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## ABSTRACT

School-based instructional coaching is an increasingly popular approach to professional development used to support in-service learning for teachers. However, little is known about the cost of coaching. The following study aims to fill this gap. First, the study describes a framework for measuring the cost of an instructional coaching program; second, this cost framework is applied to three schools with instructional coaching programs during the 2009–10 school year. While model developers suggest a cost of \$2,298 per teacher, the study found average cost per teacher at three schools to range from approximately \$3,260 to \$5,220. Third, a cost framework is developed and applied to three schools utilizing traditional approaches to professional development and average costs are presented for comparison. The study found that instructional coaching is between 6 to 12 times more expensive than traditional approaches to professional development. Because schools are making large investments in coaching programs, research should explore whether instructional coaching is cost-effective. By presenting a framework for measuring costs and reporting costs of a specific program, this study lays the groundwork for cost-effectiveness studies.

## INTRODUCTION

This study reports the cost of instructional coaching (Knight 2007), a model of professional development currently used to support in-service learning for teachers. The purpose of this study is four-fold: first, it presents a framework

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for measuring the cost of coaching programs. Second, the study applies this cost framework to three schools currently implementing instructional coaching and compares the estimates of costs to that of model developer cost estimates. Third, the study discusses strategies for reducing the average cost of instructional coaching. Finally, it estimates the costs of traditional approaches to professional development<sup>1</sup> for comparison with instructional coaching. This is not a cost-effectiveness study because few professional development models have any rigorous measures of effectiveness that would allow for such comparison<sup>2</sup> (Darling-Hammond et al. 2009; Yoon 2007). Rather, this study lays the groundwork for cost-effectiveness studies of alternative approaches to professional development. When the effectiveness of specific coaching models can be measured, the cost framework can be applied to evaluate the cost-effectiveness of coaching programs.

#### WHY STUDY THE COST OF INSTRUCTIONAL COACHING?

The following section establishes a rationale for the study in four parts. First, the section outlines the particular model of instructional coaching analyzed in the study. Second, it reviews literature on teacher effectiveness to justify the need for teacher professional development. Third, the section synthesizes research on teacher professional development, describing effective practices and current status in U.S. schools. School leaders sometimes perceive that budgetary constraints prevent the implementation of intensive professional development practices, such as coaching, despite research suggesting that such approaches raise student achievement (Odden and Archibald 2009). Finally, this section reviews cost analyses of teacher professional development and identifies a gap in extant literature on the cost of instructional coaching. Darling-Hammond et al. (2009) point to an emerging paradigm, suggesting that traditional approaches to teacher professional development are ineffective at raising student outcomes. Effective, evidence-based approaches to teacher professional development require a significant monetary investment from school districts (Odden et al. 2002). Unfortunately, few studies have closely examined the cost of alternative approaches to teacher professional development.

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1. The traditional approach to professional development is defined for the present study as one-day workshops with little or no follow-up training.

2. Biancarosa, Bryk, and Dexter (2010) studied the effects of the Literacy Collaborative, which includes coaching. Their findings indicate that literacy coaching, in the context of the Literacy Collaborative framework, significantly raised student achievement. Yoon, et al. (2007) review nine studies of professional development; however, no model studied resembled typical traditional professional development as it is defined for the present study.

### THE INSTRUCTIONAL COACHING MODEL

The study examines the cost of a specific approach to school-based coaching called the Instructional Coaching model (Knight 2007). An instructional coach is a former teacher whose central role is to partner with the principal and teachers to bring research-based instructional practices into classrooms. Instructional coaches work full-time and are typically employed at one school. The model is built on a philosophy of partnership that values teacher choice and views the coach and teacher as equals in the process of improving instruction. This underlying philosophy informs coaches as they collaborate with teachers through five steps.

The first step for the coach is to identify a teacher who is interested in implementing a new instructional practice. Second, the coach and teacher meet to discuss specific needs of the students and identify instructional practices that will meet those needs. Third, the coach models the instructional practice by teaching one or more lessons to students. Next, the coach observes the teacher implement the new instructional practice. Finally, the teacher and coach meet again to discuss how effective the lesson was and begin to identify additional areas for improvement. To support school wide instructional improvement, coaches also review student data, participate in professional learning and collaborate with the principal and other instructional leaders at the school. The goal of the Instructional Coaching model is to help teachers raise student achievement through evidence-based instructional practices, while valuing the role of teachers and granting them voice in their own professional learning.

### TEACHER EFFECTIVENESS

Professional development aimed at increasing teacher effectiveness relies on the assumption that effective instruction will improve student outcomes. If teacher quality has little impact on student outcomes, then allocating resources to teacher professional development is inefficient. Much debate in educational research has revolved around this simple question: are high quality teachers more likely to exhibit significantly greater student learning gains in their classroom? While it may be a common assumption that teachers affect the quality of learning for their students, scholars have not reached consensus on the link between measurable teacher characteristics and student learning (Hanushek 1994, 1986; Hedges, Laine, and Greenwald 1994). Often, simple characteristics like teaching experience and educational attainment do not correlate with higher student test scores, when controlling for other factors (Hanushek 1986). Yet as researchers gain more access to data and utilize more sophisticated statistical approaches to

analyzing teacher effectiveness, evidence increasingly suggests that high quality instruction has positive long-term effects on students (Chetty, Friedmen, and Rockoff 2011; Hanushek 2011).

Other scholars find a positive relationship between teacher quality and student achievement based on classroom observations, an approach that captures the complex interactions of teaching and learning (Grubb 2009; Monk 1992). Sanders and Rivers (1996) conducted classroom observations of teachers, rating each teacher on a scale of one to five in terms of effectiveness. Over the next three years, students were randomly assigned to teachers to ensure that some students would be randomly assigned to three lowest quality teachers, while other students would be randomly assigned to three highest quality teachers. The differences in test scores for each group were substantial; students assigned to the highest quality teachers for all three years scored in the 96<sup>th</sup> percentile of test scores in district one and 83<sup>rd</sup> percentile in district two. Meanwhile, students assigned to the lowest quality teachers for all three years scored in the 44<sup>th</sup> and 29<sup>th</sup> percentiles, respectively. Sanders and Rivers' findings indicate that high quality instruction significantly improves student learning. Therefore, effective professional development that improves instruction has the potential to improve learning for students.

## TEACHER PROFESSIONAL DEVELOPMENT

### *Effective Practices*

Research suggests that effective professional development is one way to improve instruction (Darling-Hammond et al. 2009). Odden and Archibald (2009) studied schools and districts that doubled student achievement, finding uniformly a large investment<sup>3</sup> in widespread, systematic and ongoing professional development. Although scholars have not narrowly defined one particular approach that most increases student achievement, researchers have highlighted characteristics of effective professional development. For example, in their review of more than 1,300 studies of the effect of teacher professional development on student achievement, Yoon et al. (2007) identify a relationship between time spent in professional development and student outcomes. Professional development programs were correlated with student achievement gains if the teacher was involved with more than 14 teacher contact hours of professional development during the school year. On the basis of these studies, Yoon et al. conclude that

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3. Odden and Archibald (2009) recommend an investment of \$450 per pupil, including \$311 for instructional coaches, \$100 per pupil to pay trainers for workshops, and \$42 per pupil that would allow teachers 10 days of non-student time, based on a hypothetical 500 student school with 18 teachers.

the amount of contact hours is a good predictor of overall impact.

Another way research has assessed the effectiveness of professional development is through measurement of instructional change, a commonly used proxy variable for increased student achievement (Cornett and Knight 2008). A three-year longitudinal study by Desimone and her colleagues (2002) explored specific features of professional development that led teachers to implement new pedagogical strategies. The authors found that professional development experiences most likely to lead to changes in instructional behavior involved opportunities for active learning; teachers played an active role in their professional development rather than acting as “passive recipients of information” (p. 101). Other features that significantly correlate to instructional change included coherence between professional development experiences and collective participation among teachers. The authors also differentiate between two forms of professional development, traditional—one-day workshops with little or no follow-up training—and reform. “Reform type” experiences, such as mentoring, teacher networks, or professional learning communities (PLC<sup>4</sup>), were more likely to lead to implementation of newly learned instructional practices than traditional approaches. Additional survey results have suggested that job-embedded approaches to professional development are more likely to have a lasting impact (Darling-Hammond et al. 2010). In summary, extant research suggests that effective professional development approaches are based in the school community, require active and collaborative teacher participation, and create opportunities for extended learning over time.

### *Current Status*

Although research highlights the need to invest in innovative approaches to professional development, school districts are not always able to do so (Desimone et al. 2002). In their review of teacher professional development in the United States and abroad, Darling-Hammond et al. (2009) found that most learning opportunities for teachers resembled traditional workshops with a duration less than two days. Furthermore, during school year 2003–04, 91.5% of teachers surveyed by the federal Schools and Staffing Survey reported participating in a workshop or training session that year, while less than half of the teachers surveyed reported participating in mentoring or coaching (Darling-Hammond et al. 2009). A national survey funded by Title II Eisenhower state grants<sup>5</sup> yielded similar results (Garet et al. 2001). The survey asked teachers to describe one of

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4. Professional Learning Communities in schools are teams of teachers who collaborate to improve their instruction and content planning (Hord and Sommers 2007).

5. Schools receiving Title II Eisenhower funds represented 93% of all districts and all 50 states, thus findings from Garet, et al. (2001) represent a national sample.

their experiences with professional development during the previous school year. Of teachers surveyed, 81.3% reported a traditional professional development experience, characterized as short-term workshops and training sessions. Only 18.7% reported a “reform type,” which included coaching, teacher study groups, and PLCs.

Therefore, despite the fact that research recommends innovative, collaborative, and sustained approaches to professional development, results from national surveys suggests that many teachers are not exposed to these experiences. This discrepancy begs a critical question: why do districts fail to implement “research-based” professional development practices, relying instead on less effective, traditional approaches?

#### ANALYSES OF PROFESSIONAL DEVELOPMENT EXPENDITURES

One impediment to the implementation of nontraditional professional development practices in schools may be cost. As Odden et al. (2002) point out, new approaches to professional development that are intensive, ongoing and job-embedded can be expensive for the school district (Odden et al. 2002). In surveys of school administrators and professional development experts, Cortina (2011) identified the cost of instructional coaching as a major factor in decision-making. Survey data also showed that school administrators perceive limited personnel time as a preventative factor for implementing intensive professional development. Therefore, cost analyses of professional development may offer insight into the feasibility of implementing innovative approaches to professional learning. While researchers have made significant progress towards identifying costs of professional development (Miles et al. 2005; Miller et al. 1994; Little et al. 1987; Moore and Hyde 1981), such studies aim to measure the total expenditure on professional development as a percent of the total district budget. This framework for understanding cost is useful; however, it does not allow practitioners or policymakers to compare the cost of different approaches to professional development, a problem that will be discussed further at the end of this section.

Donald Moore and Arthur Hyde (1981) conducted one of the earliest comprehensive studies of expenditures of professional development at the school district level. That study examined staff development for teachers in three urban school districts in California, using a previously developed framework (Moore and Hyde 1978). Moore and Hyde developed an operational definition of staff development to include any activity intended to prepare teachers for their

current or future roles in the district. Understanding a school district's financial system can be a lengthy process because school budgets rarely separate costs of staff development from other costs by line numbers, thus rigorous studies of time allocations in schools often require interviews with personnel. Moore and Hyde (1981) collected data through interviews with those involved in staff development at all levels, from leaders at the district level to classroom teachers.

Adding up all costs of staff development activities in three districts Moore and Hyde (1981) found district investment to be as low as 3.28% and as high as 5.72% of total district investment. This reflected expenditures from approximately \$2,570 to \$4,680 per teacher in 2010 dollars. Much of this cost was reflected in three major categories. The cost of teacher salaried work time represented 32–62% of the total cost of staff development; district staff time<sup>6</sup> represented 18–33%; and teacher salary increases comprised 4–9%. The total cost per teacher surpassed by 50 times the estimates of district leaders who were surveyed at the time of the study.

Studying the costs of professional development activities in 30 districts, Little et al. (1987) expanded on the work of Moore and Hyde (1981) by examining the investment from public *and* private sources. Statewide surveys and districts that were randomly selected using probability proportionate to size allowed Little et al. (1987) to compute an estimate for statewide staff development investment in California. Staff development activities were estimated to represent 4.52% of total district expenses and 5.09% when the private uncompensated contributions of teachers were included. The proportion of expenditure on teacher salaried work time was 7.2% of total expenditure on professional development, a wide discrepancy from the Moore and Hyde finding of 32–62% in the same category. This inconsistency is due, in large part, to methodological differences between the two studies. Little et al. (1987) considered only professional development days as reallocated teacher salaried work time, while Moore and Hyde (1981) included all scheduled meetings or routine activities whose purpose was devoted to the professional learning of teachers.

Miller, Lord, and Dorney (1994) analyzed the costs of professional development efforts in four urban districts across the United States. Researchers relied on three sources for data: documents related to professional development, written surveys, and interviews of those involved with staff development. That study found districts spend between 2.2% and 3.4% of the total budget on professional development. Drawing on prior studies of whole district professional development expenditures, Odden et al. (2002) established a new framework for such evaluation. Odden et al. (2002) listed six categories of

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6. Two of the three districts Moore and Hyde (1981) analyzed had professional development offices at the district level, which included several full-time professional development coordinators.

resources that comprised staff development. These categories included (1) teacher time; (2) training and coaching; (3) administration; (4) materials, equipment and facilities; (5) travel; and (6) tuition and conference fees.<sup>7</sup> Each category is broken down into individual resources, which can be thought of as “ingredients” (Levin and McEwan 2001). Miles et al. (2003) adopted this new framework to measure professional development expenditures in five geographically diverse urban districts. As shown in Table 1, studies of the professional development expenditures as a proportion of total district budget reveal a fairly consistent finding: districts have historically invested between two and seven percent of their budget to the professional development of teachers, or about \$2,500 to \$9,400 per teacher in 2010 dollars.<sup>8</sup> Odden and Picus (2008) have suggested an investment of about \$500 per pupil in 2010 dollars, which translates to approximately \$10,950 per teacher based on their assumed average class size of 21.9 pupils per teacher.<sup>9</sup>

*Table 1. Findings from Studies of Professional Development (P.D.) Expenditures*

Authors	Total P.D. Expenditures (Nominal Dollars in Millions)	Total P.D. Expenditures (2010 Dollars in Millions)	Cost per Teacher (Nominal Dollars)	Cost per Teacher (2010 Dollars)	Percent of District Budget
Moore & Hyde (1981)	\$9.368	\$24.805	\$1,768	\$4,681	5.72%
	\$4.607	\$12.198	\$1,124	\$2,976	3.76%
	\$4.069	\$10.774	\$969	\$2,566	3.28%
Little et. al. (1987) <sup>1</sup>	N/A	N/A	\$4,733	\$9,422	5.09%
	N/A	N/A	\$1,851	\$3,685	1.99%
Miller, Lord & Dorney (1994) <sup>2</sup>	\$16.499	\$25.658	\$4,023	\$6,256	2.62%
	\$8.514	\$13.240	\$2,128	\$3,309	2.18%
	\$4.286	\$6.665	\$3,098	\$4,818	2.29%
	\$2.462	\$3.829	\$4,313	\$6,707	3.42%
Miles, Odden, Fermanich & Archibald (2005)	\$11.200	\$13.281	\$2,100	\$2,490	2.30%
	\$19.500	\$23.123	\$5,000	\$5,929	3.10%
	\$8.600	\$10.198	\$2,700	\$3,202	2.20%
	\$36.300	\$43.045	\$7,900	\$9,368	6.90%
	\$19.500	\$23.123	\$4,200	\$4,980	3.70%

<sup>1</sup> For Little, et al., (1987), upper row includes salary increases and lower row excludes them.

<sup>2</sup> For Miller et al., (1994), figures have been adjusted to include fringe benefits.

7. Miles et al. (2003) also mention two additional categories, future salary increases of teachers resulting from professional development and district level research and development in professional development, but excluded these from their analysis.

8. The consumer price index is used to convert nominal dollars to current year dollars.

9. Odden and Picus (2008) recommend allocating resources for instructional coaches, teacher PD days and outside consulting.

While scholars have disagreed on what activities should be included as an expenditure on professional development, each of the above studies have the same objective, that is, to describe the investment in professional development as a percentage of total district expenditures. However, research has yet to compare the cost of alternative approaches to professional development, in part, due to the design of the studies and the undergirding theory. Expenditure studies are not methodologically designed for comparisons of cost among alternative approaches to professional development. Rather, they examine the nominal expenditures of school districts to compare all expenses on professional development relative to total district expenditure. In such a way, studies of expenditure focus on the price of goods purchased, rather than cost, which measures the value of the resources used. Studies of expenditure rely on theories of accounting cost, which typically represents the price of a good. In contrast, economic cost accounts for opportunity cost, thus enabling comparative analysis of resource allocation. Opportunity cost is the value of a good if the good was used in its most productive alternative use (Levin and McEwan 2001). Comparative cost analyses directly inform school leaders of the cost of alternative interventions. For instance, Parrish (1994) compared the cost of five alternative approaches to serving students with limited English proficiency and Levin, Catlin, and Elson (2010) compared the cost of three whole school reading programs. Unfortunately, extant literature has not compared the cost of alternative approaches to professional development. Thus, a framework for understanding the cost of alternative approaches to professional learning is warranted to help guide school leaders in decision-making.

#### A CONCEPTUAL FRAMEWORK FOR COST ANALYSIS IN EDUCATION

The economic cost of an intervention is the total value of all the resources required of the intervention, had these resources been used in their most productive alternative (Levin and McEwan 2001). Measuring the economic cost of educational interventions involves analysis of opportunity cost, which economists define as the value of what is given up by using a resource for one purpose, rather than using the resource for its best alternative use (Levin and McEwan 2001). For instance, resources devoted to lowering class size could alternatively be devoted to paying teachers higher salaries. School leaders must know the cost and effectiveness of each intervention in order to determine which policy is a better use of funds. All school interventions, reforms, or programs require the use of finite resources, whether they involve actual expenditures or simply the reallocation of resources such as personnel time. In order to fully

measure opportunity costs, measures of effectiveness are necessary to assess the value of potential alternatives.

### *Opportunity cost of personnel time*

Traditional approaches to professional development and reform approaches such as instructional coaching and professional learning communities require time commitments of teachers, principals and other educational professionals. Personnel time required for a particular program or intervention is a valuable finite resource, yet these costs are rarely distinguished as expenditures in a school budget (Levin and McEwan 2001). School district budget managers are most interested in budgetary costs, not opportunity costs; however, this may be a false distinction. While teacher salaries are planned for and budgeted before the school year begins, how their salaried work time is allocated has significant impact on student learning. For instance, DuFour (2004) has written extensively on the impact of teacher professional learning communities on student learning. DuFour's research shows that teachers' non-student time can potentially be allocated in ways that increase student achievement. However, reallocating teachers' salaried work time away from one activity, such as an all day workshop, removes any potential benefit from that task, and this lost benefit represents opportunity cost. The old idiom *time is money* rings especially true for educational professionals, whose salaried work time is often limited, thus comparing the costs to implement any school program requires analysis of the personnel time commitments.

Cost analyses that incorporate measures of effectiveness more accurately measure the opportunity cost by examining the effectiveness of alternative interventions and their cost. Levin and McEwan (2001) distinguish between cost-effectiveness, cost utility and cost-benefit analysis; each approach uses similar methods to identify cost, but employs different types of outcome measures. When measures of outcomes are not available, researchers have chosen to assume each intervention has equal effectiveness (King 1994) or avoided any assumption of effectiveness by simply comparing the cost to replicate alternative interventions that have similar outcomes (Levin et al. 2010; Parrish 1994). These have included school-wide programs to improve literacy instruction (Levin et al. 2010), as well as instructional programs for students with limited English proficiency (Parrish 1994). The current study takes the latter approach by presenting costs of instructional coaching at three schools and comparing them to the cost of traditional approaches to professional development in three other school districts.

## METHODOLOGY

The cost analysis presented in this study was performed in three steps using Levin and McEwan's (2001) methodology: first, one lists all resources used to produce the desired outcome; second, a value is placed on each resource; third, costs are apportioned according to the party by whom they are incurred. Levin and McEwan (2001) describe this method as the "ingredients method" and it has been used in many cost analyses (Miles et al. 2004; Parrish 1994; Moore and Hyde 1981).

Table 2 describes all ingredients involved in the instructional coaching model at the sample schools, how these data were collected, and how these data were converted to dollar figures. Many of the costs are not explicit expenditures; rather, they reflect reallocation of personnel time. For instance, teacher contact hours for each coach in the sample were collected from their respective coach, categorized and aggregated. Coaches provided their best estimate of the amount of hours each collaborating teacher was involved with instructional coaching in some capacity.<sup>10</sup> The coaches' contact hours with the principal and other administrators were collected using the same method. The majority of instructional coaches' salaried work time was devoted to the coaching program; however each coach devoted some time to endeavors outside of coaching and this time was not included as a cost of the program.

The cost of equipment and materials was obtained from financial administrators. Because equipment lasts several years, these costs were annualized using a 5 percent discount rate (Levin and McEwan 2001). To annualize a cost over several years, the depreciated value of the resource is added to the opportunity cost of the undepreciated portion (calculated by multiplying the un-depreciated value by the discount rate) for each year the resource is used. This process can be summarized by the formula:

$$\text{Annualization factor, } A(r, n) = (r(1+r)^n) / ((1+r)^n - 1),$$

where  $r$  represents the discount rate and  $n$  represents the lifetime of the equipment. Using a 5 percent discount rate and 5 years of life yields an annualization factor of 0.231, so the annual cost of a laptop that costs \$1,099 is \$253.87.

Coaches and developers of the instructional coaching model continually stressed the importance of professional learning for coaches in order for coaches to be effective in their role, so including the cost of professional development of instructional coaches was necessary. Coaches took part in two forms of professional development, initial start-up professional development and ongoing

10. As reflected in Figure 2, teachers' non-student time devoted to instructional coaching was divided into three categories: teachers' salaried work time when students are present, teachers' non-student salaried work time (when no students are present) and teachers' non-salaried time.

Table 2. A Framework for Measuring the Cost of a Coaching Program

Resource	Components	How Data is Collected	How Cost is Calculated
Teacher Time Spent Collaborating with an Instructional Coach	Non-student time within the regular contract, before and after school and during the planning period, meeting with the coach.	Coaches provide the amount of hours they spent with each teacher. Teachers are also surveyed through email and phone to verify coaches' estimates.	Teachers' salary plus benefits, multiplied by the total FTE percentage of teacher time. This represents a cost to the district.
	Non-student time within the regular contract, in which the teacher prepared to meet with the coach.	Coaches provide an estimate; teachers are also surveyed through email and phone.	Same as above. This represents a cost to the district. Note modeling and observing is excluded.
	Time outside the contract in which the teacher prepared to meet with the coach.	Teachers' responses from email and phone.	Same as above. This represents a cost to the individual teacher.
Coaches' Time	All time counted as coaching, except when an activity was outside the realm of coaching and created additional utility for the school or district.	Coaches provide estimate. [Examples of non-coaching activities include bus duty, lunch duty, subbing for another teacher, or teaching a class part time.]	Coaches' hourly compensation multiplied by the amount of hours, or salary multiplied by FTE spent on coaching.
Professional Development (P.D.) for the Coaches	Start-up P.D. may include workshops and shadowing experienced coaches.	Coaches describe their experience, administrators estimate coach turnover.	Start-up P.D. costs are annualized over the length of the program.
	Ongoing P.D. may include workshops and conferences.	Coaches provide estimates and financial administrators verify costs.	Prices can be used to indicate cost; time is included in compensation.
Principals' Time Spent on Coaching Program	Time the principal / curriculum specialist met with the coach.	Coaches provide estimate.	Principals' salary multiplied by full-time equivalent percentage of time.
	Time the principal prepared to meet with the coach.	Coaches provide estimate.	
Materials & Equipment	Manuals / copies coaches used to support teachers.	Provided by financial administrator.	Total expensed amount.
	Laptops for the coaches.	Price ascertained via internet stores.	Advertised price, annualized to its lifetime, at a 5% discount rate.

professional development. These experiences were described in full detail during instructional coach interviews and follow up correspondence. Start-up professional development was annualized over seven years with adjustments made for coach turnover and inflation.

The total cost per year of the instructional coaching model is summarized below in equation (1). Using this framework, the average cost per collaborating teacher<sup>11</sup> is computed and described in equation (2):

$$\text{Total Cost (TC)} = (P_C * \text{FTE}_C) + (P_P * \text{FTE}_P) + (P_A * \text{FTE}_A) + (P_T * \text{FTE}_T) + \text{PD} \quad (1)$$

$$\text{Average Cost (ATC)} = \text{Total Cost} / Q \quad (2)$$

Where  $P_C$  is the coach's salary,  $P_T$  is the teachers' salary;  $P_P$  is the principal's salary, and  $P_A$  is any other administrators or curriculum coordinator's salary.  $\text{FTE}_C$  (full-time equivalent) is the percentage of time the coach devotes to coaching,  $\text{FTE}_T$  is the *total* percentage of time *all* teachers meet with the coach during "non-student time" (when no students are present),  $\text{FTE}_P$  is the percentage of time the principal or other administrator devotes to coaching,  $Q$  is the number of collaborating teachers and  $\text{PD}$  is the cost of materials, equipment and the yearly cost of professional development. Prices of materials and equipment reflected national averages and all salaries reflected yearly national averages as reported by the National Center for Educational Statistics (Snyder and Dillow 2010). Salaries included fringe benefits, estimated at 25% on top of base salary. Note that teacher contact time includes only non-student time (when the teacher is not in her or his regular classroom setting), thus teacher contact hours while the coach is modeling and observing result in no additional cost to the program.

### *Data Sample*

The sample used to measure cost of instructional coaching included five instructional coaches in one school district in the Midwest United States, during the 2009–10 school year. The school district had an enrollment of approximately 14,000 students with 70% on free and reduced meals and 54% representing an ethnic minority. The district employed 1,200 full-time teachers in 34 schools during the 2009–10 school year. The instructional coaching program relied on a university grant for financial support and there was no district money formally allotted to the program. Instructional coaches worked full time at three different schools. One school employed three instructional coaches, while the other two

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11. A collaborating teacher is one who voluntarily chooses to work with the coach. According to the instructional coaching model, teachers who work with the coach do so on a voluntary basis, thus any teacher the coach had a scheduled meeting with is referred to as a collaborating teacher.

schools employed one instructional coach each; this variation was due to size of each school. Interviews with instructional coaches and teachers took place in person and follow-up correspondence took place through email.

Cost figures for traditional approaches to professional development were obtained through telephone interviews with three professional developers at three different school districts across two states during the 2010–11 school year. These professional developers held certifications in the Strategic Instruction Model™ (SIM<sup>12</sup>); sites were purposely selected for the study because the school districts procuring the professional development did not request follow-up training sessions.

### *Transferability of Findings*

The findings described below reveal costs of approaches to professional development for a limited number of cases. As such, findings are closer to a working hypothesis than objective figures that would include measurements of external validity and the usual standard errors. In order to understand how findings may be interpreted and used in the readers' school, a description of characteristics of school context that effect cost for each case is useful.

Three important aspects of the instructional coaching programs related to the transferability of findings. First, coaches collaborated with teachers on a voluntary basis, and were not directed to collaborate with a specific number of teachers. Second, instructional coaches' salaries were financed through an external university grant, so coaches were given slightly more autonomy than their colleagues in the school. Finally, because of their association with the university grant, instructional coaches benefited from professional development through university faculty members. Model developers concluded that the professional development provided was typical of what would be necessary in most school contexts.<sup>13</sup>

Cases of traditional approaches to professional development in the study sample, by design, closely resembled that of a typical teachers' workshop. In Site 1 and Site 3, districts contracted with outside consultants for short-term professional development sessions. At Site 2, the school district was contracted through the state's Long-term Technical Assistance Agreement and participating teachers were strongly encouraged to attend workshops. Research participants indicated that the professional development experiences analyzed for the study

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12. As part of the SIM certification program, professional developers are encouraged to provide follow-up training sessions; however, Sites 1, 2, and 3 were specifically chosen because the school districts requested little or no follow-up training sessions.

13. In addition, a final presentation of findings was provided to all research participants (model developers and school officials, including instructional coaches).

were typical of previous workshop sessions.

#### COMPARING THE COST OF TWO APPROACHES TO PROFESSIONAL DEVELOPMENT

Findings are presented in three sections. First, all resources required for the instructional coaching model are described and a cost is attached to each ingredient to measure the average cost per teacher<sup>14</sup> as planned prior to implementation. This planned framework is referred to as the Model School and the average cost per teacher at the Model School is compared to instructional coaching programs in three schools. The second section separates costs according to the party by whom they are incurred and reveals the “hidden costs” of instructional coaching. In section three, the average cost per teacher of several traditional approaches to professional development is provided to allow for a comparison with instructional coaching.

#### COST OF INSTRUCTIONAL COACHING FOR THE MODEL SCHOOL AND AT SCHOOLS 1, 2, AND 3

The developer of the instructional coaching model provided data to reflect the cost as planned by the model prior to implementation. During interviews with the instructional coaching model developer, it was suggested that meeting with 40 teachers during a school year was appropriate, which would require 333 total hours of non-student teacher time at a cost of \$15,498.<sup>15</sup> Meeting with the principal and other administrators for 3% FTE, or about an hour per week was also recommended. The recommended startup professional development was the same as what coaches in the sample received, and resulted in a cost of \$9,694 or \$1,675 annualized over seven years. Recommended ongoing professional development involved attending a three-day workshop twice per year at a cost of \$1,320 each.<sup>16</sup> Finally, equipment and materials involved the use of a laptop and manuals, and the costs of these ingredients were annualized over five years.

Combining the cost of all ingredients and dividing by the number of collaborating teachers yielded a cost per teacher of the coaching programs at

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14. The focus of this study was on the average cost per teacher because school district budgets are determined on a per pupil basis. Studies of cost in education have typically focused on costs per pupil or costs per teacher (Miles et al. 2003; Parrish 1994).

15. The instructional coaching model involves a coaching cycle that takes roughly eight hours and 20 minutes, although this figure varies widely among teachers. A teacher and coach may collaborate over the course of a month or an entire school year.

16. The details of professional development costs are described in the Methodology section. This figure includes registration fees, lodging, mileage and per diem, and is estimated based on expenses from instructional coaches in the sample.

Schools 1, 2, and 3 of \$3,350, \$2,258 and \$5,220 per teacher per year, respectively. The ingredients method solicits empirical data from schools; however, Levin et al. (2010) also provided estimates of ingredients and their costs from model developers and the current study adopts this approach. The data provided by the developer of the instructional coaching model reflected the lowest cost per teacher of \$2,298. Comparing the cost as planned by model developers with the actual cost for the three schools reveals the important ways schools can shape school reform initiatives when they are actually implemented.

Table 3 provides some descriptive statistics of how coaching took place at each of the three schools and how it was planned by the model developers. Each ingredient and its cost is expressed in Table 4, which presents the cost of the coaching program at Schools 1, 2, and 3 and the cost as planned by the instructional coaching model developer. The first column lists the ingredients; the cost of one unit of each ingredient is listed in the next column. The third column, labeled “FTE,” shows the full-time equivalent amount of time each school employee spent on the coaching program as a percentage of total salaried

*Table 3. Teacher Collaboration Data by School*

	<b>Model School</b>	<b>School 1</b>	<b>School 2</b>	<b>School 3</b>
Number of instructional coaches at the school	1	1	1	3
Number of collaborating teachers	40	23	30	42 <sup>2</sup>
Number of teachers at the school	n/a	37	30	66
Percent of teachers at the school who collaborated with a coach	n/a	62%	100%	64%
Total teacher hours spent collaborating <sup>1</sup> with an instructional coach for all teachers	333.3	170.5	565.25	515.5
Total FTE of all teacher time <sup>1</sup> spent collaborating with an instructional coach	22.76%	11.65%	38.61%	35.21%
Average number of hours per teacher spent collaborating with an instructional coach	8.33	7.41	18.84	12.27
Average FTE per teacher devoted to collaborating with an instructional coach	0.57%	0.51%	1.29%	0.84%

<sup>1</sup>Non-student time only, which means this time does not include modeling or observing.

<sup>2</sup>Coaches at School 3 collaborated with a total of 42 teachers, so each coach collaborated with an average of 14 teachers.

work time.<sup>17</sup> Model developers suggested eight hours and 20 minutes of non-student time would be required of each teacher, thus according to the model, each teacher would devote 8.33 hours out of 1,464 total hours per year, or 0.57%<sup>18</sup> full-time equivalent (FTE). Column four, labeled “Inputs,” shows the quantity of each ingredient that was used, so multiplying column two, three, and four together, gives the total yearly cost of that ingredient, which is reported in column five. The total cost and the average cost per teacher are reported in the final three rows of Table 4.

Some of the costs of the instructional coaching program were consistent across all three schools. As noted, the cost of start-up professional development for each coach and ongoing professional development were consistent for each of the five coaches, totaling \$1,675 and \$2,640 per coach per year, respectively. According to model developers, ongoing professional development for coaches can be accomplished by attending two instructional coaching three-day workshops per year, so the number of bi-weekly meetings in the Model School is recorded as zero. The annualized cost of the coach’s laptop was \$253.87, and all five coaches were supplied with a laptop.

### *Differences in Cost at Each School*

At School 1, one coach was employed who collaborated with 23 teachers for an average of 7.41 hours each, or about 0.51 percent FTE each, based on the 1,464 hour contract year. This teacher time resulted in a total cost of about \$7,927 or about \$345 per teacher. The coach at School 2 collaborated with 30 teachers, the most of any of the five coaches in the sample, and the coach met with these teachers for a greater amount of time, an average of approximately 18 hours per teacher or 1.29% of the teachers’ yearly salaried work time. Nine of the teachers who met with the coach were part of a Professional Learning Community<sup>19</sup> and this group met consistently for a total of 27 hours during the year, which led to a considerable cost in the form of teacher time. The coach at School 2 reported that principal support contributed to her ability to collaborate with more teachers during the school year. The principal strongly supported the coaching program by introducing the instructional coach to several teachers, encouraging teachers to collaborate with the coach and meeting on a weekly basis. The principal at School 2 met with the principal for 45 minutes per week during each 40-hour workweek, thus the principal spent 1.88% of salaried work

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17. No employees in the sample reported working during personal time.

18. The figure of 0.57% represents  $8.33 / 1,464 = 0.00569$  or about 0.57% FTE.

19. Professional Learning Communities in schools have been defined in many ways, but generally involve a group of teachers meeting regularly to discuss of a wide variety of topics surrounding curriculum and instruction in their school.

Table 4. Total Cost and Average Cost Per Teacher for a Model School and for Schools 1, 2 and 3

Ingredients	Cost of One Input	Model School			School 1			School 2			School 3		
		FTE	Inputs	Yearly Costs of Ingredient	FTE	Inputs	Yearly Costs of Ingredient	FTE	Inputs	Yearly Costs of Ingredient	FTE	Inputs	Yearly Costs of Ingredient
<b>Personnel</b>													
Teachers	\$68,068	0.57%	40	\$15,497.58	0.51%	23	\$7,927.29	1.29%	30	\$26,281.10	0.84%	42	\$23,967.97
Coach	\$68,685	100.00%	1	\$68,685.11	96.48%	1	\$66,268.93	97.30%	1	\$66,830.61	90.00%	3	\$185,449.79
Principal	\$109,707	2.50%	1	\$2,742.67	0.22%	1	\$241.35	1.88%	1	\$2,057.00	1.03%	1	\$1,129.98
Curriculum specialist	\$68,068	0.50%	1	\$340.34	0.00%	0	\$0.00	0.00%	0	\$0.00	0.17%	3	\$348.71
<b>Materials</b>													
Manuals / Copies	Varies			\$100.00			\$119.96			\$65.00			\$852.39
Equipment													
Laptop	\$1,099		1	\$253.87		1	\$253.87		1	\$253.87		3	\$761.61
<b>Professional Development (PD) for Coaches</b>													
Ongoing PD	\$7		0	\$0.00		80	\$567.31		80	\$567.31		240	\$1,701.94
Start-Up PD	\$1,675		1	\$1,675.29		1	\$1,675.29		1	\$1,675.29		3	\$5,025.87
3-Day Workshop	\$1,320		2	\$2,640.00		0	\$0.00		0	\$0.00		0	\$0.00
<b>Total Cost</b>				<b>\$91,934.86</b>			<b>\$77,054.00</b>			<b>\$97,730.18</b>			<b>\$219,238.26</b>
Collaborating Teachers			40			23			30			42	
Cost Per Teacher				\$2,298.37			\$3,350.17			\$3,257.67			\$5,219.96

time directly involved with the coaching program. This time commitment caused 1.88% of the principal's salary to be attributed to the cost of the coaching program. Finally, the coach at School 2 spent \$65 for workbooks and copies, or about \$2.17 per teacher.

School 3 was unique because it was a high school and three instructional coaches were employed. Two of the coaches at the school collaborated with 11 teachers each, and the third coach collaborated with 20 teachers, for a total of 42 collaborating teachers, during the 2009–10 school year. For a variety of reasons, ingredients such as materials and equipment led to higher costs at School 3; however, these resources represent a small portion of the overall average cost per teacher of the coaching program. Because the number of collaboration teachers per coach was lowest at School 3, the cost per teacher was significantly higher. These coaches reported a lack of support for the coaching program from instructional leaders including the principal inhibited their efforts to collaborate with more teachers during the school year.

#### COST INCURRED BY THE SCHOOL DISTRICT

Next, it is useful to separate costs by the parties to whom they are incurred; Table 5 displays the costs accrued to each party. While the instructional coaching program was fully funded by an external grant, the school district still incurred some costs in the form of personnel time. Although it was the original intent to incorporate the personal costs incurred by teachers and other staff if they spent personal time, no teachers in the sample reported spending any amount of personal time to prepare for coach meetings or to prepare materials developed through collaboration with the coach. The school district and the university grant were the only two entities to incur a cost as a result of the coaching program.

For this example, School 1 is presented; however other schools in the sample followed the same pattern: the bulk of the program costs were borne by the university grant.<sup>20</sup> This finding was not surprising because the university grant funded the coaches' salaries, equipment, materials and professional development, and these ingredients represented the bulk of the costs at each school. That being said, it is important to note that the use of personnel time, a vital resource within schools,<sup>21</sup> comes at a cost to the school districts.

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20. Of course, not all coaching programs are funded by external grants. Odden and Picus (2004) describe how instructional coaches can be funded through a school district's general fund and Symonds (2006) provides examples of how coaching programs in California have been funded.

21. Miles et al. (2003) provide a thorough discussion of the cost of personnel time in schools and Darling-Hammond et al. (2009) analyzed the importance of time for professional development for teachers.

Table 5. The Total Cost of Instructional Coaching for School 1, by Funding Source

Ingredients	Total Yearly Costs	Cost to School District	Cost to External Grant
<b>Personnel</b>			
Teachers	\$7,927.29	\$7,927.29	\$0.00
Coach	\$66,268.93	\$0.00	\$66,268.93
Principal	\$241.35	\$241.35	\$0.00
Curriculum specialist	\$0.00	\$0.00	\$0.00
<b>Materials</b>			
Manuals / Copies	\$119.96	\$0.00	\$119.96
Equipment			
Laptop	\$253.87	\$0.00	\$253.87
<b>Professional Development for Coaches</b>			
Ongoing P.D.	\$567.31	\$0.00	\$567.31
Start-Up P.D.	\$1675.29	\$0.00	\$1675.29
<b>Total Cost</b>	<b>\$77,054.00</b>	<b>\$8,168.64</b>	<b>\$68,885.36</b>
<b>Cost per teacher</b>	<b>\$3,350.17</b>	<b>\$355.16</b>	<b>\$2,995.02</b>

*Hidden costs*

An alternate way of examining the factors that affect the average cost per teacher is to break down the percentage of the total cost by each ingredient, based on the data collected in each school. The purpose of examining the cost this way is to show that the coaches’ salary is only a portion of the total cost of an instructional coaching program. The cost of teacher and administrator time is not often considered by school-leaders when they plan and implement professional development programs (Miles et al. 2003; Moore and Hyde 1981). Table 6 displays the cost of each ingredient as a percentage of the total cost for the Model School as well as for each of the three schools. In each pie chart, two sections are labeled: the cost of the coaches’ salary, which is typically considered the only cost of instructional coaching programs (Odden and Archibald 2009), and the cost of teachers’ salaried non-student time, which is the largest hidden cost identified for the sample coaching programs.

**TRADITIONAL APPROACHES TO PROFESSIONAL DEVELOPMENT**

In order to provide a useful comparison to the cost estimates of instructional coaching, estimates of the costs of traditional approaches to professional development are presented in Table 7, which describes empirically based cost

Table 6. Cost of each ingredient as a percentage of total cost for the Model School and for Schools 1, 2, and 3

Category	Model School	School 1	School 2	School 3
Teacher salaried time	17%	27%	10%	11%
Coach salaried time	75%	68%	86%	85%
Other personnel time, materials / equipment and P.D. for coaches	8%	5%	4%	4%
Total	100%	100%	100%	100%

Table 7. Cost of Traditional Approaches to Professional Development at Schools 4, 5, and 6

Ingredient	Cost of One Input	School 4		School 5		School 6	
		Inputs	Yearly Cost of Ingredient	Inputs	Yearly Cost of Ingredient	Inputs	Yearly Cost of Ingredient
<b>Personnel</b>							
Leader Time	\$68,685	N/A	\$0	0.87%	\$597	N/A	\$0
Consultant Fees	\$1,000	2	\$2,000	N/A	\$0	3	\$3,000
Teacher Time / Substitute Fees	\$372	24	\$8,927	19	\$7,067	63.5	\$23,619
Principal Time	\$109,707	0.43%	\$477	0.00%	\$0	0.65%	\$715
<b>Facilities</b>							
Room Rental	\$275	1	\$275	N/A	\$0	0	\$0
<b>Materials</b>							
Workbooks	\$12.50	25	\$313	19	\$238	68	\$850
Copies	\$0.05	135	\$7	100	\$5	345	\$17
<b>Total Cost</b>			\$11,998		\$7,907		\$28,202
Collaborating Teachers		24		19		66	
Cost Per Teacher			\$500		\$416		\$427

estimates from three different school districts in the United States. Each of the three sites represents one example of a school district's effort to provide traditional professional development for teachers. Many previous studies have analyzed *all* expenditures on teacher professional development by a particular school district for a given school year (Miles et al. 2005; Miller et al. 1994; Little et al. 1987;

Moore and Hyde 1981). The following analysis takes an alternative approach by analyzing the cost of *one particular workshop* as well as any follow up workshop sessions that the district requested from the same professional developer for the same teacher group. Thus each of the three sites was involved in a professional development workshop with little or no follow-up training.<sup>22</sup> Workshops were led by professional developers trained in the Strategic Instruction Model and took place during the 2010–11 school year.

First, Site 1 was used to describe the cost of a one-day workshop held in an off-site conference room for a Minnesota school district. Next, Site 2 describes the cost of a one-day workshop held at a district high school for 19 teachers in a school district in Virginia. Finally, Site 3 provided estimates of the cost of a half-day professional development workshop and two additional half-day follow-up workshops for 66 teachers and two principals in a school district in Minnesota, during the 2010–11 school year.

#### *Traditional professional development at School Site 4, 5, and 6*

At School Site 4, two outside consultants were hired by a Minnesota school district to facilitate a one-day workshop during the 2010–11 school year for 24 teachers and one principal. All teachers required substitutes to release them from their teaching responsibilities. The workshop was held off campus, so the district paid for room rental at a local hotel building. Workbooks and handouts were provided to all workshop participants. The largest cost involved in the workshop was the cost of teacher time. This district hired substitute teachers for each teacher attending the session, and the cost of substitute teachers was measured as the cost of one day of teacher time, rather than the cost of hiring a substitute. Although average substitute fees for one day require an expense to the school district of approximately \$120 (Levin et al. 2010), using the value of one full day of teacher salaried work time more accurately represents the cost of one day of student time for a teacher.

School Site 5 provided estimates of the cost of a one-day workshop held on campus of a school district in Virginia for 19 teachers during a district professional development day. A professional developer who was contracted through the Virginia Department of Education led the workshop. As a full-time professional staff member, the professional developer was responsible for offering training sessions to all districts in her assigned region as part of the state's Long-term Technical Assistance Agreement between the school districts and the State Department of Education. Although the district did not directly

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22. As is stated in the Methodology section, each workshop was purposely chosen for analysis, based on the fact that the school district requested little or no follow up.

pay for the consultant fees, the facilitator was a full time staff member of the Virginia State Department of Education, thus the cost for a one-day workshop and two full days of preparation was estimated at a total of 24 hours of salaried work time, or 1.3% of the staff member's yearly salary. Workbooks and handouts were provided to each of the 19 teachers; no administrators attended the session. Site two makes clear that an in-house facilitator is likely to be less costly than hiring an outside consultant, even when including the cost of the staff member's salaried work time to prepare and present.

The third example of a traditional approach to professional development involved a half-day workshop followed by two additional half-day follow-up sessions. These workshops were led by a SIM certified professional developer for a Minnesota district during the 2010–11 school year. All sessions took place on school grounds, so no room fees were incurred. During the first workshop, 66 fourth through twelfth grade teachers participated in a half-day workshop. Next, 10 of those teachers participated in a half-day follow-up session. Finally, 51 teachers from the original group participated in a half-day follow-up session.

One could argue that school leaders do not choose between professional development workshops and instructional coaching. Most school districts invest in some sort of traditional professional development (Darling-Hammond et al. 2009) and then decide if instructional coaching is necessary and economically feasible. To that end, it is still useful to see estimates of the cost of professional development workshops in order to highlight how the cost of instructional coaching compares.

Using the highest and lowest cost figures for each approach to professional development, coaching must be between 6.5 times to 12.5 times more effective in reaching desired outcomes than the traditional approach to professional development, in order to be more cost-effective.<sup>23</sup> Bush (1984) found that traditional approaches to professional development led teachers to implement new pedagogical strategies 10% of the time, while professional development involving the components of instructional coaching, including modeling, observing and feedback, increased implementation rates to 95%. Intermediate outcomes such as instructional change are imperfect indicators of student learning, but as Levin and McEwan (2001) point out, even a measurement of

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23. Research has suggested that both traditional approaches to professional development (PD) and instructional coaching as follow-up training are necessary ingredients for school-wide instructional improvement (Darling-Hammond et al. 2009). As such, when calculating cost-effectiveness ratios between instructional coaching and traditional approaches to PD, as is done above, it may be more appropriate to measure the cost of instructional coaching together with traditional approaches to PD, and compare that figure to the cost of traditional PD alone. When making this adjustment, instructional coaching must be between 7.7 times and 13.5 times more effective in achieving its objective in order to be more cost-effective than traditional approaches to PD alone.

student learning might be considered an intermediate outcome to loftier school wide goals, such as an increased capacity to participate in democracy, or higher lifetime earnings. Thus it may still be useful to examine findings of the current study in terms of previously established intermediate outcomes of coaching. That coaching was found to be 9.5 times more effective in accomplishing intermediate outcomes (Bush 1984) is important in light of the cost figures presented above. Moreover, Showers (1982) found peer coaching led to higher quality implementation of new instructional practices. Unfortunately, both Bush (1984) and Showers (1982) tested experimental models of professional development that were not implemented in schools on a large scale, thus combining these measures with the above cost estimates to make definitive claims of cost-effectiveness is inappropriate.

### *Discussion and Significance to Educational Research*

Among the contributions of this study, three warrant particular note. First, a framework for measuring the cost of coaching is described in full detail and results from three schools in one district are reported. This approach to measuring costs of coaching programs can be replicated by researchers and practitioners. Second, educational leaders gain an understanding of all costs involved in implementing a coaching program and which factors most influence cost. Clearly, the coaches' salary is the highest cost as a percentage of the total cost of instructional coaching; however, there are other, hidden costs of running a successful coaching program such as teacher salaried work time and professional development for coaches. Finally, the study adds to the literature on instructional program implementation. Due to the complex nature of schools and school districts, even the most prescribed instructional interventions are often not implemented according to the specifications of the model (Hall and Hord 2006; Evans 1996).

#### A FRAMEWORK FOR MEASURING THE COST OF INSTRUCTIONAL COACHING

The cost framework presented above allows school leaders to become knowledgeable of the costs involved in coaching programs. By employing the ingredients method (Levin and McEwan 2001), school leaders can comprehensively analyze all costs that are incurred as a result of a particular school program. The ingredients method provides a pragmatic and transparent approach to identifying all resources required in any school program. For instance, it is useful to identify the amount of non-student time teachers will

need to devote to the coaching program so that teachers may benefit most from it. The principal and curriculum specialists should also be involved with the processes of a coaching program, but these personnel also face time constraints and their salaried work time should be viewed as a valuable school resource. Without considering the required personnel time of those other than instructional coaches, the program is less likely to be implemented with fidelity (Levin et al. 2010) and its full benefits are less likely to be realized. The cost framework presented in this study provides a useful starting place for school leaders interested in establishing the cost of the coaching program in their school or district.

Educational researchers can also benefit from the cost framework. A framework for measuring districts' total investment in teacher professional development has been developed over the past 30 years (Rice 2003; Odden et al. 2002; Miller et al. 1994; Little et al. 1987; Moore and Hyde 1978); however, literature searches for the present study revealed no explicit cost framework or rigorous cost analysis of educational coaching. Other literature reviews have reached similar conclusions (Darling-Hammond et al. 2009; Neufeld and Roper 2003). Thus, this framework seeks to create a discourse among researchers about what costs are incurred when schools implement instructional coaching programs and how these costs can be measured. As a burgeoning approach to teacher professional development, instructional coaching has left some questions unanswered and the cost of this approach is an important question.

### *Understanding the Costs Involved in Coaching Programs*

It is not enough for school leaders to be aware of the costs of programs in their schools. School leaders must have an understanding of the impact of resource allocation decisions and be mindful of available alternatives. Educational professionals benefit from a full understanding of all resources required of any school program to ensure proper implementation (Levin et al. 2010). The current study presents two lenses with which to understand costs of a coaching program. First, Figure 6 disentangles which resources have the largest bearing on the cost of a coaching program. While instructional coach salaries represent the majority of costs, teacher salaried work time can represent as much as 27% of the total cost at the school level. Also, other costs involved in the program did not represent a significant portion of total costs at any school. This finding suggests that school leaders should provide instructional coaches with the necessary professional development, meeting time with the principal and curriculum specialists and equipment to best perform at their roles. While providing these resources may increase effectiveness, not doing so will not save a considerable amount of money.

A second lens to view the cost of a coaching program is to consider which costs are fixed and which costs are variable as the coach collaborates with more teachers. Instructional coaches indicated that meetings with the principal and other school leaders, professional development and materials and equipment all represented costs that did not change substantially as they collaborated with more teachers. Thus, variable costs of the instructional coaching programs appeared only in the additional teacher salaried work time. That is, as coaches collaborated with additional teachers, the only marginal expense was the additional teacher time. Examining this relationship closely reveals that the number of collaborating teachers likely has the greatest effect on average expenditure. As the coach collaborates with more teachers, the average expenditure per teacher decreased. Unfortunately, it remains unclear what happens to effectiveness as the coach collaborates with additional teachers.

All five coaches participating in the study spent a considerable amount of salaried work time collaborating with teachers; however, the bulk of their time was spent on other tasks. During this time coaches reported that they were preparing to meet with teachers, involved with grant related activities and completing other job related tasks. Future research should continue to investigate how instructional coaches spend their salaried work time. Identifying strategies that increase the number of collaborating teachers per coach will help decrease the expenditure per pupil of the coaching program.

The ideal or most cost-effective number of teachers per coach has not been agreed upon in the literature; however, school-leaders often pose this question as they plan and implement instructional coaching programs. Odden and Picus (2008) have suggested a figure of 200 students per coach, normalizing to a hypothetical 500-student school. Based on their recommended class sizes,<sup>24</sup> their framework calls for roughly nine teachers per instructional coach (Odden and Picus 2008). This figure is roughly in line with findings from the present study. A close examination of instructional coaching costs shows that at less than fifteen teachers per coach per year, the cost begins to rise considerably and rises at an increasing rate. Therefore, the current study builds evidence that a bare minimum of 10 to 15 teachers per coach per year may be important for cost control. Without knowledge of the effectiveness of instructional coaching at various numbers of teachers per coach, identifying the most cost-effective number of teachers per coach objectively is not possible.

In reality, there is probably no silver bullet ratio of coaches to teachers because many important factors in determining the ideal number of teachers

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24. Odden and Picus (2008) recommend one coach per 200 students and class sizes of 15 students for K-3 and 25 students for all other grades. Thus following these recommendations, a school district would allocate one coach for every 9.12 teachers.

per coach are contextual, and depend on the particular needs and objectives of the school or school district. For instance, if teachers in the school are focusing on improving community building and classroom management, teachers may need to collaborate with coaches individually over a long period of time. In such a case, a higher ratio of coaches to teachers would allow teachers the appropriate amount of time, reflection and one-on-one coaching to change the way they respond to particular student behaviors. The most cost-effective ratio of coaches to teachers in this case may be close to ten. On the other hand, if teachers are focusing on curriculum alignment or content planning, the coach might utilize group meetings and be able to collaborate with more teachers during the school year. For these coaching programs, a lower ratio of coaches to teachers may be more cost-effective for schools, and coaches may be able to collaborate with 40 or more teachers during a school year. Thus, the ideal ratio of coaches to teachers depends largely on contextual factors, particularly the content of coaching sessions.

### *Differences in Program Implementation*

The findings of this study also suggest that instructional coaching programs, like many school reforms are not always implemented the way they were prescribed (Hall and Hord 2006). The differences in costs between the Model School and Schools 1, 2, and 3 comport with prior research, which suggests that schools have agency and can shape reforms, rather than the other way around (McLaughlin 1990). Often, school leaders must ensure that interventions are implemented with fidelity so that they may produce the intended effects. At the same time, school context plays an important role in determining how an intervention should be implemented to serve the unique needs of a school and its student body. The focus of instructional improvement will often dictate how instructional coaching is implemented, which has bearing on costs. As described above, when teachers seek to improve community building and classroom management, coaches often need to work one-on-one with teachers. In this situation, cost of the program may be higher if coaches collaborate with fewer teachers. A coaching program focused on curriculum alignment may utilize groups of teachers, allowing the coach to collaborate with more teachers during the school year. Coaching programs with this goal will likely have a lower average cost if coaches can collaborate with a larger number of teachers. These discrepancies will lead to variations in cost of coaching programs.

## CONCLUSION

Economic analysis in education continues to be an increasingly utilized line of inquiry. School leaders must decide how to allocate scarce resources to best facilitate student learning and economic analyses can provide insights to guide school level decision making. The economics of teacher training and professional development is a particularly important area because personnel salary costs are consistently the largest portion of any school budget (Levin and McEwan 2001). Professional development for school leaders and teachers is one part of an effective, cohesive strategy to provide highly qualified teachers in every classroom that are better equipped to reach the unique needs of every student.

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