine total) were retained from the previous school year. Twenty-four new teachers (eight math) were hired for the 2013-2014 school year. A substantial fraction of the new faculty were either first-year teachers (two math teachers and five total) or new to the state (one math teacher and four total). Only three members of the middle school faculty had more than ten years experience teaching, and one-fifth of the faculty (5 teachers) had more than five years of teaching experience. Overall, the faculty was young and inexperienced, which is pertinent here given the responsibility of the math coach to assist this particular faculty in aligning curriculum and instruction to the CCSS.

Instruments

This study included two sources of data. First, a general survey was administered to the faculty who worked with the math coach during the 2013-2014 school year. This survey included a total of 17 items, and included a mixture of Likert-scaled and open-ended questions. Second, students' mathematics benchmark exam data were considered.

The survey items (see Appendix A) were designed to assess the effectiveness of the instructional coach in improving teachers' instructional practice and assisting teachers in aligning instruction to the CCSS. These tools were designed and selected to address various aspects of coaching practice, including:

- General questions about experiences with the coach.
- The most essential coaching practices *vis a vis* improving instruction.
- The relative impact of instructional coaching on teacher practice.
- The relative impact of instructional coaching on student achievement.
- The impact of non-coaching activities (data analysis, curriculum development, etc.) performed by the instructional coaches on coaching practice.

Benchmark exams are given to students bimonthly in each grade to measure students' progress towards proficiency with respect to learning standards and skills. This data is kept by the instructional coaches, both to inform teacher feedback and for internal use in measuring student progress across the school.

Collection of survey information took place in the last two weeks of February, 2014, when teachers participated in online surveys. The surveys were administered online, through surveymonkey.com, to ensure anonymity of response.Questions requiring an open-ended response were discussed at length to determine the nature and quality of the relationships formed between teachers and the instructional coach. Finally, student achievement data was kept throughout the year, and it was disaggregated and analyzed using simple measures of central tendency in February, 2014.

RESULTS

Seven mathematics teachers—100 percent of the mathematics teachers working at New Hope in February, 2014—responded to the online survey. The results are presented below by topic, and the raw data from the open-ended items of the survey are presented in Appendix B.

Ranking Coaching Practices

The math coach at New Hope performed a multitude of roles as coach; respondents were asked to rank several aspects of the coach's practice "in improving instruction." Respondents ranked seven elements of the coach's practice in order from greatest (ranked first) to least. The results are presented and summarized in Table 2.

Table 2
Survey Item 3: Rank the following practices of the instructional coach in order of their importance to you in improving instruction. The most important practice should be ranked '1' and the least '7.'

Ranking	1	2	3	4	5	6	7	Average
*Observation /Feedback	4	2	1	0	0	0	0	1.57
* Lesson plan feedback	0	2	1	3	1	0	0	3.43
* Discussing interventions for specific students/classes	2	2	1	1	0	1	0	2.71
* Whole group professional development	0	1	1	0	2	1	2	5.00
* Assistance with data and data analysis	1	0	2	2	1	1	0	3.71
* Discussing research-based practices	0	0	0	1	2	2	2	5.71
* Working directly with students in classroom	0	0	1	0	1	2	3	5.86

There is clear separation among the responses to this item. Respondents clearly view the observation/feedback cycle and discussions about specific classes as the most important practices of the coach (in that order). Naturally, these practices are strongly related, as discussions about specific classroom observations will evolve into the teachers' experiences working with particular classes. In the middle tier of responses, lesson plan feedback and support with student data were bunched together with an average ranking between three and four. Finally, whole-group professional development, discussing research-based practices, and assistance with students were perceived to be the least influential aspects of the coach's practice. These rankings are reflected in the responses to item ten (discussed below), in which teachers clearly indicate that they would like additional assistance in the classroom with students. That is, the ranking of "working with students in the classroom" as least influential indicates, not that the practice is ineffective, but that working with students is not part of the coach's practice. Respondents later identify this as a gap in his practice they would like to see filled.

Improving Instruction

One Likert-scale and two open-ended prompts were given to respondents to measure their perceptions of the coach's effective and ineffective practices. On the Likert-scaled prompt, "On balance, interactions with the instructional coach have improved my instructional practice," all respondents agreed (three) or strongly agreed (four) with the statement. The open-ended prompt in item four asked respondents about the positive influence of the coach on their instructional practice. The responses to this prompt reflect the rankings discussed in the previous section, as respondents highlight the importance of routine feedback on specific lessons and observation focused on specific problems that teachers perceive in their classrooms. In both of these prompts, the relevance of feedback to practice is notable, as nearly all respondents note the importance of context-specific feedback. Teachers specifically mention pace, interventions with specific students/classes, use of data to inform instruction, and classroom management as aspects of practice with which they have sought help. Three respondents refer to the specific needs of their students, which indicated that the coach worked specifically to help teachers tailor instruction to their specific students' needs.

In addition to asking respondents to reflect on the effective aspects of practice, the survey asked them to reflect on the least effective elements of the coach's practice in item ten. This item asks respondents, not only to remark on ineffective practices, but also to indicate what practices they would like the coach to perform, which were not being performed, at the time of the survey. Though they had the opportunity to criticize particular practices, which two respondents took to a minor extent, most of the respondents indicated gaps in the coach's practice that they would like to see filled. Here, the overwhelming sentiment of the seven respondents is that they would like the coach to spend more time working with students and modeling best practices, the latter of which was not a practice utilized by the coach. There are some additional responses involving meeting time for grade-level teams and spreadsheets (see below), but the responses involving greater presence in classrooms mirrors the rankings of coaching practice detailed above.

Professional Development

The coach ran bi-monthly professional development meetings (PD) with the mathematics department starting in the second quarter of the year. Topics for the PDs were decided in response to observed trends across mathematics classrooms in the coach's observations. The PDs were given Wednesdays after school, and teachers were compensated for the additional time they spent working on those days. Two items asked respondents to reflect on professional development generally. In item 14 respondents were given the Likert-scaled prompt: "The instructional coach followed up with me on formal professional development topics." Two respondents strongly agreed, three agreed, and two were neutral. In response to the more general prompt in Item 13 ("Through my work with the instructional coach, I have been able to meet most of my professional development goals this year"), one teacher strongly agreed, five teachers agreed, and one teacher was neutral on the statement. In their response to the open-ended item 17, in which respondents were given an opportunity to share "additional remarks or comments," two respondents remarked on the after-school PDs. One respondent wrote:

> The after school professional developments we have after school [*sic.*] are also very helpful because it allows us to see the specific skills that the students need to have mastered before entering each grade level. (in reference to the problems we solve in [*sic.*] the beginning). Also, allows [*sic.*] us to work collaboratively with our grade teams. I wish there was more time built into the daily school day [*sic.*] to meet with our grade level math teams collaboratively.

Another respondent wrote:

> I am painfully aware of the limited time that is available for meaningful dialogue between the instructional coach and teams of teachers. However, the need for grade level and mixed grade level meetings that offers the opportunity to focus on content seems to be an imperative… The instructional coach has a critical role in creating an atmosphere of open exchange about how to best tell the story of mathematics. And, that environment must first exist between classroom instructors, before it can happen in the classroom.

Both respondents clearly indicated a desire for more time to work across and within grade levels. Though the PDs provided them some opportunity to do so, these teachers felt a need for additional time to collaborate and develop with their peers.

Data

Data analysis was a key part of the coach's responsibilities in the mathematics department. Teachers were expected to track student progress relative to particular skills, and after each grade-level benchmark exam, the coach and each teacher would consider disaggregated data from the exam to draw conclusions about student learning and teacher practice. When given the Likert-scaled prompt in item 16, "The instructional coach helped me use data to inform instruction," four teachers strongly agreed, two teachers agreed, and one teacher was neutral. Taken in context with the items above and below, teachers' feedback on

data is woven throughout their responses to different survey prompts. Respondents clearly reported a general improvement in their ability to use data to inform instructional practice.

Common Core

Three prompts were provided to ascertain the intersection of the coach's practice with teacher understanding of the CCSS, items five (open-ended), seven (Likert scale), and fifteen (Likert scale). Item seven was the most direct: "On balance, my work with the instructional coach has improved my ability to deliver common core aligned lessons." In response to this prompt, two teachers strongly agreed, four teachers agreed, and one teacher was neutral. Item 15 read, "The instructional coach's feedback has helped me improve the quality of my lesson plans." In response to this prompt, one respondent strongly agreed, four teachers agreed, one was neutral, and one strongly disagreed. With the exception of one respondent, the teachers were univocal in response to this prompt: the coach has been instrumental in helping them align their plans and instruction to the CCSS. The means by which this happens is primarily through feedback on teachers' lesson plans and in the weekly meetings that the coach has with teachers. These responses connect to those above (Item 11), in which teachers indicated that the coach helped to "raise standards" for their students. As part of improving the quality of instruction in classrooms, an essential element had been the focus on teaching aligned to the CCSS throughout the year. Teachers' responses also connect to the discussion above about professional development. Because most of the teachers in the study were new to the school, teachers felt that they needed more time working through the CCSS and developing a consistent approach to aligning instruction. The teachers in this study indicated a perceived need for additional time to learn about the standards and develop best practices collaboratively, with the support of the coach. So, although teachers reported that the coach had helped them align lessons and instruction to the CCSS, they desired additional time to learn about and collaborate on the standards.

The Coaching Model

Given the multitude of models for instructional coaching in the research literature, one item was included that specifically asked about the coaching model used by the coach at New Hope. Item nine, a Likert-scaled prompt, read, "The instructional coach's administrative (non-coaching) responsibilities detract from her/his coaching responsibilities." In response, one respondent agreed, five respondents were neutral, and one teacher disagreed. Some depth is given to this response in the responses to item 10 of the survey—the open ended item in which teachers provide suggestions to improve the coach's practice. In their responses to that prompt, four of the seven respondents indicated that the coach was unable to incorporate the practice they recommended due to "non-coaching responsibilities" or "wear[ing] several hats." As discussed above, respondents would prefer the coach had spent more time in their classrooms, working with students, and giving demonstration lessons for the different practices they had discussed. The coach was unable to employ these additional practices due to other administrative obligations, which is a reflection for the coach on the model employed at New Hope.

Student Achievement

Respondents to the survey were ambivalent regarding the coach's effect on student achievement. The respondents' perceptions were measured using two items on the survey: one Likert-scaled (item eight) and one open-ended (item eleven). In response to the Likert-scaled prompt, "On balance, my work with the instructional coach helped me to improve student achievement in my classes," one respondent strongly agreed, three agreed, and the remaining three respondents were neutral. The responses to this item reflect the ambivalence in the closed item on student achievement: teachers see the effect of the coach on student achievement as flowing through his support of their practice. In this item, again, three respondents viewed the coach's emphasis on data as benefitting their practice and their students. Also, in response to this prompt, all but two of the teachers surveyed indicated that holding students and teachers to high standards and focusing on specific elements of practice improved student achievement. Teachers viewed the influence of the coach on student achievement as indirect, through improving one or more elements of their instructional practice.

Data was also kept on student achievement throughout the school year on the eight "benchmark" tests that were given throughout the year in each grade. These assessments were written, in cooperation with the grade-level teachers, by the coach, and they were given every two to three weeks on content that had been taught since the previous benchmark. Data for these benchmarks are disaggregated in Tables 3, 4, and 5 below by class and by grade. The benchmark data represented is from tests given between September 2013 and February 2014.

Table 3
Benchmark Performance Grade 6 (Disaggregated by Class)

Class	n	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8
All 6th Graders	77	74	63	69	60	49	51	56	68
Class A	19	73	61	57	50	39	37	52	61
Class B	20	69	56	70	67	49	54	61	55
Class C	20	68	58	68	53	37	44	43	64
Class D	18	85	77	83	69	67	73	72	81

Note: All scores are average percentages on each assessment.

Table 4
Benchmark Performance Grade 7 (Disaggregated by Class)

Class	n	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8
All 7th Graders	72	52	54	55	56	44	27	49	41
Class E	16	48	49	49	34	31	20	38	33
Class F	17	39	47	45	30	44	24	52	35
Class G	18	48	47	48	41	38	17	41	36
Class H	21	70	64	68	58	58	43	69	54

Note: All scores are average percentages on each assessment.

Table 5
Benchmark Performance Grade 8 (Disaggregated by Class)

Class	n	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8
All 8th Graders	89	53	56	57	65	66	51	50	59
Class I	24	41	51	54	59	65	58	54	66
Class J	24	53	53	54	68	67	46	49	56
Class K	21	48	52	44	58	69	45	50	53
Class L	21	72	68	77	72	72	N/A	65	65

Note: All scores are average percentages on each assessment.

While the respondents perceived an improvement in their instructional practice and an effect on student achievement, there is no evidence in the benchmark data presented above that the students improved, relative to skills. The effects of the coach's efforts are not apparent in this data, as the test data for each grade and each class vacillates considerably.

Another view of the benchmark data may be beneficial. "Proficiency estimates" were kept throughout the year for the students' estimated proficiency on each benchmark exam. This was calculated using the "cut score" for earning a proficient rating on the state exam—the percentage of points earned in total—and counting the number of students who earned that percentage of points on each benchmark. Since the benchmark exams were CCSS-aligned, the working assumption is that proficiency on each benchmark is reflective of student proficiency *vis a vis* those standards assessed. Data was kept as to the percentage of students at each grade level who scored at that level on each benchmark, and it is presented in Table 6.

Table 6
2013 Proficiency Compared with Proficiency Estimates (by Benchmark) for Grades 6-8

	6th Grade	7th Grade	8th Grade
2013 Results (Actual)	45.70%	39.00%	18.50%
Benchmark 2[a]	46%	32%	30%
Benchmark 3	51%	32%	33%
Benchmark 4	49%	22%	52%
Benchmark 5	28%	21%	49%
Benchmark 6	29%	6%	21%
Benchmark 7	31%	25%	22%
Benchmark 8	51%	12%	36%

Note: Proficiency estimates are calculated using the "cut scores" from the 2013 state test, i.e. the percentage of points required to earn a Level 3 on the NYS exam.

[a]Data for Benchmark 1 was not kept at a level of detail sufficient to make a proficiency estimate.

The trend line is clearer in Table 6 than in Tables 3 through 5. In grades six and eight, and particularly in grade eight, students performed above their results on the 2013 state test, with a slight lull in performance on benchmarks six and seven, which took place in January. Grade seven, on the other hand, underperformed their previous performance throughout the year. In comparison to the raw benchmark data presented in Tables 3 through 5, this data provides some

perspective on how students performed relative to expectations. In other words, because the benchmark exams were aligned to the CCSS, the exams included complex problems to the exclusion of rote, mechanical mathematics. This level of sophistication accounts, in part, for the seemingly low raw scores on the benchmark exams. When placed in context of the cut score for the state test, the level of student achievement is brought into clearer relief. Here there is some evidence that teachers in grade six and eight moved students towards proficiency in greater numbers than one would anticipate on the 2013 state test. Additionally, it is clear from the data that the seventh grade mathematics teachers did not have the same success in moving students to proficiency. The influence of the instructional coach is one variable that may account for these trends.

DISCUSSION

The seven respondents of the mathematics department uniformly agreed that the coach helped them to improve instructional practice. When given the opportunity to detail the drivers of instructional improvement, nearly all respondents expressed satisfaction with the coaching cycle of observation and feedback on particular lessons and classes. The emphasis on data-driven, classroom-specific interventions indicated that the faculty involved in this study felt the work of the coach helped teach their students more effectively. When prompted to identify the gaps in the coach's practice, teachers responded that they would like to see the coach do more work with students, through modeling of best practices and working directly with students in their classrooms. There is consensus that the coaching model discussed here has improved practice, specifically as it aligns to understanding and implementing the CCSS.

This study was designed to determine the effectiveness of instructional coaching as a model for teacher professional development, with respect to the CCSS. The study indicated that instructional coaching can serve as a model for improving teachers' understanding and implementation of curriculum and learning standards. In particular, the study details which aspects of the coaching cycle are most important for teachers, and these are supported by the research literature on professional development. In line with current research on professional development, teachers in this study responded well to activity that: 1) was specific to their classrooms and students, 2) allowed them to reflect on their practice, and 3) included consistent follow up. More generally, the instructional coaching model provided a context for teachers to collaborate with the coach and one another, and to reflect on best practices within their school. That opportunity for reflection, connected to daily teacher performance and student data, allowed teachers to effectively change their practice routines.

Instructional coaching provides an effective professional development model, particularly as it relates to helping teachers adapt practice to a new school context, new curriculum, and new learning standards. For a population such as the one studied here, which included a relatively inexperienced faculty that was unfamiliar with the CCSS, the work of an instructional coach can be instrumental in improving teachers' practice and alignment to rigorous curricular standards. The results of the survey indicated improved teacher understanding of the CCSS as a result of the coaching cycle. The results of this study further indicate that an instructional coaching model can provide the professional development that teachers need to meet the demands of the CCSS in everyday classroom instruction.

Important to this study is the affirmation that instructional coaching is an effective professional development model precisely because it meets the criteria for effective professional

development that is outlined in the research literature. The respondents in this study believed that the work of the instructional coach helped them improve instructional understanding and practice. It is appropriate, then, to consider the coaching model described here and consider what elements were and were not implemented effectively by the instructional coach at New Hope.

The Coaching Model

This study reinforced the research associated with the elements of effective instructional coaching, including the five key elements of coaching practice that Dole (2004) discussed: theory, demonstration, practice, feedback, and in-class coaching. The coach in this study performed all but one of these functions (demonstration). The survey respondents identified the effectiveness of the instructional coach in each of the theory, practice, feedback, and in-class elements of coaching practice. Unprompted, the survey respondents expressed the need for the coach to demonstrate techniques and provide them the opportunity to practice what they saw (demonstration). While the theory, practice, feedback, and in-class coaching aspects of the role are vindicated in this study, the teachers revealed the absence of the fifth element identified in the research as essential to coaching practice. Both the positive and negative responses to the work of this study's instructional coach would be instructive in refining the coaching model used at New Hope.

In light of the conclusions detailed above, the use of coaching elements should be studied to determine differences in effectiveness among variations of implementation. While this study echoes early research on the effectiveness of instructional coaching, the multiplicity of coaching models renders the conclusions from such research ambiguous. For example, the coach in this study also maintained a supervisory role *vis a vis* the mathematics faculty, and he fulfilled additional non-coaching responsibilities in the school. Some respondents indicated that the coach was unable to perform additional roles in the department because of outside responsibilities. In some schools, coaches are peer teachers or department chairs; in other contexts, coaches perform merely a mentor role in relation to teachers. From the perspective of school leadership, if one were to hire instructional coaches, the research is quiet on the most effective permutation of roles and responsibilities assigned to an instructional coach to optimize effectiveness. This study is also quiet on the matter of context. The coach in this study worked in an urban charter middle school, with an inexperienced, newly formed faculty that was charged with teaching in alignment to the CCSS. Of course, it is likely that different models will work in different localities and school levels, so there is ample opportunity to investigate the most effective elements of this practice. With this in mind, it would also be useful to consider the specific elements of best coaching practice in different localities. Further research on coaching would assist in quantifying the impact of particular coaching techniques on teacher practice relative to a context. By doing so, coaches could prioritize the most effective practices in developing an array of techniques for working with teachers in their particular school sites. Research on this topic began in the last decade. Additional research would provide clarity to the particular qualities and practices of effective instructional coaches.

Implications for School Leaders

This study determined that instructional coaching can have a positive effect on teacher knowledge and practice in an urban charter middle school. In the particular context studied here, in which teachers were relatively inexperienced and adapting to new standards, instructional coaching provided an opportunity for teachers to consider daily practice and adjust as the year progressed. These findings suggest that, as school leaders and teachers are held accountable to student achievement in relation to the CCSS, instructional coaching could prove to be an effective tool to improve teacher practice. From this research, there is evidence that the routine focus of an instructional coach on the daily practice of teachers can improve classroom instruction. Specifically, regular feedback on planning, instruction, and assessment provides teachers the opportunity to reflect and refine teaching in their classrooms with their students. The array of roles and responsibilities for the instructional coach are only cursorily addressed here. There is reason to surmise from this study that a coach will have a greater effect if his or her role is limited to coaching responsibilities, since the five elements of coaching described by Dole (2004) require substantial time and organization.

These findings would suggest that a small team of instructional coaches, working with the faculty of a school, could play a significant role in aligning teacher practice to rigorous learning standards. In light of this and other current research on instructional coaching, school leaders should consider an instructional coaching model for building capacity in teaching staff. In doing so, the roles and responsibilities of the coaching staff should be carefully considered and juxtaposed to the needs of the teaching faculty and their students. In particular, as the demands of the CCSS and the aligned assessments continue to take effect across the country, expert teachers who are experienced in curricular and pedagogical decision-making can play a consequential role in instructional leadership at the school level. School leaders would do well to create such positions and cultivate relationships between expert and developing faculty to ensure that instruction is aligned to the Common Core State Standards.

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Appendix A

Below are the survey questions for this study. The type of question (open ended or Likert) is indicated parenthetically.

1. What subject do you teach? [Drop down]
2. Approximately how many hours every week do you have professional interactions with your instructional coach? [Drop down]
3. Rank the following practices of the instructional coach in order of their importance to you in improving instruction. The most important practice should be ranked '1' and the least '7.'

    a. Assistance with data and data analysis
    b. Whole group professional development
    c. Observation and feedback
    d. Discussing research-based practices
    e. Lesson plan feedback
    f. Working directly with students in the classroom
    g. Discussing interventions for specific students/classes

4. What (if any) positive effects has the instructional coach had on your teaching practice? Please describe particular structures or activities (if any) that you have found most effective (e.g. professional development, lesson feedback, model lessons, etc.). [Open ended]
5. Has your work with the instructional coach helped you to better understand the Common Core standards and/or devise lessons aligned to the Common Core? Please explain. [Open ended]
6. On balance, interactions with the instructional coach have improved my instructional practice. [Likert]
7. On balance, my work with the instructional coach has improved my ability to deliver common core aligned lessons. [Likert]
8. On balance, my work with the instructional coach helped me to improve student achievement in my classes. [Likert]
9. The instructional coach's administrative (non-coaching) responsibilities detract from her/his coaching responsibilities. [Likert]
10. In your opinion, what are the least effective practices of the instructional coach. You may also describe things the instructional coach did NOT do but which you believe s/he should. [Open ended]
    Please describe particular structures or habits. [Open ended]
11. In your opinion, what effect (if any) do you think instructional coaching has had on your students' achievement? Please explain how or why. [Open ended]
12. Professional development activities developed by the instructional coach positively influenced my teaching. [Likert]
13. Through my work with the instructional coach, I have been able to meet most of my professional development goals this year. [Likert]
14. The instructional coach followed up with me on formal professional development topics. [Likert]
15. The instructional coach's feedback has helped me improve the quality of my lesson plans. [Likert]
16. The instructional coach helped me use data to inform instruction. [Likert]
17. Please use this space below to include any additional remarks or constructive feedback regarding work with your instructional coach this year.
    You may find the following list of topics helpful in framing your response:
    --Common Core

--Lesson planning
--Use of data
--Formal professional development
--Observation and feedback cycle
--Positive effects of the coaching model
--Negative effects of the coaching model
--Practices you wish the coach would adopt
[Open ended]

Appendix B

Listed below, in tables, are the verbatim responses of all survey respondents to open-ended survey items. These are ordered by topic, in the order in which they referenced in Chapter Four of this paper.

Table 8	
Responses to Item 4: What (if any) positive effects has the instructional coach had on your teaching practice?	
Respondent Number	**Response**
1	The instructional coach has taken the time to plan professional development that has been useful to improve my craft as a teacher and my classroom instruction. He's has been very diligent with giving constructive feedback on lesson plans and observations. He is also willing to take time out of his busy schedule to help and support teachers (of various content) whenever needed.
2	His honest observations of me has allowed me to re-examine my practice. He has alluded to me picking up the pace in my delivery of a lesson. I have found that I have students tuned in a bit more to instruction. It seems slight but it has made a difference.
3	The instructional coach has provided positive effects in the areas of lesson planning, data analysis, and overal *(sic.)* professional support in all areas.
4	My instructional coach has taught me how to use and analyze data to improved *(sic.)* my instruction. Guided me on the best way to teach a skill that is the easiest for our students. Also, simple classroom management techniques.
5	Feedback from my instructional coach concerning my in-class instruction and lesson plans has had the most positive effect on my teaching practice. It is important to note, too, that the majority of this feedback occurs during one-on-one weekly meetings held between the instructional coach and staff within the math department. Setting aside time for these types of discussions has proved critically important in enhancing the collaborative nature of the professional relationship, in addition to the quality and scope of the conversation. More specifically, these meetings represent opportunities in which I can reflect upon my own practice, determine what methods prove most effective (or ineffective) for my students, and identify and set goals for both myself and my students.
6	The instructional coach has increased my confidence in my teaching. While struggling with various classes or students, he will come to observe that class and give me feedback as to what I can be doing better or what I am doing well.
7	The observation feedback has been very helpful in providing me with an objective and professional reflection on ways to improve my instructional practices. Having an instructional coach that is able to accurately gage the pace at which instruction was moving, relative to the needs and ability of the students, provided guidance in calibrating what and how much I should aim to accomplish in an instructional period.

Table 9
Responses to Item 10: In your opinion, what are the least effective practices of the instructional coach. You may also describe things the instructional coach did NOT do but which you believe s/he should. Please describe particular structures or habits.

Respondent Number	Response
1	The least effective practices of the instructional coach are not being able to spread his time evenly amongst the math staff. He wears several hats and often gets tied up with other obligations, causing to reschedule meetings at times. He offers good strategies to implement and promote a positive classroom culture, however it would've been helpful if he could've modeled some of those strategies and techniques for better clarification.
2	I believe I needed more assistance with creating spreadsheets.
3	Support in the classroom, due to scheduling this was not always an available option.
4	Because of the instructional coach's non-coaching responsibilities it hinders him from being in our classroom frequently.
5	The instructional coach could be more diligent about articulating "action items," or items upon which a teacher must focus (for completion of improvement, etc.), prior to the close of one-to-one meetings. As these conversations tend to be lengthy and cover many topics, it is helpful to identify those items that both the instructional coach and teacher decide demand the most attention.
6	At times, I feel the instructional coach leans too much on the department for help. I wish the instructional coach spent more time with the kids or modeling lessons for me.
7	The most challenging task that faced the instructional coach was trying to share important information in short, 12 - 15 minute bursts three times per week. This format limited the depth of conversation and exchange between instructors and coach. Additionally, attendance and punctuality by participants was spotty. It would be helpful for an instructional coach to have a greater time span to share instructional/content ideas with staff.

Table 10
Responses to Item 5: Has your work with the instructional coach helped you to better understand the Common Core standards and/or devise lessons aligned to the Common Core? Please explain.

Respondent Number	Response
1	My work with the instructional coach has helped me to devise lessons aligned to the Common Core. The format we use along with a professional development on lesson planning has help to touch base on the teaching from bell to bell and striving to reach the needs of all students. We have focused on digging deeper into the skills students struggle with and using those fundamental skills to understand the content and concepts of the Common Core standards, preparing students to be successful on assessments.
2	Yes, my coach has offered feedback and insight into the common core standards. We meet once a week and in those meetings we discuss the common core standards along with the implementation strategies for students.
3	Yes, working with my instructional coach, I have a better understanding of each common core standard. The lesson planning feedback and assistance is the greatest help.
4	Yes, during our weekly meetings we discuss he common core standards and the best way to teach the skill.
5	Working with my instructional coach has rendered my understanding of the Common Core more comprehensive, such that I feel that my lesson plans have become gradually more aligned to the standards. Specifically, the instructional coach provides feedback for nearly all lesson plans (including supporting documents) that urges me to streamline my instruction so as to construct the most effective lesson possible for my students. Additionally, the instructional coach makes himself available to talk through LPs with teachers to discuss, among other things, how best to refine and streamline lessons in order to maximize instructional time and enhance student understanding. Lastly, grade-level teams were required to map out the year according to the Common Core standards delineated for their respective grade level, which forced teachers to flesh out the ways in which learning objective are linked with certain standards.
6	No.
7	I have become more comfortable planning lessons aligned to the Common Core, because the feedback on lesson plans and classroom observations has reinforced the benefits of providing a focused and coherent content to my students.

Table 11

Responses to Item 11: In your opinion, what effect (if any) do you think instructional coaching has had on your students' achievement? Please explain how or why.

Respondent Number	Response
1	The effect instructional coaching has had on the students' achievement is offering great and timely feedback on lesson plans and observations. Through the use of data, it has help to analyze what skills students arent (*sic.*) successful in and develop various strategies to tackle those difficulties.
2	His suggestion on picking up my pace and delivery, has forced my students to sustain their focus during instruction which has lead to more dialogue between myself and my students.
3	I believe the instructional coach guidance has overall improved not only the students (*sic.*) achievement but all the staff. He sets a high standard for the students.
4	By helping the teachers deconstruct the data. The teachers were then able to provide instruction based on the students needs.
5	Indirectly, my instructional coach has had a positive impact on my students' achievement. By working directly with me to enhance my teaching practices (from lesson planning to delivery), he has helped me grow into a better, more effective teacher for my students.
6	The data has helped me in my instruction.
7	Instructional coaching has help to push my students to higher levels of conceptual understanding. The feedback from the instructional coach supported my style of engaging students in connecting and seeing the "Big Idea", while reminding me of the need to "distill the teaching points into separate pieces."

AUTHOR BIOGRAPHIES

James B. Harrell is an assistant principal in Queens, New York. He was formerly an instructional coach at the charter school studied in the preceding paper. He is a career high school mathematics teacher, who has recently completed a program in Educational Leadership at The City College of New York, The City University of New York.

Dr. Terri N. Watson is an Assistant Professor in the Department of Leadership and Special Education at The City College of New York, The City University of New York. She is a veteran teacher and administrator in New York City and Florida. Her research examines the effective practices of urban school leaders and the application of Critical Race Theory to educational policies and practices.