PROFESSIONAL DEVELOPMENT
FOR CHRISTIAN SCHOOL EDUCATORS AND LEADERS

FRAMEWORKS and BEST PRACTICES

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EXECUTIVE OVERVIEW

Professional development opportunities are nearly universal in the experiences of U.S. educators, both in public school settings and in Christian schools (Darling-Hammond et al. 2009; Finn, Sweeney, and Warren 2010). Nationwide spending on professional development (PD) totals billions of dollars, which makes PD for educators “big business” (Hill 2009). Yet, despite the sizeable investment of time and resources, teachers generally report dissatisfaction with PD experiences, particularly with short-term workshops, which comprise the majority of PD offerings (Darling-Hammond et al. 2009). Moreover, both practitioners and researchers are uncertain as to what constitutes effective PD. According to the Editorial Projects in Education Research Center (2011), even after nearly five decades of research, “Parsing the strengths and weaknesses of the vast array of programs that purport to invest in teachers’ knowledge and skills continues to be a challenge” (1).

A number of issues in practice and research have contributed to this challenge, such as a lack of a shared definition for most PD practices; use of varying metrics to determine PD effectiveness (e.g., increased teacher knowledge, changed instructional practice, and student achievement gains); a myriad of program and study designs, that renders comparison of findings across the research difficult; and the complexity of PD programs and settings, which makes PD effectiveness an equally complex phenomenon to study. In an effort to address these problems systematically, a literature synthesis— involving extensive searches of the academic literature and analysis of over 500 studies and documents—was conducted, with the following guiding question: “What are the best frameworks and practices in professional development for Christian school teachers and leaders?”

To answer this question, this synthesis organizes findings from the literature into four distinct lines of investigation: first, mapping the landscape of PD in the U.S. (including history, models, conceptual frameworks, and PD in Christian schools); second, examining the evidence for program components (such as content focus, active learning, and duration) that may contribute to PD effectiveness; third, reviewing the research base for a number of specific PD practices; and fourth, encapsulating the research on PD for school leaders.

The Professional Development Landscape

In surveying the landscape of PD programs and related research, three broad time periods can be identified over the last five decades. In the first, the school restructuring era (from the 1960s to the mid-1990s), federal legislation provided funding for PD as a means of improving schools to produce better student outcomes. Schools imported PD methods directly from the business world during this period, which resulted in a prevalence of training workshops, conferences, and train-the-trainer approaches, all of which are categorized in the literature as “standardized PD” (Hooker 2008; Gaible and Burns 2005). PD effectiveness was typically evaluated by measuring teacher satisfaction with PD experiences, with little attention paid to the outcomes of PD for teacher practice or student achievement.

In the “reform” era (Stewart 2014; Desimone 2009), from the mid-1990s until approximately 2010, legislation continued to shape the PD terrain by calling for more job-embedded PD forms like coaching and mentoring, along with evaluation of programs based on gains in student achievement. The growth of adult learning theory during this time also bolstered and provided a conceptual base for these “site-based” forms of PD (Hooker 2008; Gaible and Burns 2005), by suggesting that teachers learn best by integrating experience, reflection, and action in an iterative cycle (Kolb 1984, 1999; Hutchings and Wutzendorf 1998); focusing on authentic problems of practice through reflection-in-action (Schön 1987; Garvin 2000); engaging in learning that not only impacts practice but also transforms professional identity (Mezirow 1991); and learning from and alongside colleagues in the social context of schools (Wenger 1998). Online PD formats became more prevalent as Internet use expanded, which offered new opportunities for “self-directed PD” (Hooker 2008; Gaible and Burns 2005) as educators participated in webinars, online discussion groups, and virtual learning communities. During this time period the role of school leaders began to shift as well, away from managerial and operational functions toward instructional leadership. Finally, research methodologies focused on specific components or features of PD experiences that might contribute to their effectiveness, along with evaluating program impact on student achievement (particularly in urban and low-performing schools).

The most recent period, from 2010 until the present, is termed by this synthesis the accountability era. Since the inception of the Common Core State Standards (CCSS) in 2010, PD across the country has moved toward training teachers in CCSS implementation and related assessment (Hill, Beisiegel, and Jacob 2013). Additionally, in the wake of the 2008 recession and reduced PD funding, the demand for cost-efficient approaches to staff development has grown stronger. Taken together, CCSS implementation and budgetary constraints may be contributing factors as to why less-expensive, short-term workshops still seem to predominate the PD landscape (Darling-Hammond et al. 2009), even though job-embedded forms of PD were widely heralded during the preceding era. Overall, the present period is marked by increased pressure on schools by states, the federal government, and the public to be accountable for both student outcomes and instructional expenditures. Thus while the search for effective PD has characterized each of the preceding eras, the pressure to identify PD opportunities with high return on investment (ROI)—now almost exclusively measured by student achievement gains—is more urgent than ever.

While not operating under the same constraints as public schools, private schools have not been isolated from these developments over time. Though there are very few empirical studies of PD in
Christian schools specifically, what exists suggests that such PD mirrors the larger landscape in American education. Survey research from different parts of the U.S. confirms that in-service workshops still predominate in Christian school PD efforts, and that more collaborative and reflective forms of PD are least available to teachers (Headley 2003; Finn, Swezey, and Warren 2010; Neuzil and Vaughn 2010). Recent research found that PD in a sample of Christian schools did not fully meet the standards of the National Staff Development Council (2001, which are now the 2011 Learning Forward Standards for Professional Learning), and that progress is needed in providing more active, collaborative, and content-specific PD (Montoro 2013). Finally, leaders in Christian education have reported that most teachers and administrators in Christian schools remain skeptical of educational research, and are not as engaged in reform efforts as their counterparts in other educational settings (Boerema 2011). Taken together, the research suggests there is room for improvement in PD experiences in Christian school settings.

Research on Professional Development Components

From the mid-1990s until approximately 2010, during the “reform” era of PD, substantial research was conducted to identify “a core set of features of effective professional development” (Desimone 2009, 181) that could be built into any PD practice (whether workshops, coaching, mentoring, and so forth) and thereby bolster its effectiveness. Five such components, all proposed and supported by adult learning theory, figure prominently in the literature:

1. **Content focus**, or a PD focus on the specific academic subject matter taught by teachers
2. **Active learning**, which is the opposite of teachers passively listening to or watching a presentation of information
3. **Coherence**, which most frequently is described as PD alignment with school, district, and state reform initiatives
4. **Duration**, or longer time span as well as greater total number of hours spent in PD
5. **Collective participation**, which entails grouping teachers who work together within the school for PD activities

Utilizing teacher self-report data, analyses of several large-scale teacher surveys provided substantial evidence that these components were linked with PD effectiveness (Garet et al. 2001; Desimone et al. 2002). The findings of these studies were correlational in nature, however, and did not provide causal data. Additionally, other research that examined outcomes like student achievement resulted in mixed findings, as did evaluations of PD programs that were designed using the five components (Hill, Beisiegel, and Jacob 2013). Other concerns with this line of research involve questions of whether other components might be equally if not more important for PD effectiveness (e.g., facilitators’ skills, teacher identity), or whether a tipping point exists where enough of one component or the addition of other components creates an effective PD experience (Desimone 2009).

While component-based research is therefore not conclusive, nor does it provide “sufficient specificity” from which to design PD programs (Wayne et al. 2008, 470), it does offer some “basic principles for designing professional learning that school and district leaders and policymakers would be well advised to consider” (Darling-Hammond et al. 2009, 9). In addition to their substantial face validity and endorsements from teacher self-report data, these components are sufficiently correlated with PD effectiveness to warrant their consideration as guidelines for designing PD programs.

**Specific PD Formats and Practices**

This literature synthesis also involved extensive and iterative searches of the literature for specific PD practices addressed most frequently in research. This process resulted in identifying the following seven broad categories of PD practices:

- **Direct-delivery approaches**, which are short-term experiences like workshops, seminars, and conferences, and are often held off-site and facilitated by outside experts
- **Intensive institutes**, or PD experiences with longer duration (e.g., a summer institute or yearlong seminar course) that are frequently offered through a university-school partnership and are most common in science and mathematics
- **Professional learning communities (PLCs)**, which are a collaborative approach to structuring teaching and learning at a school (e.g., through teacher groups, team meetings, group study) and often include a combination of other site-based approaches
- **Coaching and mentoring**, which involve the pairing of two teachers (typically of unequal experience), with the purpose of supporting the teacher in need of improvement and/or help in implementing new instructional methods
- **New-teacher induction**, or systematic programs for orienting new teachers in a school, which commonly feature mentoring by a more experienced teacher
- **Inquiry-based PD**, including the specific practices of action research, problem-based learning (PBL), lesson study, and video-based PD, each of which engages teachers in collaborative inquiry on instruction
- **Online formats**, which include synchronous courses and workshops, asynchronous webinars, online mentoring and coaching, virtual professional learning communities (VPLCs), and PD for instructional technology integration

A tremendous diversity in both program formulation and study methodologies exists for each of these practices. This is particularly the case for online formats, which can be considered more of a “delivery format” than a specific PD approach (Fishman et al. 2013) since each of the other six PD practices has been translated...
into online settings. Further, schools often combine two or more practices to formulate a PD program (for example, workshops plus coaching), making it difficult to disaggregate the impact of a single practice that is part of a larger PD “package.”

For these reasons, it is not feasible to draw comparisons between approaches in terms of effectiveness. However, the literature provides some supportive evidence of impact for each specific practice. Though there was variance in the strength of evidence from study to study, across the research for all seven approaches, substantial evidence was found that PD participation led to positive gains in teachers’ content knowledge. This was particularly true in the fields of science and mathematics, which were the most frequently studied in the literature. Additionally, all seven practices have been shown to elicit changes in teachers’ instructional practice, though evidence for this outcome is not as consistent or strong as for teacher knowledge.

However, far less is known about the impact of these practices on student achievement, for a number of reasons. First, fewer studies explicitly examined student outcomes as a result of PD participation. Second, for those studies that did measure student achievement and identified a positive impact of PD, the effect size of that impact was often weak or not sufficiently isolated from other possible contributing variables to be conclusive. Finally, some studies that examined student achievement found mixed results from teachers’ participation, or found no relationship at all. Taken together, the literature does not provide enough information on which “program models … are most effective in promoting student achievement … the need for further research on the subject is apparent” (Hanover Research 2012, 13).

**School Leadership**

Drago-Severson (2009) describes the challenging educational context in which school leaders currently work, and asks a key question: “Educators are expected to lead in ways in which they were never taught to lead and they themselves have never experienced. How can we help each other to develop the capacities needed to lead through the complex demands of teaching and learning?” (11). In an attempt to answer this question, this synthesis reviewed the literature on PD for four types of school leaders: heads of school, principals, teacher leaders, and school boards.

While there is substantial evidence in the literature that school leaders have a significant impact on teachers’ experiences and student achievement (Marzano, Waters, and McNulty 2005), there is a pronounced lack of research on effective PD for these four groups. This literature synthesis found much the same as Spanneut, Tobin, and Ayers (2011), who assert, “Compared to the literature and research about the professional development of teachers, less information existed about school leaders’ professional development” (3). The literature on heads of school, principals, teacher leaders, and school boards reveals that systematic PD opportunities appear to be few and far between for each, and what research exists on PD programs is primarily descriptive in nature with little to no evaluation (Orr 2007; Teitel 2006). Although calls for training and recommendations for PD formulations are issued in the literature, these tend to come in the form of advice from seasoned practitioners as opposed to empirical research (Land 2002).

While research on effective PD for school leaders is largely absent from the literature, there are a number of needs assessment studies that provide data regarding school leaders’ PD needs. School leaders consistently rank instructional leadership as their primary developmental concern; this was found to be the case for heads of school (Spanneut, Tobin, and Ayers 2011), principals (Spanneut, Tobin, and Ayers 2012; Whalstrom et al. 2010), and school boards (Seiler et al. 2010). Further, while published studies on effective PD for Christian school leaders are virtually nonexistent, the literature suggests that spiritual leadership is an important additional responsibility beyond the typical duties of school leaders in other settings (Banke, Maldonado, and Lacey 2012; Keenan et al. 2007; Lowrie and Lowrie 2004). More PD opportunities for school leaders that address these needs, as well as systematic evaluation of those experiences, are needed before it becomes clearer what constitutes effective on-the-job learning for school leaders.

**Conclusions**

While this synthesis reviewed research on components of effective PD, as well as specific PD practices for teachers and school leaders, an important question arises from the literature regarding the school cultures in which these practices are situated. Some research suggests that the success of PD efforts is not dependent on the specific formulation of PD, but rather is directly linked to the presence of a schoolwide orientation toward continuous improvement. This view does not limit PD to a single practice or even a collection of practices, but rather views PD as part of a larger approach to reshape the underlying values of the school community (The New Teacher Project 2015; Deal and Peterson 2010).

In order for schools to conduct PD within a cultural context of continuous improvement, this synthesis proposes the concept of a **professional development system**. Such a system has the following five key elements or process steps:

1. **An instructional culture audit**, which entails a cross-constituency review of current processes, practices, and outcomes relative to instruction, and that identifies instructional strengths, weaknesses, opportunities, and threats (SWOT)

2. **Strategic planning for instruction**, which is based on results of the instructional culture audit and includes goal setting, targeted outcomes, and metrics for success, with the aim of developing a multiyear plan that is tied to overall institutional strategic planning and incorporates resource allocation (time, personnel, funding)
3. **PD alignment**, in which PD is matched with the goals of instructional strategic planning to develop a web of PD practices (reflecting sufficient content focus, active learning, coherence, duration, and collective participation) and involving all members of the school community.

4. **Mechanisms for monitoring, feedback, and evaluation** that are consistent, involve multiple school stakeholders, and utilize diverse measures to assess impact on targeted outcomes.

5. **Supporting instructional leadership**, which includes orienting school leadership around envisioning, coordinating, managing, and leading the instructional culture.

Regarding this fifth element of a PD system, formal PD opportunities for instructional leaders are rare (Orr 2007; Teitel 2006). To successfully support these leaders, schools and professional organizations must develop what this synthesis terms **PD for instructional leaders, to lead instructional PD**. In other words, school leaders are in need of specific development opportunities in which they can learn how to better lead PD efforts at their own schools. Research suggests that school leaders’ capacities for leading such PD is positively linked with better instructional outcomes (Moore and Kochan 2013; Moore et al. 2011).

While many Christian schools face financial challenges in funding PD, they also have the flexibility and freedom to set the priorities of staff development according to their unique goals and needs. In this sense, Christian schools, like many charter schools, are more nimble than public school districts when it comes to making decisions regarding PD. While a smaller budget may prevent some schools from inviting costly presenters or sending teachers and leaders to intensive institutes, it does not preclude schools from developing a coherent professional development system as outlined above. (Many of the proposed elements and process steps of such a system have little to no cost, beyond allocation of time.) Such a system will help schools to strategically invest PD resources in ways that will have the most ROI for teacher and student outcomes.

Finally, professional associations for Christian school educators and leaders can support schools in some or all of the elements and processes inherent in creating professional development systems—whether assisting in instructional culture audits or strategic planning; offering PD opportunities that could be aligned with schools’ strategic plans; or providing PD to instructional leaders so that they can successfully lead their schools’ instructional PD. This requires that associations shift their role from PD provider to influencing the development of instructional cultures that engage in continuous improvement. In Christian education and beyond, this approach holds promise for fully leveraging PD to impact teaching and learning.
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I. Introduction

Just before the start of school in late August 2015, and coinciding with the beginning of work on this literature synthesis, a humorous meme was widely circulated on social media sites featuring a professionally dressed man and woman seated at a conference table. Beneath the drawing appeared the quote, “When I die, I hope it is at a faculty meeting or teacher in-service because the transition from life to death would be so subtle.” As with most jokes, there are some underlying truths suggested here: first, professional development (PD) experiences are pervasive in U.S. education; and second, teachers share a widely held view that such experiences are—to say the least—ineffective.

In terms of the prevalence of PD experiences, research indicates this is not far from the truth: the 2003–2004 Schools and Staffing Survey (SASS) of 130,000 public and private school teachers across the U.S. found that 92 percent of teachers participated in PD activities. Short-term conferences or workshops were attended by more than 9 out of 10 teachers, with participation rates much lower for other types of PD (Darling-Hammond et al. 2009). The next administration of the SASS in 2007–2008 showed much the same, as out of a total of 3.4 million public school teachers, 87.2% participated in PD focused on subject content in the previous year; 66.7% also attended PD on computer use in instruction, 60.8% on reading instruction, and 45.3% on classroom management (U.S. Department of Education 2008). Although nationwide data is not available on the prevalence of PD in Christian school settings, research on ACSI member schools in the Pacific Northwest, Mid-Atlantic, and Mid-America regions of the country indicates that Christian school teachers also participate in PD at a high rate (Headley 2003; Finn, Swezey, and Warren 2010; Neuzil and Vaughn 2010, respectively). These teacher participation statistics reflect what Hill (2009) calls the “big business” of PD, with PD spending comprising between 1% and 6% of district expenditures and totaling billions of dollars in federal Title II funding disbursed to states (Darling-Hammond et al. 2009).

Yet, despite this substantial investment of time and resources, teacher perceptions of PD experiences are generally negative, as the meme suggests. In the same analysis of 2003–2004 SASS data, Darling-Hammond et al. (2009) found that less than two-thirds of teachers found content-related PD useful or very useful, and less than half of respondents found PD in other areas useful at all. Overall, “most teachers were not enthusiastic about the usefulness of the professional development they received” (21). Likewise, Hill (2009) concludes from reviewing the research that PD in the U.S. is “broken,” largely due to poor content quality, low capacity of PD providers, teacher failure to transfer PD-related learning to actual teaching practice, and overall lack of coherence.

It is against this backdrop—of significant investment in PD, with little confidence in its usefulness on the part of participants and researchers—that this literature synthesis has been conducted. Before beginning any large-scale reform of PD, or even making determinations on a smaller scale by schools or organizations on how to conduct PD, it makes sense to ask the question what, if anything, actually works. If educational institutions, organizations, and educators themselves could identify the most effective and promising PD approaches, it’s likely they would shift their investments of resources in that direction. Thus, the central question guiding this literature synthesis is, “What are the best frameworks and practices in professional development for Christian school teachers and leaders?” Although the answers to this question are complex, and not nearly as conclusive as many would hope, it is a worthwhile line of inquiry given the potential of professional development to improve educational practice.

The Professional Development Literature

The decision to look for answers to this question in the literature on professional development research, as opposed to with PD providers or various constituents involved in PD delivery, is a conscious one in need of explicating. Jenkins and Agamba (2013) state the obvious when they suggest not gauging PD effectiveness by “provider self-aggrandizement survey data. The use of empirically based evidence is a more reliable method to determine elements of effective professional development” (74). In a similar fashion, schools’ descriptive reports on PD activities, with little assessment of their impact other than anecdotal data or satisfaction surveys, make it difficult to determine the degree to which the activities were successful; most school reports on PD show a “lack of data on resulting teacher and school improvement that characterizes many efforts” (Editorial Projects in Education Research Center 2011, 1). And finally, Tallerico (2005) describes why teacher surveys are no longer considered the exclusive, “preferred means of targeting professional development” (4), due to difficulty assessing the difference between respondents’ wants versus actual needs, as well as the possibility that respondents might be reluctant or unable to identify areas in which they need to improve. For both of these reasons, “the validity of the data derived” (4) from educator surveys is not certain.

This is not to say that PD providers, schools, and educators themselves are not valuable and useful sources of information on PD, but rather that efforts to identify effective PD will find advantages offered by the professional literature (and peer-reviewed journal articles in particular). These benefits include not only mitigating the potential bias to which assessments by PD providers may be prone, but also increasing the quality of research given the publication criteria and peer review process in place for most journals. Data from PD providers, individual schools, and educators can be even more valuable when examined in conjunction with, and placed in the context of, empirical research regarding effective
frameworks and practices in PD.

As in most fields of educational research, the literature on effective PD for educators and school leaders has several deficiencies. Even after almost five decades of research on PD, according to the Editorial Projects in Education Research Center (2011), “Parsing the strengths and weaknesses of the vast array of programs that purport to invest in teachers’ knowledge and skills continues to be a challenge” (1). Any review of the literature on effective PD needs to provide a candid assessment of specific challenges in the literature, and this synthesis identifies the following four: first, a lack of a shared definition for what constitutes PD; second, a difficulty in determining how “effectiveness” can be determined empirically; third, a lack of consensus on what type of data is acceptable in determining effectiveness; and fourth, the complex nature of many PD forms, which renders them difficult to assess for effectiveness.

The first challenge in the literature is the lack of a shared definition for what constitutes PD. As Desimone (2009) explains in a seminal discussion of PD research, “The literature casts a wide net for what might be included as professional development” (182). Research studies have focused on an impressive range of activities, including workshops and seminars, intensive summer institutes, conferences, faculty meetings, online webinars, self-study courses, professional learning communities, team teaching, mentoring, coaching, action research, collaborative lesson planning, lesson study, peer observation, supervision and evaluation, new teacher induction programs, national certification, and tuition assistance programs. There is even great variety within these categories of activities; for example, studies on coaching vary across content focus, to include the areas of reading and literacy, ELL, and behavioral management, to name a few. This variety makes it difficult to compare findings across studies, as “the myriad of experiences that count as teacher learning pose a challenge for measuring professional development in casual studies” (Desimone, 2009, 181).

A second challenge to consider is found in the question, how is PD effectiveness established? Are PD activities effective if teachers find them useful and engaging? If teachers learn a new skill or technique? If teachers actually change their teaching strategies? If student learning improves as a result of teachers’ own professional learning? If schools make structural changes to support teacher and/or student learning? From the perspective of the literature, the answer is any or all of the above, which makes comparing the results of individual studies of individual PD programs difficult. As Desimone (2009) states, “there is also debate about whether showing effects on teaching practice is enough to count a characteristic as effective, or whether only links to improved student achievement warrant the ‘effectiveness’ label” (283). Guskey (2000) actually identifies five different “levels” for assessing PD effectiveness: teachers’ reactions (Level 1); teachers’ learning (Level 2); organizational support and change (Level 3); teachers’ actual use of new knowledge and skills (Level 4); and student learning outcomes (Level 5). For research on PD in Christian schools, Finn, Swezey, and Warren (2010) assert there is an additional level of evaluation to consider:

Professional development within the Christian school community provides a unique challenge and opportunity in that the Christian school assumes a spiritual mission in addition to an academic one... [PD] activities must therefore take on the additional responsibility of engaging teachers and administrators as disciples of Jesus Christ. (10)

Determining effectiveness at this level might include measuring whether PD has a positive effect on Christian educators’ own spiritual lives, students’ spiritual formation and Biblical worldview development, and the overall spiritual climate of the school—all of which are difficult to measure.

A related challenge to evaluation is what kind of data is acceptable as evidence for effectiveness. According to Desimone (2009), “Still another issue is what counts as causal evidence, where the literature includes study designs on the continuum from intensive ethnographic studies of a couple of teachers, to national correlational studies, to randomized field trials” (183). Desimone explains that many studies on PD combine data sources and assumptions, making it difficult to “distinguish ideas grounded in empirical study from those grounded in conventional wisdom and those based on conceptual/theoretical ideas ... the characteristics identified as effective are usually a mix derived from all three sources” (183). This was a consistent issue identified in the research process for the current synthesis, particularly with a number of popular books on PD for teachers and administrators that interspersed anecdotal evidence, personal stories, and research conclusions among recommendations for practice. Many researchers express concern that there is not enough “hard” data on PD effectiveness and assert that most studies are “descriptive rather than quantitative ... Quantitative research on the impact of professional development remains comparatively thin” (Editorial Projects in Education Research Center 2011, 1–2). Still others have the opposite concern, namely that relying too heavily on quantitative data to determine PD effectiveness could limit insights into what approaches truly work. Guskey and Yoon (2009) discuss concern relative to the earlier work of Yoon et al. (2007), who examined 1,343 studies (published between 1986 and 2006) on how teacher PD affects student achievement, but only identified nine that met the standards of credible evidence set by the What Works Clearinghouse (an initiative of the U.S. Department of Education, Institute of Education Sciences). In retrospect, Guskey and Yoon (2009) assert, “Using less stringent criteria could have yielded a broader range of effective professional development models, activities, and designs” (498, emphasis added).

A final challenge involves the complex nature of many forms of PD, which renders them difficult to study. The ‘newer, more complex and broad-based views on how to conceptualize teachers’
professional development that have begun to emerge over the past decade … imply challenges to the measurement of professional development at both the individual and community levels” (Desimone 2009, 182). By way of example, whereas it is relatively simple to administer a survey of teacher perceptions and intent to change following a two-day workshop on differentiated instruction, it is much harder to assess the impact of job-embedded efforts like co-teaching, collaborative lesson planning, and peer coaching. This is further complicated when such efforts are included in a comprehensive PD program and implemented over the span of an academic year or longer. Among these challenges is parsing out the impact of a single PD activity from overall program impact, or determining how to “distinguish learning activities from each other in studies designed to describe trends, associations, or impacts of professional learning on knowledge, instruction, and student achievement” (Desimone 2009, 183).

These methodological and data-related challenges are not merely conceptual in nature. The proliferation of PD forms and complexities of related research have contributed to a scarcity of studies at the highest of Guskey’s (2000) levels of analysis for PD effectiveness. As Foster, Toma, and Troske (2013) observe, “Some work has examined teacher perceptions of their own learning from professional development activities … but little work has empirically examined whether, or to what extent, professional development activities influence student learning” (256). Similarly, Hanover Research (2012), in a review of research on best practices in teacher professional development (TPD), concludes that “though researchers agree that the potential of TPD is great, there is limited research available on the relationships between TPD and student achievement” (2). This in turn has obvious and unsettling ramifications for schools and those responsible for designing PD programs. Gersten et al. (2014)—who out of 643 studies of PD interventions in mathematics, found only two that assessed the impact of the PD intervention on students’ math proficiency—remark, “Until more causal evidence becomes available, schools and districts must supplement the limited evidence of effectiveness with their best judgment” (3).

The purpose of the present synthesis is to help educators do just that, by informing their best judgments through a synthesis of what is known about frameworks and best practices for PD. This includes mapping the PD landscape in the U.S. and in Christian schools in Chapter II; analyzing the research on components, or attributes, of PD that may promote its effectiveness in Chapter III; reporting on the research base for a number of specific PD approaches in Chapter IV; and presenting research on PD for school leaders in Chapter V.

The Present Study

The guiding question for this research synthesis was as follows: “What are the best frameworks and practices in professional development for Christian school teachers and leaders?” The methodology used to conduct this study was a narrative analysis of the literature. Utilizing the library databases of two large research universities (one secular, one Christian), a systematic search of the literature was conducted. Databases utilized included Academic Search Complete, Academic One File, JSTOR, Pro Quest Central, Lexus Nexus Academic, Education Research Complete, ERIC (Ebsco), and ScienceDirect. Searches were conducted using various combinations of terms including “professional development,” “in-service,” “teachers,” “educators,” “effective,” “research-based,” “Christian,” “schools,” and “K–12,” as well as the names of each of the PD practices identified in Chapter IV and the types of school leaders discussed in Chapter V.

As the literature on PD is expansive, and the scope of the present synthesis includes multiple settings (both Christian and secular) and populations (teachers as well as various school leaders), the research selected for review was necessarily delimited to the following:

• Educators and school leaders working in or affiliated with K–12 schools (For a literature review of effective PD for early childhood educators, see Zaslow et al. 2010.)

• Educational settings in the U.S. (For literature on international PD practices and research, see Schleicher 2012 and Darling-Hammond et al. 2009.)

• Studies published within the last ten years (although seminal studies and conceptual work outside of that timeframe were included where appropriate)

• Research published in peer reviewed journals, as well as books on theory and practice whose publishers are known for their education repertoire

• Literature that reported on some impact of PD efforts, as opposed to articles that were simply descriptive of PD program design, with no evaluative component

The database searches identified over 500 literature sources, which were then acquired and reviewed; approximately half (250 sources) have been included in this synthesis, with the remainder excluded on the basis of not meeting one or more of the criteria above. It should also be noted that this synthesis makes use of a small number of existing literature reviews and analyses; for each, the source documents cited were also acquired (where available) and examined. For all sources cited, references are included at the end of this synthesis.

Where research from Christian settings was available, it was included in this synthesis, and a general discussion of this research is provided in the last section of Chapter II. However due to the lack of empirical studies of PD in Christian schools, this synthesis makes use of the broader research on PD, which has mostly been conducted in public education settings. It is readily acknowledged that findings from these settings are not always directly translatable to Christian education, given the many differences—in means, as well as ends—between Christian and secular schools. It is assumed,
however, that professional Christian educators are experienced in using discernment to appropriate and apply educational research and knowledge from non-Christian sources in their own settings.

Finally, every research effort has limitations, which must be discussed and bracketed. The major limitations of this literature synthesis are inherent in the narrative approach used, as opposed to other potential approaches (e.g., a quantitative or qualitative meta-analysis of research). Marzano, Waters, and McNulty (2005), in contrasting narrative methods of reviewing literature with their own quantitative meta-analysis of research on school leadership, assert that narrative analysis is “highly susceptible to erroneous conclusions” (9) due to its tendencies for partial focus, misrepresentations of study findings, little reporting of authors’ methods, and failure to consider methods used in the studies reviewed. Care has been taken to mitigate these concerns throughout the synthesis; however, as narrative analysis relies entirely on the author’s interpretation and presentation of research, a degree of susceptibility to these limitations remains.

Despite these limitations, it is believed that narrative analysis is the appropriate and best methodology for the study. First, it is well-suited to the expansive scope of the synthesis (again, encompassing multiple settings, practices, and constituencies) as well as the diversity of study methodologies (which included a range of quantitative, qualitative, and mixed-methods approaches) and impacts examined (on educators, student outcomes, and schools). In contrast, meta-analysis, which originated in medical research, is most appropriate and works best when examining a small set of phenomena in relatively uniform settings, which is not the case here. Further, it should be noted that Hill, Beistegiel, and Jacob (2013), in an analysis of the state of the research on professional development for educators, assert that the field is not at the point yet where meta-analysis is a truly viable methodology: “Although meta-analyses of multiple programs with varying characteristics are possible, the field may take years to develop a large enough sample of studies for proper analysis” (478). For these reasons, the narrative approach is utilized and is considered the most generative for answering the research question guiding this study.

The organization of this research synthesis is as follows: Chapter II provides a mapping of the PD landscape in the U.S. and in Christian schools; Chapter III presents an analysis of the research on components or attributes (content focus, active learning, coherence, duration, and collective participation) of PD that may promote its effectiveness; Chapter IV describes the research base for a number of specific PD approaches (direct-delivery methods, intensive institutes, professional learning communities, coaching and mentoring, new-teacher induction, inquiry-based PD, and online formats); and Chapter V presents research on PD for school leaders (heads of school, principals, teacher leaders, and school boards).

II. The Professional Development Landscape

According to Dufour and Marzano (2011), “The history of education in the United States in the 20th century is essentially the history of the effort to reform schools” (11)—and, though it’s early yet, the same might be said of the new century as well. Taken together, the past fifty years in education have been characterized by extensive federal and state legislation and funding aimed at improving the performance of schools and increasing the achievement of students. Yet despite the extensive and costly investment in educational reform efforts, their implementation has been widely and publicly debated by an extensive list of stakeholders in U.S. education, including the U.S. Congress and state legislatures, local school districts, individual schools, licensure agencies, accrediting bodies, professional associations, unions, and parent and community organizations. It should be noted that private schools, while not bound by federal or state legislation to the same degree as public schools, have not been isolated from the larger educational context. For example, many private schools (including Christian schools) have accepted federal Title II funding for PD, hired teachers who have been trained in degree programs that lead to state licensure, and utilized Common Core State Standards to guide their curricula. Christian education as a movement, as well as individual Christian schools, have alternately embraced some reforms and resisted others.

All of this comprises the backdrop against which those responsible for PD have designed and implemented programs, and that academic researchers have conducted investigations to determine the most effective means of providing learning opportunities to educators. When taken together—the educational climate as shaped by federal and state legislation, the PD efforts in which schools engage, and the educational research to assess these PD efforts—it is possible to describe three general movements, or eras, over the past fifty-plus years in U.S. education. Doing so provides a broader context for understanding the specific PD and research approaches discussed in Chapters III, IV, and V of this synthesis.

While not bounded by exact dates, the eras can be described as follows: first, the school restructuring era from the 1960s to the mid-1990s; next, the “reform” era (Stewart 2014; Desimone 2009) from the mid-1990s until approximately 2010; and, from 2010 until the present, what this synthesis has termed the accountability era. These are described in detail below and are summarized in Table 1 along with each period’s predominant conceptual framework, primary delivery methods, research foci and approaches, and limitations of practice and research. Following this discussion, this chapter will present models and types of PD, theoretical frameworks, and an overview of PD in Christian schools which, when taken together, provide the larger landscape against which to interpret research findings on effective PD approaches.
Three Eras of Professional Development

The school restructuring era, encompassing the 1960s to the mid-1990s, was unofficially initiated in 1965 when President Lyndon B. Johnson signed into law the Elementary and Secondary Education Act as part of the ‘war on poverty.’ This act was the most extensive educational legislation affecting public schools ever passed, and not only had as its purpose promoting high standards and equal access to education, but also authorized funds for PD for educators. Less than two decades later in 1983, the National Commission on Excellence in Education published A Nation at Risk, a report by that tied national security to “substandard education in American public schools and called for raising standards, increasing rigor, and extending the school day and year” (Dufour and Marzano 2011, 11). This report gave way to a rapid rise in national and state task forces to investigate the condition of public education in the U.S., to the tune of some 300 such task forces within a few years of the report’s publication (Dufour and Marzano 2011). Leithwood et al. (2004) describe this time period as marked by “the effective schools paradigm and by interest in restructuring (e.g., site based management, comprehensive school reform). Researchers and policymakers idealized the ‘school as the unit of change’” (34). Schools were largely viewed as individual sites in need of structural reorganization to better ensure student learning. During this time, school leadership—which had previously been conceptualized as a management function—began to take on new dimensions; as Payrlo (2012) describes, “this shift started with A Nation at Risk report of 1983 … The most important trend in this change was the shift from managerial responsibilities to instructional leadership” (297).

With the increased emphasis on educational effectiveness and student outcomes, PD for educators became a primary focus for promoting school improvement. However, without sufficient models and research on PD, schools and districts drew upon the prevailing business and management models of the time. Thus training programs involving short workshops and conferences were adapted (often haphazardly) to create PD programs for schools. Togneri and Anderson (2003) describe the PD efforts characteristic of this time period:

In the early 1990s, prior to current reforms, districts engaged in traditional, fragmented professional development practices. For example, central offices used their district professional development days to offer a long menu of training opportunities. The opportunities tended to be short term—a day, a couple of hours—and offered little follow-up support. School-based professional development efforts had little connection to district-level professional development … Decisions at both the district and school levels were made without serious analysis of student and teacher needs. (23)

Given the nature of these PD formats, and the early state of educational research and methods writ large during this time period, most studies from this era were simple program evaluations. According to Desimone (2009), “For decades, studies of professional development consisted mainly of documenting teacher satisfaction, attitude change, or commitment to innovation rather than its results or the processes by which it worked” (181). Toward the early 1990s, however, researchers involved in large-scale school restructuring efforts began to posit that more in-depth study was needed in order to assess the full impact of PD efforts (cf. Louis and Marks 1998; Newman and Wehlage 1995). At about this time, shifts began to occur in educational theory and research—as well as in legislation that put even more emphasis on student achievement—that in turn impacted PD designs in schools. Stewart (2014) describes this new era as a “reform” movement that emerged “as prevailing belief links high-quality professional development (PD) to higher-quality teaching and high-quality teaching to student achievement … from passive and intermittent PD to that which is active, consistent, based in the teaching environment, and supported by peers” (28). The literature widely refers to this period as the “reform” era in PD. Even though this may appear as a bit of a misnomer (as the concept of reform in education originates much earlier), it was used here to denote a turning away from the previous era’s use of direct-delivery methods and evaluative studies, to more job-embedded, collaborative PD designs and in-depth methods of research.

The first driver behind this reform period was the rise of adult learning theory toward the end of the 1980s and early 1990s. (Theories of adult learning, and their implications for PD design, are discussed later in this chapter.) Tallerico (2005) refers to the advent of “constructivist and democratic theories of teaching, learning, and curriculum improvement” (4), which in turn changed the way educators thought about PD:

Beginning in the 1990s, qualitative literature began to support a roughly consistent alternative to the workshop model of professional development. This preferred approach holds that for teacher learning to truly matter, it needs to take place in a more active and coherent intellectual environment—one in which ideas can be exchanged and an explicit connection to the bigger picture of school improvement is made. This vision holds that professional development should be sustained, coherent, take place during the school day and become part of a teacher’s professional responsibilities, and focus on student results. (Editorial Projects in Education Research Center 2011, 1–2)

Similarly, Croft et al. (2010) describe the rise of “job-embedded professional development,” which “refers to teacher learning that is grounded in day-to-day teaching practice and is designed to enhance teachers’ content-specific instructional practices with the intent of improving student learning” (2). The authors identify the proliferation of new PD approaches such as action research, case discussion, coaching, data teams, lesson study, mentoring, and professional learning communities (6–7). New teacher induction programs also grew in prevalence, from 56%
of teachers participating in 1993–1994 to 68% in 2003–2004 (Darling-Hammond et al. 2009), as did the number of online PD opportunities with expanding Internet use.

A second driver behind the reform era was a change in federal legislation, when President George W. Bush signed into federal law the No Child Left Behind Act (NCLB). This legislation required schools to demonstrate improvement on standardized testing until all students attained proficiency, or face increasingly severe penalties and sanctions. In addition, NCLB provided descriptors for “high quality” professional development that intentionally excluded workshops and other short-term, direct-delivery methods: “Critiqued for their lack of continuity and coherence, workshops have at least in theory fallen out of favor. The federal No Child Left Behind Act of 2001, for instance, defines all professional development funded through the law to include activities that ‘are not one-day or short-term workshops or conferences’” (Editorial Projects in Education Research Center 2011, 1). Implicit in this requirement is the notion that high-quality and intensive PD will lead to better teaching, which in turn will yield higher student achievement. As Tallerico asserted in 2005, “education’s current political environment emphasizes students’ learning outcomes, often as measured by performance on standards-driven exams…. That value is reinforced in expert opinions about best practices for professional development” (5, emphasis in original).

In this political milieu, individual states, interstate agencies, and professional organizations began to develop standards addressing educators’ professional learning. As Desimone explained in 2009, “Education policy documents within the past several years are beginning to reflect this research consensus on critical features of professional development” (184). Although it is beyond the scope of this review to present these standards in detail, it suffices to say the following standards all share a similar emphasis on job-embedded learning with the goal of improving student achievement: the National Staff Development Council Standards for Staff Development (National Staff Development Council 2001), which are now the Learning Forward Standards for Professional Learning (Learning Forward 2011); the Interstate School Leaders Licensure Consortium (ISLLC) Standards (Council of Chief State School Officers 2008), which addresses the development of school leaders; and the InTASC Model Core Teaching Standards and Learning Progressions, in particular the standard on teachers’ professional responsibility (Council of Chief State School Officers 2013). It should be noted that this list is not exhaustive, as nearly every state either adopted these standards or developed its own set of standards for professional learning (see Loeb, Miller, and Strunk 2009 for a discussion of the state role in teacher PD).

Christian education was likewise influenced by these trends, as beginning in the 1990s, Christian schools began to include other forms of PD beyond workshops that were more interactive, collaborative, and site-specific:

To address the professional development needs of all members in a collegial community, a significant number of Christian schools have changed their focus from sending staff to external conferences and seminars in a cafeteria approach to an internal approach in which leaders and teachers co-create plans for professional growth that meet the unique needs of novices and veterans on the team. In so doing, schools envision and implement multiple-grade-level, subject-level, and school-level collaborative studies that foster shared learning. Because these efforts whet the teachers’ appetites, the schools are thereby enhancing their faculties’ commitments to engage annually in these kinds of collaborative activities. (Walter 2007, 40)

Despite these changes, workshops and conferences continued to be the predominant form of PD as reported by Christian school teachers and administrators (Headley 2003), as in much of PD in K–12 education writ large (Darling-Hammond 2009). Some possible reasons for this are that job-embedded, more-intensive forms of PD are typically more costly, require local experts to help in facilitation, and often lack fidelity in implementation. (These issues are discussed further in the following section, Models and Types of Professional Development.)

Along with the influence of adult learning theory on PD practice, and concurrent focus on increasing student achievement through PD, research in the field also underwent three major transformations during the reform era. The first was a movement to identify specific components or attributes of PD that contributed to programs’ effectiveness. The components identified for study were in alignment with much of what adult learning theory posited would make for ideal PD for educators. (See the Theoretical Frameworks section in this chapter, as well as Chapter III, Research on Professional Development Components.) These types of studies took advantage of large-scale, national surveys of teachers (Garet et al. 2001; Darling-Hammond 2009), and sought to establish correlations between the types of PD in which teachers were engaged and teacher self-report data on PD effectiveness. The second major research trend involved the investigation of PD impact on student achievement through the use of qualitative studies. Leithwood et al. (2004) describe the increased “array of individual and multisite qualitative case studies of high-performing and improving school districts that explicitly set out to isolate what is happening at the district level that might account for the reported success” (39). In a related third trend, the focus of most research shifted in setting to “large urban school districts” with “large numbers of students traditionally portrayed as low performing and hard-to-serve on the basis of ethnocultural, socioeconomic, and linguistic diversity” (Leithwood et al. 2004, 39).

Changes in PD formats as well as in research methodologies posed several difficulties for research on PD effectiveness. First, the expansion of PD programs to include a wide range of job-embedded activities, combined with the shift to qualitative case studies, made it difficult to not only find comparable programs to study but
also to generalize findings across settings. Put another away, the proliferation of PD types meant that nearly “everything” counted as PD, and nearly everything that counted as PD could be studied. A number of challenges also arose from the use of large-scale, national surveys of teachers that solely generated correlational data from teacher self-report (discussed at length in Chapter III, in the section Limits of Component-Based Approaches).

Finally, the shift of focus in research to urban settings had several implications, the most obvious being that other settings were given short shrift in the literature. However, a second possible concern is that academic challenges of urban students were so significant that PD interventions were not substantial enough to effect change (e.g., absent other large-scale, systemic changes involving curriculum, academic support, etc.); thus, studies might deem the specific PD efforts examined to be ineffective, whereas they were only ineffective in that setting (but could possibly be successful in other settings). Lastly, even with the pressure to examine student achievement as an outcome of PD, very few studies actually did so. As discussed in Chapter I, and as Croft et al. (2010) assert, “Meta-analyses have identified very few studies—out of hundreds—that provide empirically derived support for the positive impact of professional development on student achievement” (8).

The final and current era, from approximately 2010 to the present, is termed by this synthesis the accountability era of professional development. While accountability pressures are not new in education, the term seems to best characterize the prevailing concerns facing PD designers and educators in general. This period roughly begins with federal, state, and district funding cuts in the wake of the 2008 financial crisis and resulting recession, as well as the widespread adoption of the Common Core State Standards (CCSS) developed by the National Governors Association (NGA) and the Council of Chief State School Officers (CCSSO). By the midpoint of 2015, 42 states had adopted these standards as the basis for curriculum and assessment in their public school systems (Common Core State Standards Initiative 2015). As a result of these trends, from 2010 to the present, many public schools and districts—already facing reduced PD budgets from the recession—shifted most if not all of their PD resources toward training faculty in CCSS implementation and related student assessment. As Hill, Beisiegel, and Jacob (2013) explain, “professional development is often seen as the chief vehicle for implementing new policy initiatives” including CCSS (478). Not only accountable for CCSS implementation, schools also faced added financial pressure to use remaining resources on evidence-based PD with high return on investment (ROI) for student achievement.

In terms of research, there appears to be a reduction in the volume of PD-related studies published over the last five years, as compared with the first decade of the new century and the 1990s. From the standpoint of speculation, this may be due to a drop-off in federal and state funding for research (as the majority of PD-related studies deal with teaching in mathematics and science, for which federal, state, and university funding was more readily available in previous decades). Additionally, the implementation of CCSS may have constricted research agendas, as no longer could PD time be devoted to trying new PD approaches (but rather was consumed with CCSS-related training). The lack of peer-reviewed research on PD in Christian education persists to the present, so it is difficult to assess the degree to which the implementation of CCSS impacted PD in Christian schools or what PD-related trends are emerging in Christian education.

The most recent development to report occurred on December 10, 2015, when President Obama signed into law the Every Student Succeeds Act (ESSA). This act, which effectively replaces NCLB, purports to maintain its emphasis on high academic standards but also allow far greater flexibility for states in determining what specific learning standards to follow (whether CCSS or otherwise), how to administer achievement tests in mandated grades, and what accountability goals to set (Korte 2015). It remains to be seen what the impact of ESSA will be on the PD landscape, both for PD programs and related research efforts.

### Models and Types of Professional Development

Given the proliferation of PD programs and activities, it is not surprising that an abundance of PD models, accompanied by lists of specific practices associated with the models, are offered in the literature. It is helpful to provide a categorization of these models at the beginning of this synthesis, to provide the reader with an overview of the types of PD activities under investigation and their relationship to one another. Drawing on the work of Gaible and Burns (2005), Hooker’s (2008) categorization of PD activities has been cited frequently in the literature and presents one of the clearest means of differentiating between PD models and types. For each of three categories—standardized, site-based, and individual PD—Hooker provides a definition, examples of practices, and “pros” and “cons.” These are described in detail below, and are presented in Table 2.

Standardized PD, which is the “most centralized approach, used to disseminate information and skills among large teacher populations” (Hooker 2008, 3), involves workshops, conferences, and training sessions. Additionally, this category includes a “cascade model of scaled delivery” (3) in which small groups of teachers receive intensive training and then return to their own schools to train their peers (also commonly known as “train the trainer”). The benefits of this approach include exposing teachers to new ideas and methods and “disseminat[ing] knowledge and instructional methods to teachers throughout a country or region” (4). Drawbacks of this approach, however, are that it “hovers on a ‘one fit for all’ principle for upgrading teachers’ knowledge base that is independent of context” (4). Further, one-time, one-place workshops “without
ongoing support rarely result in effective changes for teaching and learning” (4). Finally, standardized PD tends to reflect a top-down, “banking” model of education (Freire 1970), in which new information is transmitted to learners, who are “knowledge consumers” with the responsibility to bring what they have learned back to their classrooms and put it into practice” (Hooker 2008, 4, emphasis in original). As discussed earlier, standardized PD was the primary approach during the school restructuring era until the mid-1990s, though workshops and conferences still remain prevalent today. Chapters III and IV of this synthesis review research on specific PD approaches that could be classified as standardized.

In contrast to standardized PD, Hooker (2008) defines site-based PD as “intensive learning by groups of teachers in a school or region, promoting profound and long-term changes in instructional methods” (3). Rather than outside experts, site-based PD uses in-house facilitators or master teachers “to engage in more gradual processes of learning, building mastery of pedagogy, content and technology skills” (5). Specific examples of site-based PD practices include lesson study, study groups, inquiry or action research, mentoring, and university and school partnerships. The positives of site-based PD are that it addresses local issues, encourages collaboration and individual initiative, and allows for flexibility as well as sustained PD. Other benefits are that it helps to establish communities of practice (cf. Wenger 1998, as discussed in the following section, Theoretical Frameworks), and has the capacity to stimulate cultural change. Drawbacks to site-based PD are that it is time and labor intensive, requires expertise in local providers or mentor teachers, and can be more difficult (for all of these reasons) to implement in resource-poor communities. Chapters III and IV of this synthesis review specific PD approaches that could be classified as site-based.

The final category described by Hooker (2008) is self-directed PD, described as “independent learning, sometimes initiated at the learner’s discretion, using available resources that may include computers and the Internet” (3). Self-directed learning may include tuition assistance programs (reimbursement for college courses), PD funds (monies allocated for teachers to seek continuing education credits or other PD opportunities on their own), professional certification, state licensure, and professional growth plans. Self-directed PD also includes “informal versions . . . [such as] teachers seeking out experienced colleagues for advice or searching for lesson plans on the Internet” (6). Several studies involving teacher self-report data note that these informal connections with colleagues can be the most impactful in terms of educators’ learning experiences. Self-directed learning also enables teachers to seek out PD that is of specific interest to them, which may encourage their full engagement in those activities as well as encourage lifelong learning.

Schools seeking to facilitate self-directed PD can consider implementing and supporting professional growth plans for teachers as part of a robust supervision and evaluation process. As Marzano, Frontier, and Livingston (2011) explain, “Such plans are formal ways for teachers to set goals and articulate strategies to accomplish those goals” (91) and should be done on a yearly basis as part of the evaluative process. The same approach can be used for school leaders in the form of a leadership development plan, as Kearney (2010, ) proposes:

A leadership development plan is an organizer for professional learning that ties directly to a principal’s goals as mutually determined by the principal and his or her supervisor. Taking into consideration the principal’s past evaluation results and recommendations, current school targets, and resources available for professional development, the principal and supervisor establish these professional development goals, select activities, identify what will be considered evidence of accomplishment, arrange scheduling and funding, and establish check-in points for feedback and adjustments. These agreements are captured in the leadership development plan and become components of the principal’s annual performance review. (24)

In addition to professional growth plans, another vehicle for validating and encouraging educators’ engagement in self-directed PD is certification and/or licensure (cf. Evans 2015 for research related to ACSI certification; Stronge et al. 2007 for research on National Board Certification).

While an important part of educators’ PD experiences, this final category of PD will not be covered explicitly in this review for a number of reasons. First, there are very few studies of independent PD in the literature, as Jones and Deter (2014) confirm: “There is little research available on independent teacher learning, which we define as learning activities that teachers engage in on their own initiative and accord, and which possess no connection to their organization” (371). Secondly, schools face a number of difficulties when they attempt to facilitate self-directed PD outside of the normal supervision and evaluation process: relying on teachers’ involvement in self-directed PD makes “important follow-up activities harder to schedule and implement, and alignment to school curriculum more difficult to accomplish” and “the use of student assessment scores and tracking change over time appear to be [better] facilitated with use of the school-based model for professional development” (Blank, de las Alas, and Smith 2008, 1).
<table>
<thead>
<tr>
<th>Timeframes (Approximate)</th>
<th>Conceptual Framework for PD</th>
<th>Primary PD Delivery Method(s)</th>
<th>Research Foci and Approaches</th>
<th>Limitations (Practice and Research)</th>
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<tbody>
<tr>
<td>1960s to Mid-1990s School Restructuring Era</td>
<td>• Didactic/banking model • Teacher-centered • Training models • School leadership PD primarily focused on managerial role, with beginning shift toward instructional leadership</td>
<td>• Workshop model, (typically one-shot, off-site) • Individual-focused and self-directed PD through tuition assistance, CEU programs</td>
<td>• Teacher satisfaction with PD • Primarily quantitative • Surveys of teacher opinions regarding PD effectiveness</td>
<td>• Practice: No ongoing reinforcement for PD learning • Research: Lacking examination of PD impact on student outcomes (e.g., achievement)</td>
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<tr>
<td>Mid-1990s to 2010 Reform Era</td>
<td>• Constructivism • Learner-centered (both students, and teachers as learners) • Adult learning theory • NCLB “high quality” PD guidelines give primacy to job-embedded and research-based approaches • School leadership focus shifts from management to instructional leadership</td>
<td>• Development of job-embedded PD (held on-site and ongoing), including PLCs, inquiry models, mentoring, coaching • Online PD formats develop • Development of standards (ISLLC 2008) • Workshop model still widespread</td>
<td>• Changes in teacher practice and student achievement gains resulting from PD • Increase of qualitative methods (e.g., case studies) • Analyses of national teacher survey data sets show correlations between PD components and teacher self-report of effectiveness</td>
<td>• Practice: Job-embedded approaches are costly, require local experts, and often lack fidelity in implementation • Research: ‘Everything’ is PD: proliferation of programs and methodologies makes it difficult to generalize findings</td>
</tr>
<tr>
<td>2010 to Present Accountability Era</td>
<td>• Due to funding cuts in wake of 2008 financial crisis and recession, plus increased accountability from states as a result of CCSS, PD focus on evidence-based, cost-effective methods • Widespread focus on CCSS-linked content/assessment • School leadership focus on instructional leadership and meeting accountability standards</td>
<td>• Much of PD resources (time, funding) in states devoted to CCSS implementation • Online PD formats continue to develop, beyond workshops to virtual learning communities and other interactive formats</td>
<td>• Impact of PD on student achievement is the primary focus of assessment and ‘bar’ for PD effectiveness • Mixed-methods approaches increase, as they become more popular in educational research writ large</td>
<td>• Practice: Search for cost-effective PD hindered by lack of evidence for “best practices”; and most PD geared toward CCSS implementation • Research: Apparent reduction in volume of PD research (possibly due to priority of CCSS implementation in schools, as well as reduction of federal and private funding)</td>
</tr>
<tr>
<td>PD Category</td>
<td>Description</td>
<td>Activity Types</td>
<td>Pros</td>
<td>Cons</td>
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<tr>
<td>Standardized</td>
<td>• Most centralized approach, used to disseminate information and skills &lt;br&gt;• Typically short-term and off-site</td>
<td>• Workshops &lt;br&gt;• Conferences &lt;br&gt;• Training sessions &lt;br&gt;• Cascade model (‘train the trainer’) &lt;br&gt;• Can be live or virtual</td>
<td>• Introduction of new methods and skills &lt;br&gt;• Enables widespread distribution of knowledge</td>
<td>• One-size-fits-all does not take into account teacher prior knowledge or needs/interests &lt;br&gt;• Typically no follow-up support for learning &lt;br&gt;• Top-down, ‘banking’ model of information dissemination</td>
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<tr>
<td>Site-Based</td>
<td>• Held on-site where educators work &lt;br&gt;• Uses local facilitators &lt;br&gt;• Engages teachers in collaboration &lt;br&gt;• Sustained and ongoing</td>
<td>• Lesson study &lt;br&gt;• Study groups &lt;br&gt;• Inquiry or action research &lt;br&gt;• Mentoring &lt;br&gt;• University and school partnerships</td>
<td>• Addresses local issues &lt;br&gt;• Enables sustained work over a longer period of time &lt;br&gt;• Enables collaboration &lt;br&gt;• Allows for flexibility; helps establish communities of practice (Wenger 1998) &lt;br&gt;• Stimulates cultural change</td>
<td>• Resource intensive (time, labor, cost) &lt;br&gt;• Requires expertise in local providers or mentor teachers &lt;br&gt;• Difficult for these reasons to implement in resource-poor communities</td>
</tr>
<tr>
<td>Individualized</td>
<td>• Self-directed &lt;br&gt;• Learner-initiated &lt;br&gt;• Formal or informal &lt;br&gt;• Frequently utilizes online formats</td>
<td>• Informal faculty collaboration or dialogue &lt;br&gt;• Tuition assistance programs &lt;br&gt;• PD funds for CEUs or training attendance &lt;br&gt;• Certification &lt;br&gt;• Licensure &lt;br&gt;• Professional growth plans</td>
<td>• High degree of importance and impact reported by educators for informal types &lt;br&gt;• Allows for pursuit of individual interests &lt;br&gt;• Encourages lifelong learning</td>
<td>• Little research on effective practices &lt;br&gt;• Disconnect from larger school PD goals &lt;br&gt;• Difficult to track impact on student achievement</td>
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While these three categorizations—standardized, site-based, and individualized—are helpful for schools planning PD programs as well as researchers examining the effectiveness of PD efforts, it is important to emphasize that educators likely do not view their development experiences in such discrete categories. Many researchers point out that teachers, when asked to describe the PD activities in which they are involved, tend to provide a mixed list that includes learning from diverse sources, often spanning all three categories (cf. Jones and Deter 2014; Montoro 2013). It may be more accurate to think of educators as participating in a system or constellation of formal, informal, and self-directed learning, for which schools exert only a partial—though critically important—influence. This reality impacts schools’ PD efforts, as designers and researchers alike must consider the larger developmental context and influences within which their specific PD efforts are situated.

**Theoretical Frameworks**

Professional development for educators involves the interplay between several things: educators and their backgrounds, the new knowledge and/or skills to be learned, various sources of learning (e.g., presenters, colleagues, experimentation, materials, activities, and so forth), and teachers’ actual practices. Given these various inputs and outputs, “Unsurprisingly, the complex nature of those transactions renders the field of professional development a challenging one to study” (Editorial Projects in Education Research Center 2011, 1).

As in many fields of educational study, PD designers and researchers have relied on theoretical frameworks to help understand educators’ learning processes, develop PD programs, and assess the efficacy of those programs. The most common framework utilized relative to PD for educators is that of adult learning theory, which—as the name implies—provides a conceptual understanding of the nature of the learning process in adulthood. Although the literature on adult learning is broad, of particular interest to the question of effective PD for educators are theories on how adults learn from experience (Kolb 1984, 1999), apply new learning in practice (Hutchings and Wutzdorff 1998), use reflection in practice (Schön 1987; Garvin 2000), engage in “transformative” learning that develops professional identity (Mezirow 1991), and learn within larger communities of practice (Wenger 1998).
Learning from Experience

Based on the work of Dewey, Piaget, and Lewin, Kolb’s (1984) model of experiential learning is one of the most commonly cited adult learning theories in the literature on PD. Kolb sees learning in adulthood as centering on learning from experience, which he posits is not an automatic or simple process. Rather, learning from experience involves a cyclical process of concrete experience, reflection, integration, and application of knowledge. Kolb depicts this cycle in his structural model of experiential learning, which is conceptualized in the form of a “wheel” and involves the interplay between four corresponding learning modes: concrete experience (CE); reflective observation (RO); abstract conceptualization (AC); and active experimentation (AE). As Kolb explains, for adults to engage in the cycle of learning:

They must be able to involve themselves fully, openly, and without bias in new experiences (CE). They must be able to reflect on and observe their experiences from many perspectives (RO). They must be able to create concepts that integrate their observations into logically sound theories (AC), and they must be able to use these theories to make decisions and solve problems (AE). (30)

Learning from experience thus hinges on the individual’s ability to reflect on the experience, to integrate the experience into current understandings, to make new meanings, and to put those meanings into daily practice. This cycle of processing new events and integrating the resultant learning does not cease at a set point, however. Merriam and Caffarella (1999) explain that in Kolb’s model, “Whatever action is taken in the final phase becomes another set of concrete experiences, which in turn can begin the experiential learning cycle again” (224). Thus, with each new experience, individuals are presented with an opportunity for new learning and an increased knowledge base with which to live—and continue to learn—in their daily lives and profession.

Kolb’s model has been used not only as a means of conceptualizing experiential learning, but also as a scheme for understanding individual learning preferences, or “styles” (Kolb 1984, 1999). In a similar schematic model, the four aspects of experiential learning (concrete experience, reflective observation, abstract conceptualization, and active experimentation) are arranged on a wheel that is subdivided into quadrants, each representing a preferred method of learning, or learning style. Kolb (1999, 8) describes individuals with these four different styles as: first, “divergers” (quadrant bounded by concrete experience/reflective observation), who value being imaginative, understanding others, and being open-minded; second, “assimilators” (quadrant bounded by reflective observation/abstract conceptualization), who value creating models, defining problems, and developing theories; third, “convergers” (quadrant bounded by abstract conceptualization/active experimentation), who value solving problems, making decisions, reasoning deductively, and being logical; and fourth, “accommodators” (quadrant bounded by active experimentation/concrete experience), who value leading, taking risks, initiating, and being adaptable and practical.

While individuals may have preferred learning styles, Kolb does not see these styles as permanently fixed, nor views it as optimal when one style predominates in an individual’s learning. In drawing parallels with Perry’s (1999) cognitive-structural model of development—in which individuals’ thinking becomes increasingly complex, as they move from dualistic to multiplicative to contextually relative ways of knowing—Kolb describes adult learning as a developmental process involving “higher-level integrations of the dialectic conflicts among the four primary learning modes … At the highest stages of development, however, the adaptive commitment to learning and creativity produces a strong need for integration of the four adaptive modes” (140). Thus, Kolb posited that expanding one’s repertoire of and facility with different styles can lead to more integrative ways of learning. And as in the Perry scheme, this movement toward complexity and integration is not automatic: if individuals choose not to involve themselves fully in new concrete experiences, they may limit their skill repertoires to learn from future experiences.

Kolb’s theory on experiential learning and learning styles would suggest that PD for educators should provide opportunities that engage the full cycle of learning. Activities should be sequenced to involve educators in concrete experience, reflection on their experiences, integration of new knowledge with prior understandings, and application of knowledge through practice in their classrooms. Further, PD activities that incorporate various learning styles into their program design would ensure that educators not only have opportunity to learn in their preferred style, but also are challenged to develop their less dominant styles and ultimately integrate them into new, more complex ways of learning.

Integrating “Knowing” and “Doing”

Like Kolb, Hutchings and Wutzendorf (1988) present a model that anchors adult learning to learners’ practical experiences, so that what “might otherwise seem to be arbitrary, abstract rules can thus be made into concrete personal knowledge with the authority of lived experience behind it” (11). In further explicating this process, the authors describe the relationship between adults’ “knowing” and actually “doing.” For a teacher, this might be illustrated in terms of “knowing” about ways to integrate technology in the classroom, versus actually “doing” the technology integration in a lesson.

Hutchings and Wutzendorf (1988) depict the process of integrating the two in terms of a “bedspring” or spiral model, in which knowing and doing come closer together with each turn of the spiral. As individuals engage in an iterative cycle of exposure to new knowledge, followed by experimentation in real or laboratory settings, and then reflection on practice, they engage in a “dialectical” (8) process between knowing and experience. Through this process, adults develop more complex and complete understandings of what it means to both know and to do something. In this way, adults develop expertise in practice.
Applied to teacher learning in PD experiences, teachers may learn a new pedagogical approach—as in the previous example, integrating technology in instruction—from a workshop or reading an article, and then work in their classrooms to implement discussion boards, “flip” the classroom, and so forth. As teachers experiment with these new methods, they reflect on their efforts and continually adapt their classroom practice as a result of new knowledge they have gained. Through this process, teachers move from seeing “knowing and doing as relatively discrete entities” in “an upward spiral of closer and closer integration, [until] knowing and doing come together in performance” (9–10). Thus, as similarly suggested by Kolb’s theory, PD that facilitates the integration of knowing and doing would require a robust design with opportunity for content learning, ample practice, reflection on new learning, and continued experimentation.

Reflecting-in-Action

Schön’s (1987) theory of adult and experiential learning also views adults’ experience as playing a key role in learning, but unlike other theorists, Schön asserts that individuals do not learn best when reflection and action occur in a cyclical or alternating pattern. Rather, he claims that for optimal learning, reflection and action should happen simultaneously in learning environments. When this type of “reflection-in-action” occurs, adults’ learning “goes beyond stable rules not only by devising new methods of reasoning … but also by constructing and testing new categories of understanding, strategies of action, and ways of framing problems” (39). Ultimately, through reflection-in-action, adult learners can “make new sense of uncertain, unique or conflicted situations of practice” and realize that neither “knowledge fits every case nor that every problem has a right answer” (40). This is particularly important in complex environments like classrooms, where educators must continuously attend to all of the elements that impact learning (e.g., content, student needs, assessment and feedback loops, and student dynamics).

Garvin (2000) concurs with Schön’s view and states that “for all their power, reflection and review processes have an important weakness: they take place after the fact” (117). Garvin presents a different model of experiential learning that can be used in adult learning environments, called “action learning” (117), in which action and reflection occur simultaneously:

> The goal remains the same—to develop practical, applied knowledge by drawing on experience—but with an important twist. Reflection and action are now intimately intertwined … learning is more proactive than in the typical review process, combining three elements: an introduction to relevant concepts, theories, and tools; a carefully selected problem or simulation to test and apply new knowledge; and a process that includes pauses along the way to evaluate progress, share learnings, and make midcourse corrections. (117)

According to Garvin, this method of learning is more authentic in that it closely mirrors an actual practice situation; adults must make real-time decisions while considering applicable theories of action, utilizing problem-solving resources, and evaluating decisions in vivo.

Key to this method is “experimentation,” which Garvin describes as an “intrusive activity” (141) that immerses learners in an active learning environment that has changing conditions as its central feature. This kind of learning, according to Garvin, is “deep” rather than “superficial” in nature:

> Such efforts are designed to produce deep understanding, not superficial knowledge. At its simplest, the distinction is between knowing how things are done and knowing why they occur. Knowing how is partial knowledge; it is rooted in norms of behavior, standards of practice, and settings of equipment. Knowing why is more fundamental; it captures underlying cause-and-effect relationships and accommodates exceptions, adaptations, and unforeseen events. (143)

Thus, action learning has the potential to produce deeper—or more significant—learning experiences for adults, if they are given the opportunity for experimentation in active and authentic learning environments. For educators, this means that PD opportunities should be closely linked to their actual practice. Instead of hypothetical situations that are explored away from the classroom, teachers can engage in ongoing experimentation and reflection within the context of their own teaching. Activities such as peer coaching and co-teaching are PD activities that can help facilitate reflection-in-action.

Transformative Learning

In addition to involving experience, action, and reflection, adult learning—as described by Mezirow (1991)—has the potential to be “transformative.” Transformative learning for adults involves generating new meanings and sense of identity, as opposed to simply acquiring new knowledge or skills and implementing them in practice. A key feature of transformative learning is adults’ questioning their previously “uncritically assimilated habits of expectation or meaning perspectives” (4) through which they understand and act in the world, as well as “overcoming limited, distorted, and arbitrarily selective modes of perception and cognition through reflection on assumptions” (5). By questioning their assumptions, adults can arrive at new ways of thinking about their practice and what it means to be a practitioner. Continuing the previous example, teachers who experience transformative learning with regard to instructional technology would question their underlying assumptions about what it means to teach and what it means for students to learn; from there, they would consider how technology might alter those perceptions, as well as their identities as teachers, and students as learners. In this sense, transformative learning involves deeper shifts in adults’ meaning making and identities, beyond simple knowledge and skill acquisition.

Mezirow (1991) describes in detail the process by which transformative learning may occur. First, adults experience a disorienting dilemma, where their experiences call into question
their assumptions. This dilemma is followed by self-examination, which in turn leads to critical examination of the assumptions in question. Next, individuals come to recognize that transformation of assumptions is a shared human experience—a revelation that can result in confidence in their own ability to navigate this process. This is followed by exploring new options, planning a course of action, and acquiring new knowledge and skills to implement this plan. Individuals then try out and eventually gain confidence in new roles. Finally, adults reintegrate their learning into a new, transformed perspective with which they make meaning of future experiences. This new perspective is subject to further transformation, as adults encounter additional and inevitable disorienting dilemmas.

It follows that for educators to experience transformational learning through professional development, PD activities would need to begin by presenting educators with complex, disorienting dilemmas that cause them to question their underlying assumptions about some aspect of education. Skillful facilitators would assist educators with moving through and forward from that experience, to either confirming or invalidating those assumptions. Next, educators would set goals for themselves for attaining the content and skills they would need to transform their practice, which would then be provided by further PD along with opportunities to experiment and create new roles.

Learning in Communities of Practice

While each of the theories described to this point have the adult learner’s internal development as their principle focus, Wenger (1998) views learning as primarily occurring in and through specific contexts, namely larger communities of which the individual is a member. Thus, in his discussion of adults as situated in “communities of practice,” Wenger applies a social learning approach to the question of how adults learn and views their learning as a “fundamentally social phenomenon reflecting our own deeply social nature as human beings” (3). Communities of practice are the contexts in which meaning making and learning occurs: “We all have our own theories and ways of understanding the world, and our communities of practice are places where we develop, negotiate, and share them” (48). The impact of these communities is not limited to individuals’ meaning making alone. Rather, participation in communities of practice deeply affects individuals’ actions and identities: “Such participation shapes not only what we do, but also who we are” (4). Furthermore, there is a dynamic “negotiation” process, or an interaction between the environment and the individual, in the construction of meaning: “By living in the world we do not just make meanings up independently of the world, but neither does the world simply impose meanings on us” (53–54).

For educators, the school settings in which they find themselves constitute their communities of practice. Wenger’s theory suggests that PD for educators should not happen in isolation (e.g., when teachers seek learning opportunities on their own or participate in PD that is off-site and/or disconnected from the realities of their specific schools). Further, as Wenger asserts that adult learners need to be involved “in actions, discussions, and reflections that make a difference to the communities that they value” (10), PD should provide schoolwide opportunities for community-wide engagement in these types of activities.

Summarizing Adult Learning Theory

Adult theory provides a helpful framework with which to conceptualize how adults learn in and from their experiences. A general description of optimal adult learning emerges from the theories reviewed. First, such learning can be said to involve the integration of experience, reflection, and action in a learning cycle that is iterative rather than having a definite endpoint. Next, learning at its best is inherently active, in that it requires ongoing experimentation rather than passive absorption of information. Learning that is problem-based—where adults learn by addressing authentic dilemmas within their environment—is also deep rather than superficial in nature. Additionally, learning can involve transformation of self, as individuals come to question, test, and reframe their ways of making meaning and, in doing so, their views of themselves and the world in which they live. Finally, rather than occurring in a vacuum, learning requires that learners be engaged in social contexts, as they construct shared meaning in collaboration with others in their communities.

Adult learning theory serves as the basis for many of the job-embedded PD efforts that arose around the turn of the twenty-first century, which is evident in Drago-Severson’s (2004) discussion of best practices for facilitating teacher learning:

> It is generally accepted that professional development in the 21st century must center on creating opportunities for teachers to examine and reflect on their practice and how it can be improved to better support student achievement … [This] approach supports teacher learning by focusing on teacher knowledge, teacher practice, and the relationships between the two to build a culture of inquiry. It attends to the individual and collective growth of teachers and is based on the philosophy that learning is a lifelong process. (105)

These learner-centered, community-based efforts include approaches like professional learning communities (PLCs), coaching and mentoring, and inquiry-based PD (as discussed in Chapter IV of this synthesis). Furthermore, adult learning theory has strongly informed component-based research on PD effectiveness (presented in Chapter III), as well as the national standards for teacher and administrator PD discussed earlier in this chapter. Thus, adult learning theory has had a far-reaching impact on the design of PD programs, operationalization of research on PD effectiveness, and development of national standards for PD.
collaboration and conversations), the PD opportunities at their online networks and trainings, book discussions, and informal a variety of self-initiated PD activities (e.g., graduate education, were content specific” (62). Further, while teachers participated in more well-planned professional development opportunities that professional learning activities” (60) and teachers “expressed a desire revealed that “their educational leadership often designed broad results indicated that those categories with the highest means were equity (3.1), leadership (2.9), and family involvement (2.7), “indicating that teachers had a strong commitment to assuring that all students learn, that they appreciated their school's leadership in regard to the professional development efforts at these schools, and that they involved the families in student learning” (58). In contrast, the lowest means were found for the categories of evaluation of professional practice (1.8), data-driven professional development practices (2.0), and learning communities (2.0), which “suggests that these teachers were in school environments where their professional development was not driven by student or teacher data and that they functioned primarily without the benefit of professional learning communities” (58). Reflecting on this data, Montoro asserts (63), “The professional development opportunities for the Christian teachers in this study appear to be well below the ideal shown in the NSDC standards.” Additional findings from Montoro’s (2013) study pointed to discrepancies between teachers’ preferred PD types and the opportunities provided by their schools. First, the NSDC survey results indicated that teachers rated content standards highest (2.7), but rated the process standards the lowest (2.15). This suggested that “teachers preferred content-specific professional learning tied to effective teaching strategies” (60). However, qualitative data revealed that “their educational leadership often designed broad professional learning activities” (60) and teachers “expressed a desire for more well-planned professional development opportunities that were content specific” (62). Further, while teachers participated in a variety of self-initiated PD activities (e.g., graduate education, online networks and trainings, book discussions, and informal collaboration and conversations), the PD opportunities at their schools varied little and were often “traditional, mostly conferences and workshops, without taking into consideration teacher experience or knowledge” (63). A third disconnect occurred in the area of collaborating with others: teachers expressed a desire to “collaborate or network with other teachers, particularly from other Christian schools” (62), but “collaboration was normally teacher initiated. Administrators rarely scheduled time for teacher collaboration and collaboration wasn’t scheduled into the school’s PD plans” (63). Finally, there appeared to be a contradiction between what school leaders believed and said regarding PD, as opposed to what they actually practiced: “Teachers believed that their educational leaders had strong beliefs about the importance of teacher professional learning and that they articulated a shared commitment to professional growth,” but at the same time they “wanted their leaders to be better role models of professional growth and learning” (60, emphasis added).

In an earlier study, Boerema (2011) conducted a survey to determine areas of research needed to support Christian schools. A total of 17 participants included seven education coordinators, three principals, and seven university professors, with fourteen participants affiliated with Christian Schools International (CSI), two affiliated with the Association of Christian Schools International (ACSI), and one who was not affiliated with either. Questions solicited participants’ views of research, as well as how research informs practice in Christian schools. Though participants generally reported a personal valuing of research and a view that “Christian schools were at a point in their history where research was important” (39), their assessment of the actual use of research in Christian schools was negative. For example, four respondents “expressed the view that Christian schools tend to be skeptical of educational research,” with the reason that “quantitative data is expensive and it is easier for Christian educators to talk about philosophy” (38). Further, some participants shared the view that “Christian schools were not as self-critical as public schools and were not as engaged in the current school reform movement as they could be” (38–39). Though not necessarily representative of all Christian school educators and contexts due to the small sample size, these findings are interesting in light of the dearth of research on PD for Christian school educators. It stands to reason that Christian educators’ negative views of research may impact not only the use of evidence-based practices in schools, but also educators’ interest and willingness to participate in educational research studies themselves.

In addition to the two studies described above, three needs assessment surveys of Christian school educators and leaders were identified in the literature. All three utilized a similar methodology and the same survey instrument to conduct research on ACSI member schools in the Pacific Northwest, Mid-Atlantic, and Mid-America regions (Headley 2003; Finn, Swezey, and Warren 2010; and Neuzil and Vaughn 2010, respectively). Thus, although they do not represent a sample of Christian school educators and
leaders nationwide, they do provide data from diverse regions of the country over a span of nearly a decade. The studies are presented here in order from the oldest to the newest, as the two newer studies utilized the survey from the first study as designed by Headley (2003).

Headley (2003) reported on a survey of teachers at ACSI member schools in the Pacific Northwest, in which 60 administrators from as many schools completed a “growth checklist” related to their PD participation. The survey identified three types of PD policies and practices: those that support individual growth; those that support group growth; and those that could support individual or group growth, or both. Individually oriented policies and practices were evident at 69% of the schools responding, and participants most frequently cited ACSI convention participation (90%), faculty handbooks (92%), and teacher evaluation for professional growth (87%), all of which were reported in 69% of schools responding. Group-oriented policies and practices were in place at 28% of schools, and participants most frequently reported ongoing faculty development courses (42%), preparation in biblical worldview integration (42%), and joint planning periods (40%). Those practices and policies that could support individual and/or group growth were reported in 47% of schools, with the most frequent being school-sponsored in-service activities (92%), new teacher mentoring (57%), and collaboration with other K–12 schools (43%). Administrators identified “basic resources” such as time and money as their and teachers’ greatest PD-related need; further, “Classroom management and biblical worldview integration were the greatest specific content and educational process need for teachers” (209).

In a more recent study, Finn, Swezey, and Warren (2010) utilized the same survey tool as Headley (2003) in research involving ACSI member schools in Virginia Beach, VA. Survey respondents included a total of 175 teachers and administrators. The most commonly cited PD opportunities in which participants engaged were workshops (75.4%), mentoring (54.3%), tuition reimbursement (42.8%), study groups (18.3%), ACSI-sponsored meetings and conferences (17.3%), formal induction programs (11%), and collaborative action research (6.2%). According to the authors, “the most frequently cited type of PD activity was the school-based in-service. These activities were often theme-based with some of the most common topics being biblical integration, computer training, and group Bible study” (16). Participants also rated a number of possible PD foci on a Likert-type scale in terms of their importance (ranging from 1 = no importance to 5 = very important) and their perceived level of personal competence in that area (ranging from 1 = no competence to 5 = very competent). The top ranked items were “Integrating Christian faith with academics” (mean of 4.77 for importance, 4.01 for competence), “Teaching the Bible and Biblical principles” (mean of 4.72 for importance, 4.04 for competence), and “Integrating Scripture into academic course work” (mean of 4.69 for importance, 3.90 for competence). In terms of areas in which participants desired additional preparation, the most frequently cited areas were classroom management strategies and practices (45.8%), understanding trends and issues in education (35.4%), identifying and working with special needs learners (35.4%), integrating Christian faith with academics (33.7%), and using computing technology for learning (33.7%).

Neuzil (2010) and Neuzil and Vaughn (2010) reported the results of surveys administered in the Mid-America region of ACSI, involving 38 administrators and 180 teachers from 38 ACSI member schools in that region. Two surveys were used: one that incorporated Headley’s (2003) instrument, and an established professional learning community (PLC) instrument that gauged respondents’ beliefs as to whether their school staff had developed into a learning community. Regarding the first survey, a list of 28 professional development activities was divided by quartiles based on response rates. In the highest quartile (75 to 100%), the most frequently rated response was school-sponsored in-service activities, followed by ACSI convention attendance, teacher evaluation, and faculty handbooks. In the next quartile (between 50 and 75%), results indicated that administrators provided professional leave days, new-teacher mentoring, and a graduated salary scale based on teachers’ educational attainment. In the third quartile (25 to 50%), activities included providing a professional development fund for faculty and tuition reimbursement for graduate study. In the lowest quartile, activities included collaboration with other K–12 schools, critical friends groups (inquiry groups), teacher shadowing, teacher portfolios, videotaping of peers, and journaling. The authors noted that the activities in this last quartile are the least available to teachers, but provide the greatest degree of collaboration, peer feedback, and reflection.

Finally, in an analysis of the PLC survey, researchers found that the PD activities of peer observation, teacher evaluation for professional growth, school-sponsored in-service, and collaborative teacher research were all significantly and positively correlated with teachers’ perceptions of a PLC at their schools. Additionally, ACSI convention participation approached statistical significance for positive correlation. When taken together, these five studies provide insight into the lay of the land in PD practices in Christian schools, though it must be cautioned that none are large-scale and each was set in a specific geographical region. The first insight is that PD practices in Christian schools do not fully meet national standards, and improvement is needed in providing more active, collaborative, and content-specific PD (Montoro 2013). Second, needs assessment research from different parts of the U.S. confirm that in-service workshops still predominate in Christian school PD efforts, and that more collaborative and reflective forms of PD are least available to teachers. Further, the PD topics of greatest interest to Christian school educators are related to biblical integration and worldview,
as well as classroom management (Headley 2003; Finn, Swezey, and Warren 2010; and Neuzil and Vaughn 2010). Finally, Christian educators remain skeptical of research and are not as engaged in reform efforts as their counterparts in other educational settings (Boerema 2011), which may help to partially explain the lack of research on PD in Christian education.

III. Research on Professional Development Components

As discussed in Chapter II, a trend in research methodology during the reform era of professional development was to examine components that contribute to the effectiveness of PD. One of the key researchers in this area, Desimone (2009) explains this method as a way of addressing research challenges posed by the nature of PD:

One way of translating the complex, interactive, formal, and informal nature of teacher learning opportunities into manageable, measurable phenomena is to focus measurement on the critical features of the activity ... that make it effective for increasing teacher learning and changing practice, and ultimately for improving student learning — rather than on the type of activity (e.g., workshop or study group). (183, emphases in original)

This approach (examining critical features), then, is posited as a viable method for overcoming the inherent complexities in PD-related research.

In addition, as new and various types of PD proliferated during the same time period, this approach offered an advantage to practitioners: if critical features could be identified, those who designed PD activities did not have to adopt a standardized approach to PD that had been deemed “effective.” Rather, schools could continue to utilize diverse methods and be assured of their likely effectiveness as long as they had these critical features in place. As Desimone explains regarding this method of research, “the goal is not to develop or validate a monolithic approach and then get others to adopt that approach. Instead, research on teacher learning ought to support adaptation and customization ... while maintaining a consistent core base” (186).

Desimone (2009) asserts that “there is an empirical research base to support the identification of a core set of features of effective professional development ... [and] a consensus that these core features play an important role in determining the effectiveness of professional development” (181–183). The literature identifies five such features of PD: (1) content focus, or PD that addresses the specific academic subject matter taught by each teacher; (2) active learning, which is the opposite of teachers’ passively listening to or watching a presentation of information; (3) coherence, which most frequently is described as alignment with school, district, and state reform initiatives; (4) duration, or the span of time as well as total number of hours spent in PD; and (5) collective participation, which entails grouping teachers together for PD activities.

This chapter will report on key studies that form the basis for this line of research, followed by discussions of each of the five features and supporting research for each (drawn from the key studies, as well as additional studies that were found in the research for this synthesis). It should be noted that while there is some crossover from research in this area with specific PD practices described in Chapter IV, those studies that specifically examined components for effectiveness are included in this chapter. Finally, studies of specific PD efforts designed using the components are evaluated, and the limits of this research approach are discussed along with implications for PD practice.

Key Studies

The five components of content focus, active learning, coherence, duration, and collective participation were first posited in two major studies that involved analysis of data from large-scale, national surveys of teachers (Garet et al. 2001; Desimone et al. 2002). Desimone (2009) asserts that in both studies, “the features of professional development were what mattered for relationships with changes in knowledge and skills and classroom practice. The effects of the structure of the learning opportunity on teacher change—for example, whether it was a workshop or study group—were fully explained by the features of the activity” (183).

The first study, by Garet et al. (2001), evaluated the federal Eisenhower Professional Development Program (Title II funding) by using probability sampling to survey a nationally representative sample of 1,027 teachers, most of whom taught mathematics or science. These teachers had attended Eisenhower-assisted activities during the second half of 1997, and were sampled from 358 districts and Eisenhower-related programs across the country.

With a response rate of 72%, the survey results provided detailed, self-report information regarding teachers’ experiences and related behaviors to the PD activities in which they participated. The data were analyzed for both structural features of PD activities (form, duration, and degree of collective participation) as well as core features (content focus, active learning, and coherence).

Subsequent to this, Desimone et al. (2002) built on the previous work of Garet et al. (2001) to conduct a three-year longitudinal study from 1997 to 1999 of mathematics and science teachers. The study sampled 207 teachers from 30 schools in 10 districts across the country (with one elementary, one middle, and one high school selected from each district). The sampled districts all utilized diverse approaches to PD and were disproportionately high poverty rate. Like the Garet et al. (2001) study before it, Desimone et al. (2002) did not directly gauge the effects of PD on student achievement, but instead measured teacher self-report related to the following areas: participation in eight types of PD activities; number of contact hours; timespan of activities; degrees of collective participation, active learning, and coherence; content focus; use of technology; use of higher order instructional methods; and use of alternative assessment practices.
In a third but unrelated study that also relied on teacher self-report data, Darling-Hammond et al. (2009) found support for some of the components identified by Desimone et al. (2002) and Garet et al. (2001) as contributing to effective PD. Darling-Hammond et al. (2009)—who identify effective PD as being sustained, intensive, collaborative, focused on content, connected to other school initiatives, and geared towards building relationships among teachers—analyzed teacher self-report data from three sources: the National Center for Education Statistics (2005) Schools and Staffing Survey (SASS) for 2003–04, which involved a nationally representative sample of more than 130,000 public and private school teachers across all 50 states and the District of Columbia; the National Staff Development Council Standards Assessment Inventory (SAI) 2007–2008 data for four states (Alabama, Arizona, Georgia, and Missouri), which measured teachers’ perceptions regarding PD involvement as compared with NSDC’s standards for effective PD; and data from other surveys, such as the MetLife Survey of the American Teacher and the National Education Association’s Survey of America’s Teachers and Support Professionals on Technology, which served as comparison data sets for findings with the SASS data set. In their presentation of their findings, the authors also provided a brief review of related studies from the literature that supported their findings.

Although much of this research focused on the experience of teaching and learning in public schools, Independent School Management (ISM), a management support firm for private-independent schools, identifies much the same list of components (Brisciana 2013). Drawing on two studies led by ISM—Research on School Management (RSM) and Student Experience Study (SES)—and from ISM’s “experience … as well from current knowledge of research and best practices” (4), Brisciana (2013) describes “an ideal faculty professional growth and renewal program” (126) that has essentially the same five components, though they employ different terminology.

In keeping with the component of content focus, ISM describes the ideal program as teacher “knowledge that can be put to use for the best interests of current and future students” (127). Aligned with the component of active learning, PD should be “teacher-directed” and “propelled by the teacher, but with the administrator ready, willing, and able to provide support and counsel, to help the teacher attain his/her goals” (126). In keeping with the component of coherence, ISM asserts that ideal PD should be “site-based,” or “focused on learning in one’s own school and from one’s own peers and mentors” (126). In terms of duration, ISM claims PD should be “continual,” as a “regular and ongoing part of daily and weekly routines” (126). Finally, for collective participation, ISM describes ideal PD to be “socialized,” as “when knowledge and insight is gained by a teacher, it is shared freely and actively with colleagues” (127).

Drawing on the findings of these four sources (Garet et al. 2001; Desimone et al. 2002; Darling-Hammond et al. 2009; Brisciana 2013), as well as other studies identified in the literature, a discussion of each component—content focus, active learning, coherence, duration, and collective participation—follows.

**Content Focus**

In her review of the research, Desimone (2009) identifies content focus of teachers’ PD experiences as possibly the most influential of the list of features. Darling-Hammond et al. (2009) likewise reviewed results from studies that suggested that “professional development is most effective when it addresses the concrete, everyday challenges involved in teaching and learning specific academic subject matter, rather than focusing on abstract educational principles or teaching methods taken out of context” (10). Citing the findings of a total of five studies, Darling-Hammond et al. (2009) assert that teacher practice and student outcomes have been shown to improve when teachers “define precisely which concepts and skills they want students to learn, and to identify content that is most likely to give students trouble” (10). Specific studies examined by Darling-Hammond et al. (2009) include Garet et al. (2001), who found a statistically significant, positive correlation between content focus and enhanced knowledge and skills as reported by teachers. Similarly, Strahan (2003) found that analysis and discussion of student performance was correlated with high levels of student performance at three high-achieving schools.

Additional research pertaining to content focus includes that of Blank, de las Alas, and Smith (2008), who reviewed 41 evaluation studies from 2004 to 2007, from a sample of 25 PD initiatives for mathematics and science teachers in 14 states. Of the 41 studies, one-third had evaluations that yielded measurable effect sizes on student achievement or change in instructional practices. The review found significant positive results of professional development programs when they included “focus on content knowledge in the math and science subject areas plus training and follow-up pedagogical content knowledge” (1).

**Active Learning**

Desimone (2009) describes active learning in PD as the opposite of “passive learning typically characterized by listening to a lecture” and as taking “a number of forms, including observing expert teachers or being observed, followed by interactive feedback and discussion; reviewing student work in the topic areas being covered; and leading discussions” (184). Garet et al. (2001) found that the dimension of active learning was positively correlated with teachers’ self-report of enhanced knowledge and skills, though not as strongly as other components identified in their study. Desimone et al. (2002) found that active learning had a “significant effect” on increasing teachers’ use of a particular technology strategy (99), which led them to conclude that professional development “characterized by ‘active learning,’ where teachers are not passive ‘recipients’ of information, also boosts the impact of professional development activities” (101).
Joyce and Showers (2002) summarize earlier research they had conducted on teacher training in the late 1980s, which was a “meta-analysis of nearly 200 research studies, plus a review of the literature on staff development” (Showers, Joyce, and Bennett 1987, 79). [It should be noted that specific information on the studies reviewed and how effect sizes were determined is not offered in either the original article or in the book; however as the authors’ work is widely cited in the literature on PD, it is presented here.] The authors examined three additive levels of PD approaches: first, information only (e.g., presentations at workshops); second, information, plus the addition of demonstrations and practice; and finally, information, plus demonstrations and practices, plus coaching. With each added treatment component, the level of active learning in the PD experience increased. For each PD condition, they examined teachers’ knowledge acquisition, skill acquisition, and transfer of learning to the classroom.

In the area of knowledge acquisition, Joyce and Showers (2002) found that information or theory-only activities such as lectures and discussions “increase knowledge by an effect size of about 0.50 (one half of a standard deviation on a normal curve)” (76); the mean on tests of teacher knowledge after workshops, for example, was “about at the 67th percentile of the distribution of the pretests” (76). When demonstrations, practice, and feedback during practice are added to the informational component, the authors report that average effect size increased to 1.31, and posttest means were close to the 90th percentile of the pretests’ distribution scores. The authors assert, “The increase in understanding is so large when demonstration and practice are incorporated that, even when knowledge is the primary objective, presentation-only treatments should be avoided in most settings. The multidimensional approach is much more effective” (76). Thus, as PD became increasingly active in nature, teacher knowledge appeared to increase as a result of participation.

Joyce and Showers (2002) describe a similar positive change in teachers’ skill acquisition—as determined by whether participants could exhibit those skills during simulations in workshops—as the intensity of the intervention increased. The authors claim that specifically, “Theory or demonstration alone results in effect sizes for skill of around 0.5 of a standard deviation for refining existing skills and even lower for new skills. When demonstrations and practice are added, the effect size rises to about 1.18 in the average study. When coaching is added to the theory, demonstration, and practice treatment, skill continues to rise” (76).

Finally, in terms of transfer of learning from the PD activity to actual classroom practices, no effect was observed for either the first or second conditions. The authors conclude that “transfer to the workplace is minimal for what would often be considered a high-powered series of training sessions where presentations and discussions, demonstrations, and practice sessions are included and various degrees of skill development are ascertained” (77). However, the authors found that an effect size of 1.42 is observed “when coaching is added to an initial training experience comprised of theory explanation, demonstrations, and practice” (77). This jump is considerable, and suggests that coaching was the most powerful—and arguably the most active—method for increasing transfer of learning.

**Coherence**

Coherence is defined by Desimone (2009) as the “consistency of school, district, and state reforms and policies with what is taught in professional development” (184). Garet et al. (2001) identified a substantial positive correlation (.42) between coherence in PD and teachers’ enhanced knowledge and skills, as well as between coherence and change in teaching practice (.21). The authors assert:

This suggests that compared to teachers whose professional development is not coherent, teachers who experience professional development that is coherent—that is, connected to their other professional development experiences, aligned with standards and assessments, and fosters professional communication—are more likely to change their practice. (934)

Again citing this study (Garet et al. 2001), Darling-Hammond et al. (2009) assert that research “suggests that professional development tends to be more effective when it is an integral part of a larger school reform effort, rather than when activities are isolated, having little to do with other initiatives or changes underway at the school” (10). The authors describe the National Science Foundation’s Discovery program in Ohio, which was aligned with that state’s curriculum, as an example. Through intensive institutes, follow-up seminars, support from regional staff developers, and annual conferences, the program was found to foster an increase and continued use of inquiry-based instruction (10). Blank, de las Alas, and Smith (2008) also found that a common feature in the programs that demonstrated change in student achievement or in teacher instructional practice was “a commitment to linking the teacher development to the curriculum and organization of their assigned schools” (21).

**Duration**

The feature of duration refers to “both span of time over which the activity is spread (e.g., one day or one semester) and the number of hours spent in the activity” (Desimone, 2009, 184). In reviewing the literature, Desimone (2009) asserts, “Research has not indicated an exact ‘tipping point’ for duration but shows support for activities that are spread over a semester (or intense summer institutes with follow-up during the semester) and include 20 hours or more of contact time” (184). Out of all of the PD components which have been studied, duration has the most substantial research base to support its correlation with PD effectiveness (as per the studies below, and also as discussed in Chapter IV in regard to intensive institutes).

The key study demonstrating the importance of duration to the effectiveness of PD was conducted by Yoon et al. (2007), in which the
authors reviewed the research from 1986 to 2003 and identified just nine (out of 1,300 studies) that met the What Works Clearinghouse standards for evidence. All nine involved elementary schools and had sample sizes ranging from 5 to 44 teachers, and were either randomized controlled trials or involved quasi-experimental designs. Regarding the nine studies, Yoon et al. concluded:

Studies that had more than 14 hours of professional development showed a positive and significant effect on student achievement from professional development. The three studies that involved the least amount of professional development (5–14 hours total) showed no statistically significant effects on student achievement. (iv)

Further, the authors found that teachers who received an average of 49 hours of PD saw a boost in students’ achievement by approximately 21 percentile points (i).

Corocan, McVay, and Riordan (2003) conducted a study of 334 science teachers that also provided support for duration as linked with PD effectiveness. The PD program under consideration was sponsored through a partnership between Merck & Co. and four public school districts in New Jersey and Pennsylvania, and was designed to nurture a change in science instruction from traditional methods (e.g., textbook-based memorization) to reform methods (e.g., guided, inquiry-centered teaching). Research methods involved surveys regarding teachers’ classroom practices and number of hours spent in PD activities. In their evaluation of ten years of the partnership, the authors found a statistically significant relationship between the actual amount of PD teachers received and their use of inquiry-centered pedagogy, after adjusting for school and teacher differences. Specifically, teachers with 80 hours or more of PD were significantly more likely to use inquiry-based practices than teachers who had fewer hours of PD.

Blank, de las Alas, and Smith (2008), again in their review of 41 evaluation studies, also found that a common feature in the programs that showed changes in student achievement or in teacher instructional practice was a “relatively high amount of time for each teacher in professional development” (21). The authors found that the total time in PD for those studies with significant effects was 50 hours or greater. While most of these hours were accrued during intensive PD such as summer institutes, some programs evaluated also “featured major follow-up efforts with teachers in the classroom or school so that teaching practices learned could be reinforced and improved after the teachers had begun to try them with students” (26).

One study provided evidence that PD efforts that are not of sufficient duration are not likely to have an impact on desired student outcomes. Jacob and Lefgren (2004) studied school reform efforts in the Chicago Public School system in the late 1990s to estimate the effect of teacher PD on elementary students’ math and reading achievement. The researchers specifically examined “probationary” elementary schools, which had received that designation due to less than 15% of students meeting national norms on standardized reading exams. These schools received special funding to purchase external staff development from universities, nonprofits, and independent consultants. The researchers analyzed administrative data from student and school records, including math and reading scores on the Iowa Test of Basic Skills, for teachers and their third-through-sixth-grade students from 1996 through 1999 (n = 100,228 students, in 461 schools). In terms of teacher involvement in PD, teachers at probationary schools increased their attendance at PD events by 25% from 1997 to 1999, and attended an average of 3.4 PD activities each month in 1999 (compared with 2.6 for teachers at other schools).

When examining student data, after controlling for numerous student and school-related variables, Jacob and Lefgren (2004) did not find a statistically significant increase in student achievement that was correlated with increased PD; instead, average achievement did “not appear to change discontinuously in reading or math … This suggests that teacher training in Chicago did not have a substantial impact on student achievement” (64, emphasis in original). Disaggregated analysis by partnership (e.g., university, nonprofit, or independent consultants) showed “it does not appear that any of the major external partnerships had a significant impact on student achievement in the probation schools” (76). The authors posit that the 25% increase in PD hours may not have been sufficient, as “marginal increases in in-service training have no statistically or academically significant effect on either reading or math achievement, suggesting that modest investments in staff development may not be sufficient to increase [student] achievement” (51).

Some research suggests that duration may not only have a direct impact on PD effectiveness, but also can facilitate or otherwise support other components. With respect to the component of coherence, in a meta-analysis of 16 studies of PD effectiveness for mathematics and science teachers (published from 1989 to 2007), Blank and Atlas (2009) found “a statistically significant positive correlation between frequency and … promoting coherence in teacher learning (r = .794)” (26). While the mean contact time was 91 hours for teachers in program activities, with 14 of the 16 programs lasting for six months or more, some programs provided over 100 hours of PD in an effort to help teachers meet state standards and parameters for high-quality PD under NCLB.

In terms of the impact of duration on collaboration, Johnson, Kahle, and Fargo (2007) conducted a three-year longitudinal study of 11 middle school science teachers who participated in a two-week summer institute focused on implementing instruction in alignment with the National Science Education Standards. Following the summer institute, teachers participated in monthly release days for PD sessions during the academic year. The authors assessed students’ performance on the Discovery Inquiry Test in Science as well as state assessments, and found that students of teachers in the intervention school significantly outperformed students at a
control in these results: “Whole-school, sustained professional development provides the opportunity for collaboration of teachers over time, which creates a community of learners and enables professional growth, even outside the realm of the program” (785). Even though the PD program lasted three years, teachers reported that they continued collaborating even in year four, after the program had finished.

Exploring the correlation between duration and multiple components, Garet et al. (2001) found that both increased time span and increased contact hours had a substantial positive influence on opportunities for active learning (correlation coefficients of .30 for time span, and .31 for contact hours) as well as coherence (.26 for time span, and .16 for contact hours). The authors surmised that increased duration provided benefits for active learning, “such as the opportunity to plan for classroom implementation, observe and be observed teaching, review students’ work, and give presentations and demonstrations” (933). They additionally suggest that longer activities “tend to promote coherence including connections to a teacher’s goals and experiences, alignment with standards, and professional communication with other teachers” (933).

It is important to note that despite the preponderance of research that supports longer duration as a component for PD effectiveness, some studies have found little to no impact of increased duration. Perhaps most significantly, in their longitudinal study building on Garet et al.’s (2001) work, Desimone et al. (2002) did not find any significant results for increased duration (either contact hours or timespan).

Similar findings were reported by Young and Lee (2005), who directly examined the achievement of elementary science students whose teachers utilized a kit-based inquiry science curriculum. A total of 21 demographically similar teachers participated in the study, with twelve teachers and their 226 fifth graders from districts utilizing the science kits plus PD, and nine teachers and their 173 fifth graders from other districts that did not have science kit materials and did not utilize systematic science PD. The intervention group was then stratified by number of hours of PD to form two groups (six classes of 116 students whose teachers had the most PD hours with the project, and six classes of 110 students with teachers with relatively few hours of PD). A total number or range of contact hours is not provided in the study, though it is estimated from the description of the PD that teachers spent anywhere between six to 24 hours per year. Data collection involved the use of a prestudy and poststudy assessment using an elementary science achievement test, as well as two teacher questionnaires. The researchers did not find any significant differences in the mean total scores for kit-based students with low-PD versus high-PD teachers.

Collective Participation

This component involves grouping together teachers in PD activities who generally have regular interaction with each other in their normal work day. Groups can have various compositions, such as teachers from a specific grade level, department, school, or district. By extending this interaction into formal PD settings, teachers have the opportunity to engage in interaction and discourse regarding teaching approaches. In their review of research, Darling-Hammond et al. (2009) discuss the isolation, privacy, and individualism that describes much of teaching in the United States, and assert that these “cultural norms are not easily changed, particularly if school structures and working conditions continue to favor” these conditions (11).

Darling-Hammond et al. (2009) point to studies that suggest that schools’ efforts to foster working relationships and collaboration among teachers are positively correlated with gains in teacher productivity and student achievement. For example, in their longitudinal study of teachers’ PD experiences, Desimone et al. (2002) found that collective participation had a significant effect on increasing mathematics and science teachers’ use of a particular technology strategy. The authors state that this finding is “consistent with ideas about best practice and the way teachers learn and implement new knowledge, which suggest that teachers benefit from relying on one another in developing technological skills” (101).

In a more recent study, Sun et al. (2013) report that PD with a collective participation focus may even increase teachers’ collaboration beyond the actual PD activities themselves. The authors conducted a two-year study focusing on middle school teachers engaged in PD that involved a focus on content, active learning, and collaboration, in an effort to improve writing instruction. Their specific research focus was to determine the “spillover” effect of the PD, or the degree to which PD has an effect on other teachers beyond those who directly participated in the PD. A set of teachers from 20 schools participated in the treatment PD, while an additional 19 schools (with comparable populations of teachers) delayed participation for two years and thus were considered a control group. While they did not look at student achievement, the researchers examined teacher perceptions of the impact of PD through three annual surveys during the baseline and treatment year. Findings suggested that teachers who participated in the treatment PD were more likely to offer assistance to their other colleagues, serve as resources for peer teachers, and use active learning strategies in assisting their peers. Self-reported improvements in instructional practices occurred among teachers who didn’t participate in PD almost as much as those who did directly participate in PD, a finding that provides evidence for a spillover effect.

Research Designed Around the Components

Given the prevalence of component-based research during the reform era of PD, researchers and PD designers began developing PD programs around the components. These studies range in publication date from 2008 to 2014, which corresponds with
the end of the reform period as well as the beginning of the accountability period discussed in Chapter II. From the standpoint of field development, this timing makes sense, as the research on components for effective PD was established in the preceding decade, and would have provided a line of inquiry for researchers in the following years. The findings from these studies are mixed, however; two studies provide evidence for the relationship of components with PD effectiveness (Johnson and Fargo 2014; Diamond et al. 2014), but four studies did not (Adamson, Santau, and Lee 2013; Santagata et al. 2011; Garet et al. 2011; Garet et al. 2008). As Hill, Beisiegel, and Jacob (2013) explain, “Agreement about this list had reached a level such that many in the field felt comfortable characterizing support for the list as a ‘consensus’ … Yet disappointing results from recent rigorous studies of programs containing some or all of these features have turned this consensus on its head” (476).

Most recently, and providing empirical support for component-based PD, Johnson and Fargo (2014) studied the impact of a two-year PD program on student achievement in elementary science. The study involved two elementary schools in a large, urban district in the southwestern U.S., where one school received the PD intervention and the other did not (nor any other science PD program during the course of the study or the three years prior to the study). The case study involved a total of ten teachers in grades 4 through 6 and was explicitly “designed around the research-based pillars for successful professional development programs including a content focus, active learning experiences for teachers, coherence with teacher beliefs and policies, sufficient duration to support change, and collective participation of teachers from the same school” (Johnson and Fargo 2014, 851). A key purpose of the study was to “provide insight into the ability of Desimone’s (2009) core conceptual framework for professional development and TPD to impact state student achievement outcomes in science” (849). The program involved two, two-week summer workshops, eight academic release days, and 20 monthly grade-level support sessions, for a total of 224 hours of PD contact time. Students at both elementary schools were followed from fourth grade through sixth grade, using results from a state-mandated criterion referenced assessment (CRT) in science.

Johnson and Fargo (2014) found that while scores increased for both elementary schools each year, CRT scores improved at a significantly higher rate for the treatment school than the control school. Specifically, during the baseline year, 25% of intervention school students scored as proficient, while 18% of the control school students did so. After one year of the intervention, 50% of the intervention school students scored at a proficient level but 31% of the control school students scored as proficient. In year two, that percentage jumped to 67% for the intervention school and dropped to only 29% at the control school. From baseline to the end of the treatment, 42% more students scored proficient in science at the intervention school than at the control school; this effect was even greater for Hispanic students, of whom 85% were proficient by the end of the intervention as opposed to 25% at the control school. Further supporting the authors’ conclusion that these gains were related to the PD intervention, an additional nine elementary schools in the district—that also did not receive TPD intervention, but were not a part of the original control group—showed no significant gains in state science achievement during the time of the study, but performed similarly to the control school.

In the same year, Diamond et al. (2014) found a similar result for student achievement in a study of science PD for fifth-grade teachers in a large urban district in the southeast. As compared with the study by Johnson and Fargo (2014), which only involved ten teachers as participants, Diamond et al. utilized a cluster randomized trial with an intervention group of 32 schools and a control group of another 32 schools, for a total of 223 teachers. The PD intervention involved a science-based curriculum, five days of PD workshops, and on-site support provided by teachers every four to six weeks (thus this design employed both content focus and duration). The study utilized a science knowledge test and teacher questionnaire as pretest and posttest measures; researchers also conducted teacher observations and analyzed student results from a “state high-stakes science test” (648).

Diamond et al. (2014) found that the PD interventions had a significant effect on treatment group teachers’ science knowledge test scores and questionnaire responses over those of the control group. However, no significant difference between the groups was found on observation ratings. Regarding student achievement, no comparison was found in the study results between the performance of both groups. The study did report, however, that teachers’ scores on the science knowledge test were the largest significant predictor of student achievement outcomes, regardless of which group they were in (the mean classroom science achievement increased by 2.16 points for every additional point earned by a teacher on the posttest, with teacher knowledge uniquely accounting for 6% of the total teacher-level variation in mean classroom science achievement). This finding provides support for the assumption, inherent in this and most PD-related research studies, that increasing teacher content knowledge contributes to gains in student achievement.

In addition to these two studies providing supporting evidence for component-based PD, four studies were identified that do not show support. First, Adamson, Santau, and Lee (2013) conducted a qualitative study of elementary teachers’ instructional strategies for scientific understanding and inquiry and supporting English language learners (ELLs), and found that a PD intervention featuring the components of duration and active learning did not yield any significant results. The three-year intervention, conducted in six schools in a large and highly diverse urban district, involved curriculum units for students and teachers based in science content.
standards, as well as teacher workshops that featured active learning during the summer and throughout the school year. Through 213 post-observation interviews with 198 third-, fourth-, and fifth-grade teachers, it was found that teachers who participated for the full three years of the intervention did not report using inquiry-based strategies any more than teachers who participated for one or two years (566).

Adamson, Santau, and Lee (2013) cite several possible reasons for this lack of impact, including the need for more support in PD (such as co-teaching and modeling), and interestingly, a lack of coherence between inquiry-based teaching and a high-stakes testing culture in schools. This study raises the question of whether a subset of the components is sufficient to impact teacher practice, or whether all of the components must be present in a given intervention. (This question is further discussed later in this chapter, in the Limitations section.) On the other hand, it potentially illustrates the concern regarding reform-based research in urban settings, as raised in Chapter II: that PD interventions being studied are not sufficient to elicit change, but might be effective in settings that are not significantly underperforming.

Second, Santagata et al. (2011) studied 59 teachers (33 in a treatment group and 26 in a control group) and the impact of a two-year PD intervention on approximately 3,900 students and their mathematics learning. Like the previous study, the setting was five low-performing inner-city schools. The authors explain, “The content and design of the program reflected several of the principles of effective PD” (8) including content focus, active learning, collaboration, and coherence. The PD intervention specifically involved video-based and other analyses of lessons, as well as content exploration. Data collection included a teacher survey, coding of videotaped sessions, and analysis of student results on quarterly assessments and the California Standards Test. Findings showed no statistically significant difference between the treatment and control group on students’ learning. Santagata et al. (2011) identify several possible reasons for this, one of which was teachers’ considerably lower content knowledge than the national average (again illustrating the concern regarding reform-based research in urban settings). Additionally, the authors cite inadequate administrator support for the activities, the mandatory nature of PD (which may have created negative feelings and a sense of having to comply with PD), a methodological need for additional observations of classroom practice, and insufficient documentation of practices.

A third study, by Garet et al. (2011), examined the impact of two years of a PD program for seventh-grade mathematics teachers, focused on improving teachers’ knowledge of specific topics and specialized mathematics knowledge related to those topics. Thus, the PD program studied involved both the components of duration and content focus. The program was delivered by ten facilitators from two separate PD organizations to approximately 100 teachers in 12 districts in the first year of the study, and approximately 50 teachers in 6 districts in the second year. The researchers compared two specific outcomes—teacher knowledge and student achievement—for the treatment group versus a group of teachers who did not participate in the PD program. In terms of teacher knowledge, the authors found no significant impacts on teachers’ total score on a specially constructed teacher knowledge test; on average, 75.7 percent of the teachers in the treatment group correctly answered test items of average difficulty compared with 74.7 percent of control group teachers. Additionally, no significant impact was identified on student achievement, as measured on a customized rational numbers test.

An earlier study by Garet et al. (2008) examined PD interventions aimed at improving second-grade teachers’ knowledge and practice in reading instruction, as well as their students’ achievement in reading. The evaluation looked at 90 schools in six districts for a total of 270 teachers, with an equal number of schools randomly assigned to treatment A (content-focused teacher institute series, which started in summer and ran through the school year), treatment B (the same series but with added in-school coaching), or a control group (which participated in PD as usual offered by the district). The PD interventions were selected for study based on the criteria set forth in the literature for effective PD components, namely that the activities included essential content and promoted use of specific classroom practices (content focus), were intensive (longer duration than most comparable districts), were connected to the core reading program in the district (coherence), and encouraged teachers to actively participate in PD (active learning). The evaluation examined student achievement data, assessed teacher knowledge (via a pretest and posttest), and included classroom observations.

Garet et al. (2008) found that while there was a positive impact on teachers’ knowledge of scientifically based reading instruction (effect size of 0.37 for treatment group A, and 0.38 for treatment group B) and on the use of explicit instruction in the classroom (effect size of 0.33 for treatment group A, and 0.53 for B), neither group saw a statistically significant increase in students’ test scores. This is an interesting finding, as it calls into question the hypothesized link between increases in teacher knowledge and gains in student achievement. Furthermore, the addition of coaching to the treatment (for those in treatment group B) did not have a statistically significant impact on teacher practices, and the authors state that what little change was observed may be due to chance, or other unknown or unexamined factors. Finally, no statistically significant impact on measured teacher or student outcomes was observed the year after the treatment.

In asking the question of why teacher knowledge and skills increased in the experimental groups, but no difference was observed in student achievement based on teachers’ participation in the PD, Garet et al. (2008) considered whether “the specific knowledge and practices that were promoted by the PD, or our
measures of them, are not good predictors of student achievement” (61). Through further analysis, the researchers found there was a statistically significant association between teacher knowledge and student achievement, regardless of teacher group (treatment A, B, or control). They found a coefficient of 0.07, “indicating that students in a classroom taught by a teacher scoring a standard deviation above average in reading content and pedagogy knowledge might be expected to score about 0.07 standard deviations above average on their reading test” (62). This provides a possible linkage between teacher knowledge and student achievement.

Regarding the mixed research findings from studies that utilized the components in PD design, Hill, Beisiegel, and Jacob (2013) assert, “It is too early to tell why these results—and especially the results of randomized trials—contradict conventional wisdom among researchers” (476). They acknowledge that problems with PD design may be contributing factors, such as variation in program content, deviation from best practices, poor implementation, or difficulty scaling the program to different sites. Additionally, “Poor research design— inadequate measures, insufficient power—may also contribute to these findings” (476). There is also the question of whether the specific setting has an impact on the effectiveness of the PD intervention, as large-scale studies on the correlation between PD components and effectiveness (e.g., Garet et al. 2001; Darling-Hammond 2009) utilized data from different types of schools across the country, instead of only underperforming schools in urban areas as did these studies.

Limits of Component-Based Research

Research on components for effective PD featured prominently during the reform era of the 1990s through the first decade of the new century. Education policy at the same time emphasized the same components; for example, NCLB mandated that PD activities be sustained, aligned with content standards and assessments, aimed at improving teachers’ knowledge of their subjects and evidence-based instructional strategies, and evaluated regularly for effectiveness based on student achievement (Desimone 2009). Despite this popularity, there are four identifiable limitations—even beyond the mixed results to create and evaluate programs based on these components, as described above—to this line of research.

First, some authors have suggested that rather than emerging directly from empirical research on PD effectiveness, the key components identified in the literature arose from adult learning theory and were then built in as assumptions in component-related research. For example, as discussed in Chapter II, Wenger (1998) describes collaboration in communities of practice as essential for adult learning; this critique posits that when component-based research studies were designed, researchers searched for correlations between collaboration and effectiveness—as opposed to conducting analyses on all possible correlations, and then determining which components emerged from those analyses. Hanover Research, in a 2012 review of the literature, articulates this limitation by calling the component of duration a “base assumption” (3) in many studies for which the “validity has not been conclusively proven” (3). This assumption is not merely theoretical, as it has had a tangible impact on PD design, namely that workshops have fallen out of favor and “are generally considered to be the least effective approach” in the literature (3). With regard to the importance of integrating new skills into teachers’ daily work, Hanover Research (2012) asserts, “It is the general consensus that [PD] is more effective when the skills taught are integrated into the daily work of teachers in the classroom…Again, many studies operate from this base assumption without independent validation” (3). And finally, in regard to content focus, the report asserts that “a general consensus that [PD] focused on subject content has the greatest impact on student achievement, though this assumption is seldom evaluated” (10).

A second and related limitation is that there may be components of PD that have yet to be identified as key to PD effectiveness. These as-of-yet unidentified components may be as important—if not more so—than the five already identified in the literature (Desimone 2009). For example, Penuel et al. (2007), in a study of 454 teachers involved in an inquiry science program and its impact on teachers’ knowledge and practices, found evidence for varying “shades” of existing components—such as adaptability to teachers’ local context (content focus) and follow-up to initial experiences (duration). The quality of PD facilitation may also have an impact, as the research on teacher perceptions suggests that PD effectiveness may be linked to facilitators’ professionalism, supportiveness, management skills, knowledge, ability to connect personally with participants, and even personality (Jeanpierre, Oberhauser, and Freeman 2005; Sztajn et. al. 2007; Nipper and Sztajn 2008; Linder et al. 2013).

Additionally, Koellner and Jacobs (2015) suggest that PD can fall on a continuum from highly adaptive (to the goals, resources, and circumstances of the specific school setting) to highly specified (with set goals, content, and resources provided to schools). Their own study of an adaptive PD design for middle school mathematics teachers demonstrated modest improvements in teachers’ knowledge and classroom instruction, and although there was significant variability in the data, student achievement scores over time were higher for participating teachers. The authors suggest that while most studies of PD impact favor highly specified or ‘fixed’ PD programs (as they are more conducive to quantitative analysis), researchers should consider factors like flexibility “that have otherwise gone unnoticed, in part, due to clustering all PDs under one umbrella” (2). A related question to whether there are unidentified components is if—hypothetically speaking—all key components are found, is there an ideal combination or amount at which PD effectiveness can be predicted? As Desimone (2009) explains, “we do not yet have a clear indication of thresholds for these features. For example, how much professional development is enough?” (192). This refers back to her discussion of whether there is a “tipping point” (184) when it comes
to the duration of PD and effectiveness. Only rigorous studies that are identical in their designs and settings, but focus on the addition or subtraction of a specific PD component, may be able to shed light on this specific question; Wayne et al. (2008), in a critique of component-based research, call for well-designed experiments that test specific features to address this issue (477).

A third and substantial limitation is that the majority of data utilized in component-based research originates from teacher self-report, typically obtained through large-scale surveys. As Desimone et al. (2002) explain, their research “design is not an intervention study, where a well-established and implemented approach to professional development is given to one random half of teachers, while the other random half of teachers does not experience the intervention” (103). Concerns with relying on self-report data are multiple: first, there is the questionable accuracy of self-report data, due to potential issues like inaccurate recall (especially over months or years). Second, respondents likely have varying introspective and reflective abilities, and may be susceptible to response bias. Third, self-report data does not enable an examination of the direct impact of PD on student outcomes; as Desimone (2009) concluded, “We do not have sufficient evidence to indicate which features of professional development are effective for eliciting improvements in student learning” (183, emphasis added).

The problems with self-report data are underscored in a study by Polly and Hannafin (2011), who found a stark difference between teachers’ espoused or aspirational practices and practices actually in use. The researchers conducted an in-depth but extremely small-scale qualitative study of the effects of a yearlong PD effort at integrating technology in mathematics at the elementary level. They selected two out of 24 participants in the program (who had demonstrated high motivation and interest to change) and used observations, video analysis, and interviews to gauge change in instructional practice as a result of PD. The authors found that “disconnects were evident between teachers’ instructional practices and their espoused practices. Participant interviews indicated that teachers perceived their instruction as embodying learner-centered instruction, although video analyses proved otherwise” (128).

A fourth limitation to this research approach is the omission of variables that can impact PD effectiveness, but which are not inherent to the PD design itself. For example, teacher characteristics may also impact PD effectiveness, and include: teachers’ preparation or background knowledge and resulting PD needs (cf. Garet et al. 2008; Zhang et al. 2015) and career stages and related needs (cf. Masuda, Ebersole, and Barrett 2013). Additionally, affective dimensions can come into play within PD, such as teachers’ motivation, openness to new experiences, level of interest in PD, and sense of self-efficacy (cf. Gegenfurtner et al. 2009; McDonald 2012; Christesen and Turner 2014; Dixon et al. 2014). Teachers’ sense-making, particularly regarding the coherence of PD and how it relates to the larger system in which they work, can also have an impact (cf. Allen and Penuel 2015). So too might the degree to which they have input into PD design (Houle 2006) and their willingness to participate, whether PD is compulsory (which may impact results negatively, as suggested in the study by Santagata et al. 2011) or voluntary (which may result in selection bias, as found by Barrett, Butler, and Toma 2012). A very small fraction of these teacher characteristics have been considered and controlled for in component-based research, but it may eventually be shown that they are more highly correlated with the success of specific PD efforts than how those efforts are designed. This is echoed in Borko’s (2004) description of PD as not merely an activity or set of activities, but rather a “system” that encompasses the PD program as well as teachers as learners, the facilitators who work with the teachers as they acquire new knowledge and skills, and the context in which the PD occurs (4). The interplay between all of these factors is dauntingly complex to conceptualize and to study, but the effectiveness of PD may be dependent upon that interplay more so than a set of components or attributes of PD.

Wayne et al. (2008) summarize these limitations of component-based research when remarking that “drawing on various bodies of theory and correlational and case study evidence, a consensus has been built on promising ‘best practices’ [but] this consensus—although it has endured for more than a decade—lacks sufficient specificity to guide practice” (470). This is perhaps the most substantial limitation of component-based research, as “the consensus falls short of addressing several practical questions faced by those who design and fund PD” (469). Wayne et al. (2008) ask, for example, “With what frequency, duration, and quality would coaching or mentoring need to occur to make a difference?” (470). Not just theoretical questions, “These are simple, practical questions faced by those who design and fund PD initiatives” (470) that render conclusions from component-based research uncertain ground from which to address basic questions of policy and practice.

Implications for Practice

Almost all of the authors who address component-based research—including those who have contributed significantly to the field—call for additional, rigorous investigation to resolve many of the limitations identified above. A number of authors (such as Wayne et al. 2008) go as far as suggesting that there is simply not enough actionable data on components (see also Hanover Research 2011). It is hard to predict when or how sufficient evidence would emerge from research that would conclusively support (or not support) specific components of PD design as directly causing the desired outcomes of PD. This is particularly true in the case of student achievement; Patton, Parker, and Tannehill (2015) conclude in their literature review on “core features of effective professional development” (28) that, “While many researchers and agencies conclude that it is the most important outcome of professional development, assessing...
the causal link between professional development and student achievement may be difficult if not impossible” (36).

Finally, although empirical evidence is the bar set for PD effectiveness in this synthesis (as discussed in Chapter I), it must be acknowledged that the components have tremendous face validity as factors that contribute to that effectiveness. Not only are they in keeping with the suggested best practices that arise from adult learning theory, but also many educators endorse the components as common sense for designing PD. This is a typical sentiment in many of the popular handbooks on faculty development, including one by Reeves (2010), who strongly asserts:

We know what effective professional learning looks like. It is intensive and sustained, it is directly relevant to the needs of teachers and students, and it provides opportunities for application, practice, reflection, and reinforcement. We also know what it doesn’t look like: death by PowerPoint, ponderous lectures from people who have not been alone with a group of students for decades, and high-decibel whining about the state of (take your pick) children, parents, teachers, public education, and Western civilization. (22)

The face value of the components is further substantiated by results of teacher surveys in secular and Christian education settings, which reveal both the continued preponderance of workshop-based PD and teachers’ general dissatisfaction with that approach (Darling-Hammond 2009; Montoro 2013; others).

After taking the current state of research and the face validity of the components into consideration, this synthesis concurs with most researchers’ suggestions as to how to utilize the findings of their studies: not as a set formula for ensuring PD effectiveness, but rather as guiding principles for overall design of PD programs. Along these lines, Darling-Hammond et al. (2009) state, “While we stress that causal relationships are not fully established, the literature does point to some basic principles for designing professional learning that school and district leaders and policymakers would be well advised to consider” (9, emphasis added). Croft et al. (2010) arrive at a similar conclusion in their discussion of the research on job-embedded PD (JEPD), which features many of the components:

Much of the research on professional development for teachers is descriptive without causal investigation, making it hard to pinpoint what factors contribute to highly effective JEPD (i.e., JEPD that leads to improved practice, which leads to improved student learning outcomes) … Although more rigorous research is needed, including both experimental and nonexperimental research, the existing research base does provide important guidance for the design of high-quality JEPD. (8, emphasis added)

The immediate realities of practice—that educators face real-time decisions about how to provide quality PD programs, with the aim of impacting student outcomes—may mean that they cannot wait for watertight conclusions from research (which may not be soon forthcoming, given the state of the literature as discussed in Chapter I). In the meantime, it seems wise to consider components that may contribute to PD effectiveness in “discussions about the specific goals of professional development, what evidence best reflects the achievement of those goals, and how that evidence can be gathered in meaningful and defensible ways” (Patton, Parker, and Tannehill 2015, 36).

IV. Professional Development Practices

Identifying specific professional development practices in the literature can be a challenging task, for several reasons. Not only does the literature include a myriad of approaches under the umbrella of PD (Desimone 2009), but also schools formulate them in different ways as they implement them in their unique settings. Further, many times the PD programs evaluated in the literature feature more than one practice—for example, a summer institute, plus monthly workshops, plus coaching for teachers—which makes it difficult to parse out the impact of a specific practice. As Bredeson (2013) explains, the “design, delivery, content, context, and outcomes of professional learning are not easily separable” (375).

To address these challenges, this synthesis involved extensive and iterative searches of the literature to identify the practices addressed most frequently in research studies. The results of these searches were compared with models of PD, such as that of Hooker (2008), that classified PD experiences as standardized, site-based, or individualized. This process resulted in the following seven broad categories of PD practices:

- Direct-delivery methods (workshops, seminars, conferences)
- Intensive institutes
- Professional learning communities (PLCs)
- Coaching and mentoring
- New teacher induction programs
- Inquiry-based PD (including action research, problem-based learning, lesson study, video-based PD)
- Online formats

These practices are presented in Table 3, along with a categorization of each according to Hooker’s (2008) model.
TABLE 3. Professional Development Practices and Corresponding Categories

<table>
<thead>
<tr>
<th>PD Practice</th>
<th>Description</th>
<th>Category*</th>
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<tbody>
<tr>
<td>Direct-Delivery Methods</td>
<td>Includes workshops, seminars, and conferences; short in duration and often facilitated by</td>
<td>Standardized</td>
</tr>
<tr>
<td></td>
<td>outside experts, off-site</td>
<td></td>
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<tr>
<td>Intensive Institutes</td>
<td>PD experiences with longer duration (e.g., a summer institute, or yearlong seminar course);</td>
<td>Can be standardized</td>
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<td></td>
<td>frequently offered through a university-school partnership (where university faculty</td>
<td>and/or site-based</td>
</tr>
<tr>
<td></td>
<td>facilitate and evaluate PD); most common in science and mathematics</td>
<td></td>
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<tr>
<td>Professional Learning Communities</td>
<td>Collaborative approach to structuring teaching and learning at a school (e.g., through teacher</td>
<td>Site-based</td>
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<tr>
<td>(PLCs)</td>
<td>groups, team meetings, group study); thus, often involve a combination of other site-based</td>
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<tr>
<td></td>
<td>approaches</td>
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<tr>
<td>Coaching and Mentoring</td>
<td>Pairing of two teachers (typically of unequal experience), with the purpose of supporting the</td>
<td>Site-based</td>
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<td></td>
<td>teacher in need of improvement in teaching and/or implementing new instructional methods; can</td>
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<td></td>
<td>also be conducted by a content or strategy expert (as in the case of reading and literacy</td>
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<td></td>
<td>coaching)</td>
<td></td>
</tr>
<tr>
<td>New-Teacher Induction</td>
<td>Systematic programs for orienting new teachers in a school; typically involves the</td>
<td>Site-based</td>
</tr>
<tr>
<td></td>
<td>assignment of more experienced teachers as mentors to new teachers</td>
<td></td>
</tr>
<tr>
<td>Inquiry-Based PD</td>
<td>Includes action research, problem-based learning (PBL), lesson study, and video-based PD, all</td>
<td>Site-based</td>
</tr>
<tr>
<td></td>
<td>of which engage teachers in collaborative inquiry on instruction</td>
<td></td>
</tr>
<tr>
<td>Online Formats</td>
<td>Includes synchronous courses and workshops, asynchronous webinars, online mentoring and</td>
<td>Can be standardized,</td>
</tr>
<tr>
<td></td>
<td>coaching, virtual professional learning communities (VPLCs), and PD for instructional technology</td>
<td>site-based, and/or</td>
</tr>
<tr>
<td></td>
<td>integration</td>
<td>individualized</td>
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</tbody>
</table>

* (Hooker 2008; Gaible and Burns 2005)

Each of these practices is discussed in a separate section of this chapter, beginning with a definition of each practice and followed by presentation of related research. As discussed in Chapter I, research studies included in this review:

- Involved educators and school leaders working in or affiliated with K–12 schools
- Were conducted in educational settings in the U.S.
- Were published within the last ten years (although seminal studies and conceptual work outside of that timeframe were included where appropriate)
- Were published in peer-reviewed journals, as well as in books on theory and practice whose publishers are known for their education repertoire
- Reported on some impact of PD efforts, as opposed to articles that are simply descriptive of PD program design, with no evaluative component

Where significant limitations of studies were found (such as missing information on methodology, or no comparison or control group), such limitations were bracketed for each study. Finally, a summary of findings for each practice is presented as well as considerations for implementation in PD programs.

**Direct-Delivery Methods: Workshops, Seminars, and Conferences**

Direct-delivery methods of PD are described by Hooker (2008) as standardized PD, or a “centralized approach, used to disseminate information and skills among large teacher populations” (3). This includes workshops, seminars, and conferences, as well as the “cascade model of scaled delivery” (3) in which small groups of teachers receive intensive training, and then return to their own schools to train their peers. As discussed in Chapter II, the benefits of this model include exposing teachers to new ideas and methods and “disseminating knowledge and instructional methods to teachers throughout a country or region” (4). These activities also tend to be cost-efficient as compared with more intensive models, such as coaching (Wayne et al. 2008).

As also discussed in Chapter II, teachers generally express dissatisfaction with their experiences in workshops (Darling-Hammond et al. 2009; others), and many authors describe the drawbacks of direct-delivery methods. Robb (2000) discusses four specific issues that are common to workshops that may contribute to their ineffectiveness. First, one-day-only teacher training workshops often don’t account for differing levels of teacher expertise, and tend to overload participants with strategies and materials. Second, presentations by outside experts are often one-size-fits-all, and presenters generally are unfamiliar with the school. Third, many principals do not participate in workshops beyond dropping in during the session. And fourth, most principals do not provide follow-up support for teachers as they implement new ideas they acquired in workshops. Nonetheless, direct-delivery methods remain the predominant form of PD in the U.S. for teachers:

Criticized for their lack of continuity and coherence, workshops have at least in theory fallen out of favor. The federal No Child Left Behind Act of 2001, for instance, defines all professional development funded through the law to include activities that “are
not one-day or short-term workshops or conferences.” There is little evidence to suggest that states and districts adhere to this directive.

(EDITORIAL PROJECTS IN EDUCATION RESEARCH CENTER 2011, 1)

Self-reported participation rates by teachers confirm this. According to Darling-Hammond et al. (2009), more than nine out of ten U.S. teachers have participated in PD consisting mainly of short-term conferences or workshops, and in the Garet et al. (2001) study of Eisenhower-assisted PD, 91% of teachers participating in district PD did so in traditional activities like in-district workshops, out-of-district workshops, and conferences. Studies of Christian education settings likewise found a similar prevalence of workshops in teacher PD (Montoro 2013; Finn, Swezey, and Warren 2010).

While participation in direct-delivery methods of PD remains strong, empirical research on these methods is virtually nonexistent. This is likely due to three issues. First, beginning in the 1990s and continuing through today, educational researchers have increasingly focused on “reform” or “embedded” forms of PD instead. Second, because workshops, seminars, and conferences are short-term by nature, researchers may not expect to find significant impacts resulting from participation and therefore do not conduct research on these experiences. A third reason is that funded research—particularly in science and mathematics—tends to favor long-term programs like intensive institutes as part of long-term university-school partnerships (as discussed in the following section).

To examine a large-scale study of the effectiveness of direct-delivery methods, it is necessary to turn again to earlier research on PD components. In their analysis of survey data from 1,027 Eisenhower teacher participants, Garet et al. (2001) found that workshop formats tended to vary widely, and many did reflect the core features (content focus, duration, active learning, coherence, and collaboration) identified in the study as contributing to PD effectiveness. The researchers report finding “a considerable amount of overlap between traditional and reform types of professional development on the other structural and core features of these activities” (934). Specifically, study findings indicated that content focus and coherence were equally identified for traditional activities (e.g., workshops) and for reform activities, and teachers reported the effectiveness of some workshop experiences at the same level as reform types of PD. Further, in terms of teachers’ self-reported outcomes, enhancement of knowledge and skills and changes in classroom practice were also reported at similar rates for both traditional and reform PD.

Two important differences were noted between traditional and reform activities, however. First, in terms of active learning, the mean number of reported opportunities featuring this component was higher for reform activities (4.4) than traditional (3.4), though the authors found a great deal of variability therein (with some traditional PD experiences offering 12–16 types of active learning, and some reform PD offering only one or two types of active learning). The second major difference was in duration, which Garet et al. (2001) found to account for much of the difference observed between traditional and reform activities:

[A]lthough we find distinctions between the effects of traditional and reform activities, they generally are not direct effects on teacher outcomes. Rather, the effect of reform versus traditional professional development activities operates indirectly through the other design features and dimensions of quality ... That is, reform activities tend to produce better outcomes primarily because they tend to be of longer duration. (935–936, emphasis added)

This is important because it suggests that workshops and direct delivery models, if well-designed to be of sufficient length and incorporate active learning and other components, can have the same impact as other types of activities. Garet et al. (2001) conclude, “Traditional and reform activities of the same duration tend to have the same effects on reported outcomes ... Thus, to improve professional development, it is more important to focus on the duration, collective participation, and the core features (i.e., content, active learning, and coherence) than type” (936). While again this research is correlational and relies on teacher self-report as opposed to direct measurement of PD outcomes, it suggests that not all workshops are created equal—and when designed well, they can have a positive impact on outcomes.

One study identified in the literature provides evidence to this effect, but in reverse: Lee et al. (2004) investigated a PD program comprising four daylong workshops to improve science literacy for elementary students, but found no change in teacher practice as a result of participation. The four workshops provided instruction to teachers in how to utilize hands-on, inquiry-based science pedagogy, and teachers were also provided with corresponding instructional units and materials. The study involved six schools in a large, urban school district in the Southeast, with all 53 third- and fourth-grade teachers engaged in the PD (no comparison group was used). Data collection included focus group interviews, surveys, and classroom observations, with the goal of assessing teachers’ beliefs and perceptions of impact and confirming that data through observations of instructional practices. No independent assessment of actual changes in teacher knowledge (e.g., through a content test) was made; therefore teachers’ self-report data were the only source of information on knowledge gains. Results of the surveys indicated that the level of importance teachers ascribed to inquiry-based teaching increased, as did their positive view and perceived knowledge of related teaching methods. The researchers found, however, that a “discrepancy existed between teachers’ perceptions of their improved science knowledge and practice (as indicated on the questionnaire and in interviews) and the lack of significant change in their actual instructional practices (as evidenced in the classroom observations)” (1037). While this points to a disconnect between teachers’ self-report of knowledge changes and actual changes in practice, it also gives credence to the idea that short-term
workshops without follow-up are likely not sufficient to positively impact instruction. In contrast, there are a myriad of studies that examine more intensive programs that involve direct-delivery methods, but sustain them for greater periods of time and engage participants in a higher number of contact hours. Many of these intensive experiences occur over the summer through partnerships with universities, and often include ongoing follow-up support for teachers throughout the academic year. Studies of intensive institutes—which account for the largest percentage of research on effective PD for teachers—have found changes in teacher knowledge and practice, and some even identify gains in student achievement. This more intensive approach to PD is discussed at length in the following section.

**Intensive Institutes**

Intensive institutes are PD programs that require extensive contact hours for participants, and are typically offered outside of normal school hours, whether during the summer or evenings. Institute facilitators will often provide additional on-site support for teachers throughout the following academic year. While they employ direct delivery of content, many intensive institutes also feature collaborative opportunities for teachers, such as the opportunity to work with colleagues to develop curriculum units.

The majority of intensive institutes are in the fields of science and mathematics, and are often funded by a national foundation or educational partnership. Many intensive institutes are the result of a partnership between a university and local schools. This partnership is commonly called a professional development school (PDS), where university faculty collaborate with district or school teachers for the purpose of professional development, research on teaching and learning, and improvement of student achievement (National Council for Accreditation of Teacher Education 2015). Due to the fact that university faculty typically participate in the design and evaluation of intensive institutes, and many are grant-funded and therefore mandate evaluation, there is an abundance of research evaluating these experiences. As a result, the number of studies on intensive institutes PD far exceeds that of any other type covered in this synthesis.

This body of research is not without limitations, however. Knight, Wiseman, and Cooner (2000) explain that a number of methodological challenges posed by research on professional development schools has prevented measurement of direct impact of PD, particularly in regard to student achievement (26). These issues include lack of control groups due to ethical reasons, teacher wariness as the subjects of research, and distance of standardized testing from the intervention (making it hard to gauge impact on student achievement). Nonetheless, when taken together, the research on intensive institutes offers the strongest evidence base for effective PD.

Because of the large number of studies on intensive institutes identified for inclusion in this synthesis (a total of 19, spanning 2004–2014), and because many of these studies have common features in terms of both PD design and methodology, they are presented in summary form in Table 4. A discussion follows regarding common features across programs, as well as their impact on outcomes such as teacher knowledge, instructional practice, and student achievement.

**TABLE 4. Research Studies on Intensive Institutes**

<table>
<thead>
<tr>
<th>Author/Year</th>
<th>Setting</th>
<th>Participants</th>
<th>Program Description</th>
<th>Methods</th>
<th>Findings/Impact</th>
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<tbody>
<tr>
<td>Koomen et al. (2014)</td>
<td>Three-year study of a summer institute at the University of Minnesota in ecology.</td>
<td>192 teachers (113 elementary and 79 secondary, with 170 from public schools).</td>
<td>Two-week institute taught by college faculty (one week of science content, and one week of analyzing research investigation data and small group presentations); a follow-up day in the fall and one in the spring to examine teachers’ implementation in their classrooms.</td>
<td>Attitude survey administered to all teachers, plus classroom observations of nine teachers. No pre-assessment of classroom practices.</td>
<td>Change in teacher practice. Found “unevenness” (20) in inquiry enactments, meaning that teachers used various components of inquiry modeled in the PD but did so infrequently and not consistently.</td>
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<tr>
<td>Author/Year</td>
<td>Setting</td>
<td>Participants</td>
<td>Program Description</td>
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<td>Murley et al. (2014)</td>
<td>Two-year geography PD initiative developed with four state geographic alliances.</td>
<td>21 teachers (3–8 from each region).</td>
<td>PD content was structured around Lincoln's life (including the Lincoln Heritage Trail and Lincoln monuments and memorials), and involved pre-institute readings, site visits to places associated with the content, required submission of products from the visits, participants' using video-recording devices at sites to develop class content, requiring use of that content with students, and reconvening for participants to share results of student learning.</td>
<td>Surveys of participant knowledge, review of teacher products, student assessment of products, and self-assessment of learning.</td>
<td>Teacher knowledge gains and reported impact on students. Gains in teacher knowledge; teachers also reported a number of observed student gains (e.g., increased motivation for at-risk students, success for special needs students, greater civic engagement).</td>
</tr>
<tr>
<td>Polly et al. (2014)</td>
<td>Three-year grant project for STEM education funded by the U.S. Department of Education Mathematics Science Partnership, involving a university and two school districts.</td>
<td>291 teachers and their 9,826 students.</td>
<td>10-month PD to assist teachers in implementing Common Core mathematics curriculum; involved 28 hours in a summer workshop, 12 hours in follow-up workshops during the school year, and 20 hours of classroom-embedded PD (e.g., follow-up activities, video recording lessons, structured reflecting on teaching).</td>
<td>Pre-project and post-project instruments measuring teachers' beliefs, practices, and mathematics knowledge for teaching; student achievement measured by curriculum-based unit tests as pretests and posttests.</td>
<td>Change in teacher practice; teacher knowledge gains; student achievement gains. Statistically significant change in self-report of teacher-enacted practices, with 76 teachers shifting to &quot;student-centered&quot; from teacher-centered; gains in teachers' mathematical knowledge on a content test; statistically significant relationships between teacher content knowledge posttest score and student achievement; significant relationship between teachers' change in teaching beliefs (toward that promoted by the PD) and student achievement.</td>
</tr>
<tr>
<td>Author/Year</td>
<td>Setting</td>
<td>Participants</td>
<td>Program Description</td>
<td>Methods</td>
<td>Findings/Impact</td>
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<tr>
<td>Yasar et al. (2014)</td>
<td>Five-year study of a summer institute in math and science.</td>
<td>180 math, science, and technology teachers from 15 secondary schools in two school districts.</td>
<td>Month-long summer institute and follow-up activities (Saturday trainings, implementing lesson plans developed during the institutes). Teachers voluntarily attended two years of the institutes, then served as coaches for small groups of beginning-level teachers. Total time in PD 80–200 hours.</td>
<td>Data analysis of graduation rates, student achievement scores, and report cards for students of participating teachers and a control group; qualitative feedback from participants.</td>
<td>Change in teacher practice and confidence; student achievement gains. After first year (80 hours), teachers’ confidence level increased but use of PD-related instruction did not; after more years of involvement, teachers reported gains in confidence and use of instruction. Increase in graduation rates and student achievement scores in mathematics in partnering districts observed; treatment students outperformed control on achievement tests (with a positive correlation between number of intervention teachers at a site and test performance).</td>
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<tr>
<td>Foster, Toma, and Troske (2013)</td>
<td>Evaluation of NSF-funded Math and Science Partnerships to improve teaching and STEM outcomes.</td>
<td>175 Kentucky school districts, including 38 partnership districts, the Kentucky Science and Technology Corporation, and 10 universities located in three states.</td>
<td>Higher-education-faculty-designed summer training programs for K–12 math and science teachers (held at schools or at colleges). PD varied in the number of hours per session and number of sessions for particular courses.</td>
<td>Data collected from state tests in math and science over a period of seven years (two years before and five years post implementation).</td>
<td>Student achievement gains. Number of PD hours was correlated with higher math achievement at the middle school level; 1% increase in teachers who participated in the training improved the average school’s math score by 0.10 of a standard deviation. No effects found in high schools or in science.</td>
</tr>
<tr>
<td>Perkins and Cooter (2013)</td>
<td>Memphis Literacy Academy, a partnership between Memphis city schools and faculty leaders at the University of Memphis College of Education.</td>
<td>144 teachers in grades K-3.</td>
<td>150 hours of PD during the spring and summer of 2005, with 60 of those hours being job-embedded literacy coaching; PD focused on classroom assessment, use of student data to inform instruction, effective teaching methods in reading and writing, adapting instruction for students with special needs, and techniques for involving families.</td>
<td>Teacher survey, two interview protocols, a focus group, and a classroom observation protocol (the Literacy Observation Tool, or LOT). No control group used.</td>
<td>Changes in teacher practice; self-reported gains in teacher self-efficacy; possible student achievement gains. Teacher self-report of increased self-efficacy; some change in teacher practice observed in pre- and post-LOT scores; 14.9% improvement at the “proficient” level on state tests when compared with the 2004 results (but no control group used, so cannot be conclusively interpreted).</td>
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<tr>
<td>Author/Year</td>
<td>Setting</td>
<td>Participants</td>
<td>Program Description</td>
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<td>Abe et al. (2012)</td>
<td>Impact study of the Pacific Communities with High Performance in Literacy Development (Pacific CHILD) PD program in American Samoa, the Commonwealth of the Northern Mariana Islands (CNMI), and Hawaii.</td>
<td>4th- and 5th-grade teachers from 45 schools (totaling 3,052 students and 197 teachers), with 23 schools assigned to the treatment condition (for a total of 1,566 students and 95 teachers), and 22 schools assigned to the control condition (for a total of 1,486 students and 102 teachers).</td>
<td>Two-year program to improve reading comprehension was designed to provide 42 days of PD (one 10-day annual institute, three 3-day mini-institutes, monthly lesson demonstrations, twice-monthly classroom observations, and weekly team meetings). However in practice, teachers averaged 15 days (36% of PD design) in the first year, and those that participated in both years averaged 31 days (74% of PD design).</td>
<td>Stanford 10 and TerraNova achievement test data, written teacher knowledge assessment, and observations.</td>
<td>Changes in teacher practice; teacher knowledge gains; student achievement gains. Positive findings for teacher outcomes (teacher knowledge-average score on a 40-point knowledge assessment was 27.0 for treatment group schools, and 25.0 for control group schools; estimated average observation score on a five-point scale ranging from zero to four was 2.20 in the treatment group and 1.85 in the control group); statistically significant difference between student treatment and control groups in SAT 10 reading comprehension scores (estimated average score was 654.3 for students at treatment schools and 629.0 for students at control schools).</td>
</tr>
<tr>
<td>Heller et al. (2012)</td>
<td>Comparative study of three versions of an electric circuits course for elementary teachers in six states.</td>
<td>Over 270 elementary teachers and their corresponding 7,000 students.</td>
<td>Three courses—Teaching Cases, Looking at Student Work, and Metacognitive Analysis—held for 3 hours every other week during school year (total of 24 hours). Courses had identical science content, but varied in approach to analysis of thinking and teaching (via narrative case studies, analysis of own students’ work, and reflective discussion about teachers’ own learning, respectively).</td>
<td>Tests of factual knowledge (along with written justifications with answers) for both teachers and students; teacher surveys (of background, self-reported beliefs about science and teaching, and rating of the impact of the PD). Administered to participants and control group of teachers and their students.</td>
<td>Teacher knowledge gains; gains in student achievement. All three courses showed significant gains in teacher and student scores on tests of science content knowledge, compared to control groups. Effect sizes even stronger for follow-up year. Only Teaching Cases and Looking at Student Work courses improved the accuracy and completeness of students’ written justifications, and only Teaching Cases positively impacted teachers’ written justifications.</td>
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<td>Sample McMeeking, Orsi, and Cobb (2012)</td>
<td>Two years of a Mathematics Science Partnership NFS grant at a Colorado university.</td>
<td>128 mathematics teachers from seven school districts and 64 middle schools.</td>
<td>Teachers voluntarily attended either 1 or 2 university summer courses in math (each two or three weeks). Courses focused 80% on math content, 20% on pedagogy. Four follow-up workshops on Saturdays during the fall to design lessons based on PD instruction.</td>
<td>Analysis of state mathematics test results for two cohorts of students (one that received mathematics instruction from participant teachers in the year before the PD, and a second cohort that received mathematics instruction the year after the PD).</td>
<td>Student achievement gains. Students’ odds of achieving a score of Proficient or better increased with teacher participation in the PD; however, this effect was found only for teachers who enrolled in two full intensives during the summer (there was no effect found for teachers enrolled in only one intensive).</td>
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<td>Van Duzor (2012)</td>
<td>Case study of chemistry PD course taught by university faculty.</td>
<td>17 K–8 teachers.</td>
<td>Semester-long course (2.5 hours/week) for three graduate credits.</td>
<td>Pretests and posttests of teachers' chemistry knowledge, weekly journals, interviews, and observations of the PD course; no examination of change in practice or student impact.</td>
<td>Teacher knowledge gains. Gains in teachers' chemistry knowledge. Persistence in learning qualitatively associated with teachers' sharing their experiences and concerns and reflecting on their learning.</td>
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<td>Zwiep and Benken (2012)</td>
<td>Program evaluation of summer institutes in math and science.</td>
<td>103 teachers (52 focusing in science, 51 in math) in grades 4–9 from four large school districts (two suburban and two urban) in CA.</td>
<td>Weeklong summer institute based on grade level or area of interest, featuring hands-on content sessions and instruction in pedagogy; two school-year collaborative meetings held on-site at schools.</td>
<td>Teacher surveys, pre- and post- content knowledge exams, daily institute reflections, practice-based interviews, and journals. No examination of change in practice or student impact.</td>
<td>Teacher knowledge gains. Significant gains in teacher knowledge (average scores rising from 43 to 70% in science, and 63 to 75% in math). Teachers reported a deeper understanding of the nature of their discipline and how students learn.</td>
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<td>Rushton, Lotter, and Singer (2011)</td>
<td>Chemistry summer institute at a university.</td>
<td>7 high school science teachers from 5 school districts (4 high-need).</td>
<td>Two-week summer institute featured inquiry-based activities, content sessions, teaching practice with Upward Bound students in summer enrichment program, and reflection opportunities (videotape analysis).</td>
<td>Interviews, written reflections, analysis of videos of classroom implementation of inquiry, and observations of classrooms during academic year. No data on pre-institute teaching practices.</td>
<td>Change in teacher practice. Observations found all teachers utilized PD instruction methods in their classrooms (evidenced in 75% of observations).</td>
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<td>Akerson, Hanson, and Cullen (2007)</td>
<td>Two years of summer workshops in science content, with action research in the second year.</td>
<td>17 K–6 elementary teachers from three school districts.</td>
<td>In 2007 study, a two-week summer workshop that provided PD in science content and teaching techniques that emphasized the nature of science and scientific inquiry. In 2010 study, same participants attended a second summer institute on instruction in action research and created an action research proposal, followed by monthly workshops during the school year and meetings with the researchers/facilitators.</td>
<td>In 2007, assessment of teachers' views of the nature of science (NOS) was used to assess pre- and post-institute knowledge; additionally, seven teachers were interviewed and videotapes were made of the workshop sessions (but no assessment of impact during school year); in 2010, videotaping of all PD, classroom observations of teachers, teachers' action research proposals, student work, NOS assessments designed and implemented by teachers, final written reports, surveys (12 participants), and interviews (5 participants).</td>
<td>Change in teacher views. The 2007 study found that teacher NOS views, as well as understanding and use of NOS terminology, improved by the end of the workshop, but misconceptions about NOS persisted; the 2010 study reported qualitative findings regarding teacher perceptions of benefits and challenges (e.g., time constraints) of action research.</td>
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<td>Cullen, Akerson, and Hanson (2010)</td>
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<td>Akerson and Hanson</td>
<td>Three-year program to develop elementary teachers’ views of the nature of science (NOS) and corresponding instructional practice.</td>
<td>One K–6 elementary school with 300 students; case study conducted with three teachers (a total of 6 out of 14 teachers participated at the school).</td>
<td>Science-inquiry PD held during the school year, with 20 hours of workshops in year one, 36 hours in year two, and 28 hours in year three (total of 84 hours). Additional 42 hours of individualized support (observation, modeling, debriefing by mentors) was provided over the three years.</td>
<td>Teacher and student surveys, interviews (using a specific protocol for assessing NOS views), videotapes of instruction, transcripts and field notes from PD activities and classroom observations, and teachers’ lesson plans and descriptions of changes to their instruction. No comparison group used; small sample size.</td>
<td>Change in teacher practice and views; change in student views. Teachers and most grades showed positive changes in their views of NOS, and analysis of teaching also showed improvement in teacher practice for inquiry.</td>
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<td>Wee et al. (2007)</td>
<td>Two studies of a multiyear, inquiry-based science intensive, that then employed cascade / “train-the-trainer” approach.</td>
<td>2004 study of 30 primarily middle school science teachers from 6 states in the Midwest; those teachers (Level I participants) then trained 31 colleagues at their schools (Level II). 2007 study with 13 teachers from year three of program.</td>
<td>Summer institute involving investigation of local environments and inquiry-based teaching; participants then returned to their schools and trained colleagues in inquiry methods during the year.</td>
<td>The 2004 study used pre- and post-surveys and a mid-program interview to assess changes in teacher knowledge of inquiry, as well as observations of classrooms and Level II training, teacher interviews, surveys, and review of training plans and reports. The 2007 study used open-response assessments, site-visit observations and reports, and analysis of concept maps.</td>
<td>Change in teacher practice. 2004 study found 83% of Level I teachers demonstrated a change in classroom practices toward inquiry, and 68% of Level II participants changed their practice. 2007 study examined practice more closely and found that while teacher self-report of changes increased, observations did not confirm self-report data or did not find a high level of inquiry in teaching.</td>
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<td>Shepardson and Harbor</td>
<td>Summer and fall intensive institute on butterfly ecology in MN and TX, respectively.</td>
<td>School teams consisting of a secondary science teacher and two students; total of 44 teachers and 86 students.</td>
<td>Two-week intensive institute with instruction in inquiry and numerous opportunities for teams to conduct short, inquiry-based projects.</td>
<td>Pre- and post-written assessment of teacher content knowledge, classroom observations, case studies of 20 participating teachers. No control group or assessment of student achievement.</td>
<td>Change in teacher practice. Significant increase in number of teachers providing inquiry opportunities to students; qualitative data attributes this to program characteristics (extensive science content, focus on process knowledge, actual practice, facilitators’ expectations and abilities).</td>
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<td>Jeanpierre, Oberhauser, and Freeman (2005)</td>
<td>Three-year science education partnership between the University of Michigan and the Detroit Public Schools.</td>
<td>14 middle schools, with one to three teachers per school; total of 8,000 students.</td>
<td>Summer institutes, monthly work sessions, teacher discussion groups, and classroom support from university staff to develop inquiry-based and technology-infused curriculum units and projects.</td>
<td>Pretests and posttests for all students in classrooms that had utilized the projects; tests consisted of items designed to measure both curriculum content knowledge and science process skills. No control group.</td>
<td>Student achievement gains. Statistically significant gains in test scores each year of participation, with effect sizes greater for content scores than process scores. Weighted average effect sizes for total impact across all projects showed that the strength of effects grew over the three years (compounding effect).</td>
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Out of the 19 studies reviewed, a total of 17 involved PD for science or mathematics teachers, with the remaining two studies examining PD programs in literacy (Perkins and Cooter 2013; Abe et al. 2012). All but three of the studies involved a summer institute, with the others providing PD only during the academic year (Heller et al. 2012; Van Duzor 2012; Akerson and Hanson 2007). Programs ranged in duration from two weeks to three years, with the most frequent period of time being approximately a year. A total of six programs provided support to teachers outside of the primary PD experience, through methods like team meetings, follow-up activities, and coaching (Koomen et al. 2014; Polly et al. 2014; Murley et al. 2014; Yasar et al. 2014; Perkins and Cooter 2013; Zwiep and Benken 2012; Abe et al. 2012; Cullen, Akerson, and Hanson 2010; Akerson and Hanson 2007; Marx et al. 2004). In terms of outcomes, the most frequent impact identified across studies was a change in teacher practice as a result of the PD experience. A total of nine studies included direct observation of changes in teacher practice (Koomen et al. 2014; Foster, Toma, and Troske 2013; Perkins and Cooter 2013; Abe et al. 2012; Rushton, Lotter, and Singer 2011; Wee et al. 2007; Shephardson and Harbor 2004; Akerson and Hanson 2007; Jeannpierre, Oberhauser, and Freeman 2005). Most studies provided strong evidence of change on observational measures, though three studies showed mixed, some, or no change (Koomen et al. 2014; Perkins and Cooter 2013; Wee et al. 2007). One study demonstrated improvement of teacher practice through use of the cascade model, though changes in teacher practices were observed at a higher rate for the trainers who attended the original PD, than for those teachers trained by the trainers back at their schools (Shephardson and Harbor 2004). An additional two studies included self-report data from teachers indicating a change in practice, but did not include direct observation (Polly et al. 2014; Yasar et al. 2014). The second most frequent outcome identified across studies was a gain in student achievement, which was directly measured and supported in eight studies (Polly et al. 2014; Yasar et al. 2014; Foster, Toma, and Troske 2013; Perkins and Cooter 2013; Sample McMeeking, Orsi, and Cobb 2012; Heller et al. 2012; Abe et al. 2012; Marx et al. 2004). An additional two studies administered surveys to students, who reported gains in their learning and views of content (Murley et al. 2014; Akerson and Hanson 2007). In terms of teacher knowledge, six studies directly measured the impact of PD for this outcome and found strong gains in content scores (Polly et al. 2014; Murley et al. 2014; Heller et al. 2012; Zwiep and Benken 2012; Van Duzor 2012; Abe et al. 2012). An additional five studies provided self-report data on changes indirectly related to teacher knowledge and practice, such as views of instruction, self-efficacy, or confidence (Yasar et al. 2014; Perkins and Cootter 2013; Akerson, Hanson, and Cullen 2007, and Cullen, Akerson, and Hanson 2010; Akerson and Hanson 2007). Four studies shed light on the question of whether increased duration has a positive effect on PD impacts (recalling the question from the previous section of this synthesis, on direct delivery methods). These studies explicitly identified differentiated outcomes for participants based on the duration of their participation in the PD experience (Yasar et al. 2014; Foster, Toma, and Troske 2013; Sample McMeeking, Orsi, and Cobb 2012; Marx et al. 2004). The observed outcomes either were not present at lower levels of PD duration but were found at higher levels, or were present at lower levels but were amplified by longer PD duration. Finally, one study utilized the same content and duration of PD, but differentiated the pedagogical approach used in three different versions of the program (Heller et al. 2012). While all three versions showed identical gains in content scores for teachers and students, significant differences were found on students’ and teachers’ written justifications for the answers they provided on the content test. Specifically, PD experiences either using case studies of teaching or examining student work improved the accuracy of student justifications, while only PD using case studies improved the accuracy of teacher justifications of answers. For PD that used reflective discussion about teachers’ own learning (metacognition), no gains in justification accuracy was found for students or teachers. In summarizing the findings of these 19 studies, it can be concluded that there is considerable evidence in the literature for the effectiveness of intensive institutes for teacher PD, with gains evident in teacher knowledge, changes in teaching practices, and gains in student achievement. (It should be noted that science, mathematics, and literacy were the content areas for the intensive institutes studied; thus the impacts of intensive institutes in other subject areas is not known.) There are several factors that may contribute to the effectiveness of intensive institutes, many of which are reflective of the components discussed in Chapter III. First, the intensive institutes described in this synthesis are all content-based and are directed to teachers’ instruction in a specific subject area. In this sense, they are tailored to the needs of individual teachers (as opposed to general sessions on pedagogy that teachers must then apply, on their own, to their teaching). Further, most of the intensive institutes offered teachers opportunities to practice what they learned, to work together collaboratively, and to receive follow-up support throughout the academic year. And as discussed earlier, intensive institutes were longer in duration than other direct delivery methods like workshops or conferences. As compared with other practices discussed in this literature synthesis, research on intensive institutes provides the strongest support for this approach as an effective PD practice. This statement is made with some important caveats, however. The majority of these studies were conducted as part of grant-funded projects and involved partnerships between university or educational agency researchers and school personnel. This means...
that intensive institutes are likely to have access to ample funding and knowledgeable educational researchers. Further, due to the availability of funding and no-cost support through these PD programs, K–12 schools and teachers may be more incentivized and more willing to participate. Finally, most funders require a rigorous program evaluation for accountability purposes, thereby ensuring that quality research will be conducted on program outcomes. For all of these reasons, intensive institutes are uniquely positioned to yield robust PD programs and studies of gains for teachers and students. Other PD practices may be equally effective, but do not have the financial or personnel resources behind them—or school and teacher buy-in—to demonstrate effectiveness to the same degree, or at least the same volume. Thus readers are cautioned against concluding that intensive institutes are the most effective of the PD practices examined in this synthesis; rather, they are the practice for which there is the most evidence.

Some of the same advantages that have resulted in the research on intensive institutes may ultimately prove to be disadvantages for schools, teachers, and PD providers who might wish to develop them. Because they are costly and resource-demanding, intensive institutes are typically initiated, coordinated, and funded by foundations and universities, as opposed to individual districts or schools. In the current era of accountability, it remains to be seen whether the availability of intensive institutes is impacted by constricted funding (both public and private) and the demands of Common Core State Standards (CCSS) implementation. Interestingly, one of the intensive included in this synthesis involved developing a Common Core math curriculum in Colorado (Polly et al. 2014), but that does not appear to be a trend among the studies reviewed. Finally, the challenge of financing intensive institutes is amplified for private schools and their employees as opposed to individual districts or schools. In the current era of accountability, it remains to be seen whether the availability of intensive institutes is impacted by constricted funding (both public and private) and the demands of Common Core State Standards (CCSS) implementation.

As compared with other PD practices discussed in this synthesis, PLCs are likely the most diverse in terms of their formulation in practice (cf. Wells and Feun 2007). Simply put, there are as many PLC formats as there are schools that utilize PLCs. PLCs are also rarely static PD programs, but rather move through different stages of development that necessitate ongoing adjustment (Jones and Thessin 2015). Likely for both of these reasons, the typical study of a PLC is “generally more descriptive than rigorous in its methods” (Feger and Arruda 2008, 12) and there is little empirical research on PLC outcomes. Vescio, Ross, and Adams (2007) observed this directly in their review of the literature on PLCs, in which they found that only ten out of 55 documents addressing PLCs provided any empirical data of any kind. Of that number, a majority had considerable methodological issues (such as lack of data about practices prior to the study, as well as small sample sizes), and most did not measure changes in actual practice but relied instead on teacher self-report data (84). Despite these issues, Lomos, Hofman, and Bosker (2011) conducted a subsequent meta-analysis of the studies included in the literature review conducted by Vescio, Ross, and Adams (2007), and found a relatively small but significant summary effect (d = 0.25, p < 0.05) of professional community on school achievement (137).

Research on PLCs appears to have waned in recent years, with a search of the literature mostly identifying studies published prior to 2005. Many of those studies dated back to the early 1990s (cf. Hord

**Professional Learning Communities (PLCs)**

Professional learning communities, or PLCs, are a school reform initiative that gained popularity in the late 1990s and early 2000s. PLCs are not a simple PD practice but rather a collaborative approach to structuring schools, and as such often involve organizing educators into teams that work together on shared instructional goals. Vescio, Ross, and Adams (2007) identify the origin of PLCs in organizational management, which was translated into education when “the concept of a learning organization became that of a learning community that would strive to develop collaborative work cultures” (81). The authors explain that underpinning PLCs are two assumptions: first, that knowledge is situated and developed in the day-to-day experiences of teachers through reflection with other teachers; and second, that engaging teachers in PLCs will increase professional knowledge and student learning. As Stewart (2014) also explains, “The mission of a PLC is to gain a deeper understanding of how students learn content and then to apply that understanding to how content is taught” (29). Dufour and Dufour (2012) describe a variety of collaborative teams that can comprise PLCs, such as grade-level teams, same-course teams, interdisciplinary teams, or district or regional teams. PLCs can even be virtual, extending beyond a specific school to an entire district or professional organizations (as discussed later in this chapter in the section on online formats). Regardless of how PLC groups are formulated, Dufour and Marzano (2011) assert they must involve teachers in ongoing, job-embedded learning activities like collaborative projects, collective inquiry, and action research, and not just smaller-scale activities like teacher meetings or book clubs (21–22). Similarly, Stoll et al. (2006) list professional inquiry, joint review of curricula, and feedback on teaching as key activities for PLC groups. Little (2006) views PLCs as engaging in supportive practices for teacher learning such as observation, mutual support, and feedback, as well as exerting collective control over decisions that impact curriculum (15). Schools with PLCs also tend to reflect a shared leadership model, in which teachers, administrators, and other education professionals in a school all assume responsibility for student learning (Huffman and Hipp 2003).
1997, for a review of early PLC research). The five studies identified for inclusion in this synthesis were all single-case studies of schools or districts from 2003 to 2011 and are presented here beginning with the most recently published (Thessin and Starr 2011; Hollins et al. 2004; Phillips 2003; Strahan 2003; Supovitz and Christman 2003). It should be noted that some of these studies are not rigorous enough in their evaluation methods, even for case studies, to draw conclusions about the effect of PLCs (as information on instrumentation and data analysis was missing or incomplete).

Thessin and Starr (2011) conducted a two-year case study on the Stamford, Connecticut, school district that introduced PLCs in 2007–2008. The PLCs featured a cycle that involved teachers conducting research on targeted instructional areas, analyzing student data, examining student work, reviewing instructional practices, assessing student progress, reflecting on their findings, and developing an action plan (50). In the first year, PLC activities included common planning times and a book study. In the second year, training sessions were added for PLC facilitators and involved eight six-hour sessions outside of the school day. Out of the district’s 1,400 teachers, 260 volunteered to attend these sessions. The authors explain that these facilitators’ trainings were added in the second year due to difficulties in the first year, as teachers were “confused and, in some cases, even frustrated by this new direction. Simply putting well-meaning individuals together and expecting them to collaborate was not enough. They needed professional development and guidance” (50). The authors examined results for the 2009 and 2010 Connecticut Mastery Test for the district and compared those results with statewide data. While they do not provide specific information on the results (nor year-over-year gains in the district or state), the authors report that district students demonstrated higher overall achievement in the percentage of students scoring “at or above goal” when compared to students’ performance statewide. The authors explain, “No one reform can be cited for Stamford’s improvements, but teachers clearly believe that PLCs have helped them improve their practice” (54).

Hollins et al. (2004) examined a low-performing, high-poverty elementary school that featured the development of a PLC using teacher study groups. The groups met over a two-year period with the goal of improving literacy for African American students. The authors report that as a result of the PLC, teacher conversations became more positive regarding students and teachers improved their understanding of students’ culture. Additionally, teachers reported increased sharing of instructional approaches, reflecting with colleagues, and collaborating to develop new approaches to instruction. Achievement data for both second- and third-grade students at the school were compared with other schools in the district, with the finding that students whose teachers were involved in PLC groups improved significantly over comparable students in other schools. Specifically, second-grade students at the target school demonstrated a 28% overall gain from 1998 to 2000 for students scoring above the 25th percentile on achievement tests, whereas the districtwide gain for students was only 12%. Similarly, the percentage of students moving into the 50th percentile also exceeded that of overall district gains for both second- and third-grade students. It is not clear from the study to what degree these gains can be attributed to the PLCs or to other potential school-specific factors.

Supovitz and Christman (2003) report findings and conclusions from large-scale evaluations in two urban districts that implemented PLC reform initiatives. In Cincinnati, efforts involved the creation of team-based schools where teacher teams (of three to five teachers) worked with groups of 60–120 students over multiple years. In Philadelphia, learning communities of 200–400 students were also accompanied by the same teachers over multiple years. While the study does not report specific data or the methodology used in these evaluations, the authors report their general conclusion that only in groups which “focused on changing the instructional practices of their members was there measurable improvements in student learning” (4). Groups that saw these gains engaged in instructional discussions that were ongoing and supported by administration, and systematically investigated the relationships between classroom practices and student work (5). Thus while both school districts were involved in restructuring efforts, “only in a subset of the schools, and teacher communities within, did the reforms penetrate the instructional culture between teachers around teaching and learning” (4, emphasis in original). However, these changes in teaching and learning were not reflected in overall student achievement nor did they spread to other teacher groups. For example, most student achievement gains in the Philadelphia study sites were attributable to an early literacy initiative, and overall test scores in Cincinnati study sites were similar for team-based and non-team-based schools. Thus, it was only at the level of individual teams that differences in instructional practices and subsequent gains in student learning were significant.

Phillips (2003) studied a five-year reform effort in one middle school in a large urban district in the southwestern U.S. with a subgroup of students (556 out of a total of 1,425 students). With this subgroup, the school implemented PLCs from sixth to eighth grades. PLC activities included teacher study groups that led to curricular innovations, early release of students on Fridays for teacher PD sessions, and teacher leadership and direction of the staff development plan. The study utilized qualitative data (such as principal and teacher interviews, observations, focus groups, school reports, and student work products) as well as analysis of student achievement scores. Data analysis showed that student achievement increased dramatically over a three-year period, with ratings on a statewide standardized test increasing from “acceptable” in 1999–2000 (with 50% of the students passing subject area tests in
by providing resources, information, and materials to assist in building their confidence, and function as sponsors for the teachers' profession and the teachers' place in it, encourage teachers and direction, provide a broader understanding of the teaching between the two but rather views the coach and mentor as sharing interchangeably. ISM (Brisciana 2013) does not distinguish in practice. Observing that the two terms are often used and mentoring lack a common definition or standard formulation. Like many other practices discussed in this synthesis, coaching and mentoring are job-embedded forms of PD that have increased in prevalence since the 1990s. Deussen et al. (2007) explain that while these practices are not new in education, "the idea was reinvigorated by the frustration with traditional workshops and the need, under the No Child Left Behind Act of 2001, to find more effective means to enhance instruction and learning" (1). The context in which coaches and mentors work in K–12 settings varies and can take place as stand-alone PD activities, as follow-up to direct-delivery methods, or even during a workshop. Galbraith and Anstrom (1991) assert that regardless of program structure, the key to coaching and mentoring is sustaining the relationship between matched teachers for an extended period of time, which allows for accountability, support, and ongoing feedback.

Within K–12 settings, individuals with the title of coach can be master teachers, administrators, trainers from universities, and consultants (Robb 2000). Coaches who work full-time in that role may be former teachers who no longer work in the classroom, but instead work full-time coaching other teachers, often in different schools or across districts. In contrast to full-time coaches, on-site coaches are often experienced classroom teachers who also coach other teachers in a part-time capacity in addition to their teaching load. Finally, large districts may provide a coach supervisor or support person who meets with all of the coaches within the district, either individually or as a group, to provide supervision and guidance.

A considerable number of coaching models and cycles are proposed in the literature (cf. Hall and Simeral 2008; Diaz-Maggioli 2004), but regardless of their distinct formulation, most involve teachers' growth toward self-awareness, reflection in action, and change in instructional practice. This process is spurred on and facilitated through a range of coaching actions like needs assessment, observation, critical questioning, and collaborative reflection. Coaches work side-by-side with teachers in the classroom by observing, modeling, providing feedback, and co-planning lessons according to the needs and goals of individual teachers (Deussen et al. 2007). Rather than just helping teachers solve classroom problems, coaches take a developmental approach in which their "primary goal is to build on what a teacher knows and does well" (Galbraith and Anstrom 1991, 60).

The literature on the use of coaching in education is extensive. However, the majority of studies identified were conducted on the impact of literacy coaching, particularly in early education settings. This is reflective of the widespread use of coaching in literacy instruction and is evidenced by the prevalence of professional
associations, federally funded programs, and research centers devoted to literacy coaching. (Because of the specificity of literacy coaching methods, and the difficulty of determining whether and how those practices can be translated into K–12 settings and other content areas, this chapter does not specifically address literacy coaching as a distinct practice; readers interested in literacy coaching may wish to consult Sailors and Price 2015; Porche, Pallante, and Snow 2012; Biancarosa, Bryk, and Dexter 2010; Carlisle and Berebitsky 2010; Lockwood, McCombs, and Marsh 2010; Garet et al. 2008; and U.S. Department of Education 2008a.)

To provide an assessment of coaching and mentoring as effective PD practices across K–12 settings and subjects, this synthesis makes use of three existing literature reviews that collectively examined hundreds of studies (Joyce and Showers 2002; Cornett and Knight 2009; and Kretlow and Bartholomew 2010) as well as two studies published after these reviews that evaluated a secondary coaching program to improve classroom interactions (Gregory et al. 2014; Allen et al. 2011). After reporting findings from these sources, a discussion of what is known regarding the effectiveness of coaching and mentoring as PD practices follows.

In the earliest review to examine the outcomes of coaching, Joyce and Showers (2002) summarize their previous research on teacher training in the late 1980s involving a “meta-analysis of nearly 200 research studies, plus a review of the literature on staff development” (Showers, Joyce, and Bennett 1987, 79). The authors examined three different PD conditions: information only (e.g., workshops); information plus demonstrations and practice; and finally information, plus demonstrations and practice, plus coaching. When coaching was added to the third condition, the authors found a greater correlation with increased teacher skill acquisition over the other two conditions. Further, coaching was the only condition in which transfer of skills to actual classroom practice was identified. (A more detailed discussion of their findings for each of these conditions can be found in Chapter III in the discussion of active learning as a component of effective PD.)

In a more recent review of the literature, Cornett and Knight (2009) examined 250 documents on four types of coaching: peer coaching, cognitive coaching, literacy coaching, and instructional coaching. In their narrative review of 60 of these studies, the authors conclude that coaching positively impacts teacher attitudes, job satisfaction, and teaching practices. The authors found support for Joyce and Showers’ (2002) assertion that coaching “increases implementation, or as it is known in the literature, skill transfer” of learning obtained through workshops or other PD methods (Cornett and Knight 2009, 209). What is less known, however, is the impact of coaching on student outcomes: “The ‘missing link,’ so to speak, in coaching research, is studies that clearly show that coaching improves the specific teaching practices that increase student achievement” (210). Additional areas the authors identified as needing research included school support systems for coaching, ways that administrators can support the coaching process, best practices for coaches, evaluation of coaches, and PD for coaches themselves (210).

In the most recent literature review, Kretlow and Bartholomew (2010) conducted a comprehensive examination of research published over twenty years to determine the impact of coaching on teachers’ implementation of evidence-based practices. Out of 457 studies, the authors identified 13 that met their selection criteria (with the remainder excluded due to poor or unclear research design, or only using self-report data). Ten of the studies involved in-service teachers, nine of which were at the elementary level and one at the preschool level, with a total of 37 teachers participating across these studies. Though, none of the coaching interventions reviewed for in-service teachers were delivered at the secondary level, and all involved small sample sizes. The content focus of the coaching programs studied included mathematics, reading, spelling, classroom management, and mixed content (from multiple academic areas). Duration of coaching-related PD varied among the studies and ranged from several hours to 16 weeks. Most coaches in the studies were volunteers and had a wide variety of backgrounds and practices.

In their report of findings from their review, Kretlow and Bartholomew (2010) found that across the studies most teachers positively rated the coaching activities and commonly suggested more individual coaching sessions as a means to improve the experience. In terms of change in teaching practice, the studies (which measured impact on teaching practice by calculating the percentage or number of times teachers accurately utilized skills in which they had been coached) demonstrated that, “Overwhelmingly, coaching improved the accuracy of teaching behaviors across studies reviewed” (293). In some cases, this effect was observed after a brief intervention—as few as two coaching sessions (294). Findings in regard to student achievement were fewer and mixed, however. Only two studies reported data for the elementary level. One study demonstrated that coaching was positively correlated with gains in students’ weekly spelling tests; the second study, which involved general education teachers, found that student outcomes varied widely (289). Kretlow and Bartholomew (2010) conclude that the “results of this review suggest coaching is a promising practice for promoting high fidelity of evidence-based practices from training settings to real classroom settings” (293), while the impact of coaching on student achievement is less established.

As all of the studies identified by Kretlow and Bartholomew (2010) involved students at the elementary level, and all were published in 2010 or earlier, an additional two studies were identified that are more recent and involve secondary students. In two studies of the same PD program, Gregory et al. (2014) and Allen et al. (2011) used a randomized controlled design to assess the effectiveness of a secondary coaching program to improve classroom interactions (the My Teacher Partner–Secondary program). The study involved a total
of 87 teachers (61% middle school, 39% high school) in 12 schools in Virginia. Teachers were grouped into intervention and control conditions, with those teachers in control groups participating in their school’s regular PD programs only. Intervention groups participated in a one-day orientation workshop before the start of school, submitted videotapes of lessons every two weeks throughout the school year, and engaged in a coaching cycle intended to provide feedback on teacher-student interactions in the classroom. The cycle consisted of the following steps: the coach edited videotaped instruction into clips; each teacher reviewed the clips and responded in writing; the teacher and coach met via phone or computer for a conference; both the teacher and coach collaboratively developed an action plan for improvement and goals for next cycle; and finally, the coach summarized the conference and action plan in writing. Data collected for the study included coding of the instructional videos, results from teacher surveys, and school records. Control group teachers also submitted videotapes of instructional lessons throughout the school year for analysis. Additionally, achievement data on the Commonwealth of Virginia Standards of Learning tests were analyzed for two cohorts of students, for a total of approximately 1,300 students during the intervention year and about 1,000 students during the post-intervention year. Test results were compared for those students who had participating teachers with those whose teachers were in the control group.

Regarding the study findings, Gregory et al. (2014) report that teachers involved in the intervention group experienced significant though modest gains in students’ behavioral engagement in their classrooms after a year of involvement in the program, as compared with the control group (a .46 SD overall difference in engagement from fall to spring, after controlling for classroom characteristics, with the program explaining 4% of the variance). With regard to student achievement, Allen et al. (2011) reported no statistically significant difference in student performance in the intervention year. However, analysis of post-intervention-year data found a difference: achievement of students who had teachers involved in the intervention was significantly higher than that of students whose teachers were in the control group. (The effect size of 0.22 was approximately equivalent to an increase in an average student’s achievement from the 50th to 59th percentile.) A significant limitation of the study, however, is that the researchers did not control for differences between the two groups of students prior to the intervention.

When taken together, the research on coaching as a PD approach for teachers is not fully conclusive, as most of the studies in the literature employ “research methodologies that fall short of providing credible estimates of the causal impacts” of the practice (Rockoff 2008, 2). However, as Marzano and Simms (2013) conclude in their own analysis of the literature, the research “appears stronger and less equivocal” regarding the positive impact of coaching for changes in teacher behavior than for student outcomes (7); nonetheless, they state that “it is reasonable to suggest that effective coaching can have a positive impact on student achievement” (7).

A critical line of inquiry in evaluating the effectiveness of coaching and mentoring is understanding the variables that might contribute to their effectiveness. Since these approaches are based upon an ongoing relationship—as opposed to a static content-based program—variables like the coach’s abilities and the willingness of the person being coached to change (Marzano and Simms 2013) are likely critical to the success of the process. However, very little is known about the relationship of these variables to the success of coaching and mentoring. Further research in these areas is needed to better understand the potential of these practices as effective PD.

**New-Teacher Induction**

The statistics on new-teacher attrition suggest there is a “revolving door” of teachers leaving the profession well before retirement age (Ingersoll 2012). In 2012–2013, a U.S. Department of Education survey found that 7% of teachers with one to three years of experience left teaching during that year (Goldring, Taie, and Riddles 2014). Haynes, Maddock, and Goldrick (2014) estimate that between 40% and 50% of new teachers leave teaching after five years, with higher rates found in urban, rural, high-poverty, and high-minority schools (2–3). These attrition rates “compromise the nation’s capacity to ensure that all students have access to skilled teaching” and are estimated to cost states a cumulative of $1 billion to $2.2 billion per year (Haynes, Maddock, and Goldrick 2014, 2).

A growing response to these concerns over the past few decades has been the creation of new-teacher induction programs. Designed to help teachers transition through their first year or years of teaching, such programs are based on the understanding that teaching is complex and that “teacher preparation is rarely sufficient to provide all the knowledge and skill necessary to successful teaching, and that a significant portion of this knowledge can be acquired only on the job. This view holds that schools must provide an environment where novices can learn how to teach, survive, and succeed as teachers” (Ingersoll 2012, 47). Darling-Hammond et al. (2009) and Burke (2010) report a steady increase in new-teacher induction programs; 68% of new public school teachers reported participating in a new-teacher induction program in 2003–2004, up from 56% a decade earlier (Darling-Hammond et al. 2009).

Mentoring programs are often a key feature of new-teacher induction and may account for much of this increase, due to passage of state laws requiring mentoring hours for teacher licensure. Of the 68% of teachers involved in induction programs in 2003–2004, 71% reported being assigned a mentor teacher (Darling-Hammond et al. 2009). As Smith and Ingersoll (2004) explain:

Teacher induction can also involve a variety of elements—workshops, collaborations, support systems, orientation seminars, and especially,
mentoring. Mentoring is the personal guidance provided, usually by seasoned veterans, to beginning teachers in schools. During the past two decades, teacher mentoring programs have become the dominant form of teacher induction … indeed, today the two terms are often used interchangeably. (683, emphasis in original)

Mentoring programs for new teachers often involve shared preparation periods, where mentors and mentees can converse about classroom management, class events, and struggling students. Such programs often provide group meetings for the mentors themselves, so they can support each other in their mentoring roles (Robb 2000).

There are several limitations in current research on new-teacher induction programs, inclusive of new-teacher mentoring. Ingersoll (2012) explains that empirical research is limited, and Smith and Ingersoll (2004) assert that much of what exists does “not involve the kind of careful control that would allow unambiguous conclusions about the particular value added by the program component being considered” (706–7). For example, many studies lack experimental or quasi-experimental designs, and as such do not employ random assignment or utilize a control group. Further, much of the research on new-teacher induction programs focuses on the impact of programs on teacher retention, but not on teacher practice or student achievement; taken together, the research on these programs presents “mixed findings” (Fletcher and Strong 2009, 338).

Ingersoll and Strong (2011) found this to be the case in their literature review of research on new-teacher mentoring, which identified just 15 out of 500 studies that met their criteria for inclusion (e.g., provided data on outcomes, compared data from participants and nonparticipants, and explicitly described data and methods). Of that number, most had significant limitations, like very small sample sizes or designs that did not utilize random assignment. However, those that they reviewed provided empirical support that new-teacher induction programs have a positive impact on retention and on teacher commitment and retention (as measured by higher job satisfaction and commitment).

In the most recent of five studies identified for inclusion in this synthesis, Glazerman et al. (2010) conducted a large-scale study of new-teacher induction programs offered by the Educational Testing Service (ETS) and the New Teacher Center (NTC). A total of 1,009 beginning teachers from 418 schools in 17 urban, low-income public school districts participated in the study. The schools were randomly assigned to either treatment or control conditions, with all beginning teachers in a given school either receiving the treatment or not, depending on the school’s assignment. For the treatment schools, beginning teachers received induction for one or two years that involved weekly meetings with mentors, who themselves received training and materials. Additionally, teachers participated in monthly PD sessions and had opportunities to observe veteran teachers. Teachers in the control condition participated in the normal PD opportunities offered through their schools. Using classroom observations, surveys, and test scores, the researchers followed the teachers for three years, from 2005 to 2008. No significant differences were found between the two groups in terms of teacher retention over the three years of the study. There were also no significant differences in classroom practices during the first year. (The study did not track classroom practices past this point.) No differences in student achievement were found for the first two years, but in the third year significant differences were found between the students of control group teachers versus students of treatment teachers. Specifically, based on changes in pretest to posttest scores, teachers’ participation in two years of mentoring was the equivalent of moving the average student from the 50th percentile to the 54th percentile in reading, and from the 50th to the 58th percentile in math. Glazerman et al. (2010) describe these findings as mixed, though they do provide suggestive evidence that long-term mentoring of new teachers may have an impact on student achievement.

A study by Fletcher and Strong (2009) similarly provided evidence of student achievement gains as linked to new-teacher mentoring, as well as differentiated results based on the type of mentor to which teachers were assigned. The authors examined a total of 28 fourth- and fifth-grade teachers in a large urban district, with 16 teachers assigned full-release mentors (or mentors who worked full-time in that role) and 12 assigned site-based mentors (others within their schools who mentored, in addition to their teaching schedule). While full-release mentors had a caseload of 12–15 new teachers, and site-based mentors were assigned to one or two teachers, both groups received identical PD relative to their mentoring role. The researchers examined the results of the state testing program in ELA and mathematics and found that students of teachers involved with full-release mentors scored better over a year than students of teachers with site-based mentors, at both grade levels and in both subject areas. This was also the case for low-achieving students. Further, Fletcher and Strong (2009) found that teachers who had a full-release mentor over the entire two years had greater student achievement gains than those in classes of teachers in the other groups. This data confirmed a previous study (Fletcher, Strong, and Villar 2008) in which the researchers also found better outcomes for full-release mentors as opposed to site-based.

Thompson et al. (2004) studied the impact of California’s Beginning Teacher Support and Assessment program (BTSA), in which participation was required for all new teachers in California. All programs featured mentoring and formative assessment, but there was considerable variance in how programs were implemented from district to district. Thus, the authors compared the degree of support reported by teachers in their programs, as well as the outcomes for teaching practices and student learning. Out of a total of 1,125 teachers surveyed, 287 third-, fourth-, and fifth-grade public school teachers in their third year of teaching responded.
Those teachers were then segmented into groups based on low, middle, and high levels of engagement in their induction program experiences, after controlling for a number of school and student demographic factors. In addition to the survey, interviews and observations were conducted for a subset of respondents. Thompson et al. (2004) found that those teachers with high engagement in the induction program had higher scores on seven out of nine measures of instructional practice, though only one was statistically significant. The researchers also found that student achievement scores were higher for teachers with greater engagement in the induction program, as compared with teachers with lower levels of engagement (though again, the differences were not statistically significant). The authors conclude that the induction program had a positive effect on both teaching practice and on student test scores, but as the survey had a low response rate, the sample was not adequately representative (Ingersoll and Strong 2011).

Finally, Smith and Ingersoll (2004) examined an earlier set of SASS data from 1999–2000 school year which was then linked with the Teacher Follow Up Survey (2000–2001), to determine the effects of different kinds of induction activities on the likelihood that beginning teachers would leave their jobs. Their sample consisted of 3,235 teachers in their first year of teaching. Statistically significant findings included that having a mentor in the same subject area reduced a teacher’s risk of leaving at the end of the first year by 30%. Other induction efforts (such as seminars, classes, common planning times, and participating in regularly scheduled collaboration with other teachers) had positive effects in terms of reducing teacher turnover, but they were small and not statistically significant. Interestingly, the authors “calculated the additive effect of three induction ‘packages,’ each involving progressively more components” and found:

The results of our additive analyses showed that, collectively, as the number of components in the packages increased, the probably of turnover decreased, but the number of teachers receiving the packages also decreased. Notably, the largest reductions in turnover were associated with activities that tied new teachers into a collaborative network of their more experienced peers. (704)

Specifically, analysis showed that for the 56% of teachers who received a “basic” induction package of mentoring and supportive communication, the turnover rate was 39% (but the relationship between the package and the turnover rate was not statistically significant). For the 26% of teachers who received the basic induction plus collaboration (with mentors from their own field, common planning time or regularly scheduled collaboration, and a seminar for new teachers), the predicted turnover rate dropped to 27% and was found to be statistically significant. Finally, the fewer than 1% of teachers who had the basic package plus collaboration, plus a teacher network and extra resources (e.g., reduced number of preps and being assigned a teacher’s aide) had less than a 20% rate of turnover (which again was found to be statistically significant). The findings of this study, though now outdated, suggest that more extensive mentoring programs are correlated with reduced teacher turnover.

While the research on new-teacher induction programs is not extensive, there appears to be empirical support for such programs improving outcomes for teachers and students. This is particularly true for new-teacher mentoring. Given that new-teacher mentoring is a requirement for licensure in many states, it is likely that a number of private schools—including Christian schools—provide these types of PD experiences for teachers. All but one of the studies reviewed showed differentiated results for new teachers based on level of engagement in the program, type of mentor, or number of components in the program; taken together, these findings suggest that “more” is likely “better” in designing new teacher induction programs.

Inquiry-Based PD

Inquiry-based PD for teachers proposes that teachers should be engaged in the same kinds of learning activities they would expect of students. For adult learners seeking to improve their practice, this includes thinking critically about problems, asking good questions, reflecting on their actions, strategizing for change, and evaluating the success of change efforts. All of these activities are characteristic of what the literature calls inquiry-based PD. Blumenreich and Falk (2015) describe how school environments are conducive for this kind of teacher learning and how it may look in practice:

Schools offer fertile ground for teachers to learn, share, collaborate, and innovate. When teachers do research about their work, they are able to construct new knowledge about teaching. They invent new solutions to nagging problems, identify new challenges to address, and respond to the unique contexts and needs of the children and families of the communities where they teach. Through ongoing investigation and reflection about practice, teachers invent better ways to explain lessons, entice reluctant learners, bring unruly classes under control, and ignite children’s imaginations. Exercising their intellect and judgment in these ways enhances their abilities to teach effectively; and teachers feel empowered when they take charge of their teaching. This builds teachers’ capacity for professionalism … (51)

While this process can be undertaken by individual teachers, most inquiry-based PD practices assume that teachers learn best and benefit most from engaging in these activities collaboratively with colleagues. Just as students are expected to learn with and from one another, inquiry-based PD proposes that adult learners in school settings should do likewise.

There are many variations and types of inquiry-based PD, and often terms affiliated with the practice—such as teacher research, inquiry teams, collaborative inquiry, common lesson planning, team teaching, and so forth—are used interchangeably in the literature. For the purpose of this synthesis, the research has been grouped into the following four categories, which have distinct threads of investigation in the literature: action research, where teachers
conduct systematic investigations into changing their teaching practice; problem-based learning, or PBL, which involves groups of teachers organizing their learning around solving problems of practice; lesson study, where groups use a specific approach to collaborative inquiry that originated in Japan; and video-based PD, which involves teacher groups in collaborative inquiry using a specific technology. A definition and specific research is presented for each of these four PD approaches, and is followed by a summary of findings relative to inquiry-based PD at the end of this section.

Action Research

In defining action research, Tallerico (2005) explains, “Think of it as teachers conducting mini-experiments, then changing some practice as a result of what is learned from the experiment. The changed practice is what makes this action-oriented research” (46). Diaz-Maggioli (2004) envisions action research as a cycle of six steps: posing questions, charting the research, gathering data, interpreting data, taking action, and reflecting on the action’s consequences (64). And much like Hutchings and Wutzdorff (1988), West (2011) describes action research as occurring when “knowledge is derived from practice and practice is informed by knowledge in an ongoing (spiraling) process” (91).

Action research can take place in a number of different settings within a school. Spaulding and Falco (2013) describe three levels of action-level research: the first, classroom-level action research, is where individual teachers examine their practice on their own. The second is school-level action research, where an inquiry team examines a gap in student performance and designs a schoolwide effort to address it. And finally, systemwide or districtwide action research involves larger teams that investigate cross-school initiatives. Spaulding and Falco (2013) endorse classroom-level research as a “powerful tool to help teachers recognize weaknesses in their instruction” (16), but encourage “action research as a vehicle for school administrators to foster relationships with staff members and the school community as a result of engaging the school community in the research process itself” (16). When done collaboratively as a PD approach, action research has the potential to reduce teacher isolation and to transform instructional practices at a school (West 2011; Tallerico 2005).

From their own experiences working with teachers conducting action research, Capobianco and Feldman (2006) assert that structures need to be in place whereby teachers are grouped together and follow a regular meeting schedule (e.g., weekly, bimonthly, or monthly). Often this process at a school is called teaming, “and can include teams like school improvement or shared-decision making, curriculum development committees, and study groups” (Tallerico 2005, 40). These teams go by many names in the research and in practice; Diaz-Maggioli (2004) calls these groups “critical development teams” and Stanley (2011) refers to them as “collaborative teacher study groups.” Groups can comprise teachers from the same grade levels, the same content areas, or even from different schools, but regardless of the composition, members have the goal of improving student learning and share responsibility for the group’s inquiry process (and often share facilitation as well). Administrators can support teachers not only by setting up facilitative structures, but also by fostering an environment where teachers feel comfortable examining weaknesses in their own practice. As Reeves (2010) explains, “educators and school leaders must encourage colleagues to conduct research and to accept discomfiting information” (77).

The majority of literature on teacher action research involves narrative descriptions of single-teacher projects, studies of the use of action research in teacher preparation programs, and descriptions of how teachers use action research as a pedagogical approach with their students. Very little addresses action research as a PD approach, and most empirical studies that were found came from international contexts (particularly Europe and Asia). This makes it difficult to assess the effectiveness of action research as an actual PD activity for teachers in the U.S. Two literature reviews on action research found much the same: in a survey of literature published prior to 2000, Zeichner (2003) found that “many of the references in the literature to the value of teacher research are anecdotal in nature and are not the result of systematic and intentional exploration of teachers’ experiences” (303). Over a decade later, Capps, Crawford, and Constand (2012) still found that “no reported study has connected participation in inquiry-based PD with all the desired outcomes of teacher PD: enhanced teacher knowledge, change in beliefs and practice, and enhanced student achievement” (291).

For the present synthesis, three more recent studies (Haug and Sands 2013; Myers and Dillard 2013; and Strambler and McKown 2013) provide some evidence of action research as an effective PD approach, though there are significant methodological issues with the studies. This synthesis also identifies an additional four studies that examined the effectiveness of action research as a PD approach (Feldman and Weiss 2010; Giles, Wilson and Elias 2010; Gallimore et al. 2009; Reeves 2008, 2010).

Most recently, Haug and Sands (2013) conducted a study of a literacy learning lab that involved four intervention teachers and seven control teachers from varied subject areas. All 11 teachers taught high school in two intervention schools and one control school. The yearlong program involved three two-day sessions (one prior to the school year, one during winter break, and one at the end of the school year) and eight lab-based PD days during the school day. Participants collaboratively set action research goals and attended content workshops during the two-day sessions. During the lab-based PD days, teachers spent the morning observing a peer teaching in a laboratory format (with an opening session, prebrief, lab visit, and then debrief) and the afternoon was spent in content workshops followed by reflection activities. Data collection included observations, student surveys regarding class learning, student
artifacts, and participant interviews. Haug and Sands (2013) state that the action research PD’s “impact on teacher behavior, as indicated through classroom observations and student artifacts, was significant” (201). Analysis of classroom observations showed higher levels of incorporating PD-developed approaches (such as providing learning targets to students, linking current instruction to previous instruction, and giving explicit goals for activities that were linked to literacy) among intervention teachers than in a group of nonintervention teachers that were also observed. The classroom learning survey of students also indicated that intervention classrooms had statistically higher levels of student engagement. Despite these findings, the researchers caution that the study did not examine preintervention data or assign teachers randomly to the intervention or control conditions; Haug and Sands (2013) assert that the study findings cannot “claim causality without a more controlled experiment” (206).

In a second recent study, Myers and Dillard (2013) investigated the impact on teachers’ growth in leadership attitudes and perceptions as the result of participating in action research on literacy strategies. (The study did not involve direct assessment of impact on classroom practice or student learning.) The PD program was provided by the California Reading and Literature Project at the Graduate School of Education at California Lutheran University, and was constructed based on Reeves’ (2008) New Framework for Teacher Leadership (discussed later in this section). The study year involved 24 volunteer teachers in four action research seminars and a group symposium at which they presented on their projects. No demographic data on teachers was provided. Online surveys were used to assess teachers’ growth before, during, and after the PD and asked teachers to respond to open-ended questions about what they had gained through participation. Of the respondents, 54% indicated that they had developed a different perspective on action research, with four participants describing working together with colleagues as positive; three teachers linked the action research framework to their practices; and three teachers reported that the action research had an impact on their practices. The limitations of the study are the simple evaluative design, which relies on self-report data from a small sample of participants.

In a more rigorous research design, Stambler and McKown (2013) conducted a group-randomized study of teacher action research with the purpose of promoting academic engagement and achievement for elementary students. In the study, 18 teachers from three suburban elementary schools in Chicago were nominated by their principals and were randomly assigned to an intervention and a comparison group. In the intervention group, teachers studied evidence-based instructional practices for academic engagement and also conducted an action-research project on implementing those practices in their teaching. Comparison-group teachers participated in a self-study group that read about the same practices, but did not engage in the action research project. Both groups participated in eleven 90-minute, twice-monthly teacher PD series, but only the intervention group also completed a mandatory action research project. Data collection methods included teacher surveys (of teaching practices, as well as student engagement) as well as student engagement measures (administered by paper but with an interviewer, who could ask follow-up questions). Findings of the study demonstrated that teachers in the intervention group reported using group-based instruction more frequently than comparison-group teachers. Additionally, the researchers reported that students who had low engagement and low reading scores prior to the PD demonstrated greater gains if their teachers were in the intervention group, as compared to those whose teachers were part of the comparison group.

Feldman and Weiss (2010) report on a two-cycle study of teacher engagement in action research with the goal of integrating digital photography into teaching practice. A total of 28 teachers completed the first cycle of action research, and a subset of five teachers continued with a second cycle of action research. All teachers had previously participated in two five-day summer workshops, which provided instruction on how to use digital cameras and imaging software as well as how to integrate the technology into the classroom. (No further demographic information on the teachers was identified in the study.) For the first cycle, teachers designed and implemented an evaluation plan of the classroom implementation of digital photography. For the second cycle, the group met five times after school during the academic year at the teachers’ schools; teachers also completed their own projects in addition to developing and presenting a technology workshop regarding their practices to their colleagues. Ethnographic methods were used for data collection and included participant observation, taped group conversations, and analysis of documents and teacher products. The researchers found that as compared with teachers in the first cycle, teachers at the end of the second cycle demonstrated increased knowledge about the use of digital imagery technology, changes in beliefs about their roles as teachers, and better reflection of inquiry in their final reports from their second project (as compared to their first project). The researchers identified the action-research group meetings as a key feature in the observed changes between the two cycles. Limitations to this study include a small sample size, lack of a comparison group, and a lack of information on teacher background and characteristics.

Giles, Wilson, and Elias (2010) conducted a case study evaluation of a university-partnership course titled Classroom Research that was offered on-site at Parkland Elementary School in Missouri. The course was attended by teachers who were either volunteers (who wished to take the course for continuing education or graduate credits, or for noncredit) or first-year teachers (called “teaching fellows”) who took the class for credit as part of a yearlong
induction program and a requirement for their MEd. The course involved biweekly meetings throughout the school year (typically before the school day) with a facilitating mentor who was supported by a university faculty member. During the course, information about action research was provided; teachers worked on practical tasks related to their own action-research projects (such as choosing research questions, collecting and coding data, interpreting data, and creating an action plan); and teachers engaged in discussion about their projects. At the time of the study, 16 teachers per year were participating in the course (approximately 38% of the school’s faculty), and some teachers had joined the class multiple times in the past. Data collection involved semistructured interviews in the spring with 11 teaching fellows, 12 teachers who had worked at the school for over five years (including mentors), the principal, and the school-university partnership liaison coordinator (the researchers noted that all participants were female). Qualitative data revealed that a deepening of the professional community had occurred at the school as evidenced by increased collaboration, focus on teaching, and professional dialogue. The researchers generated a rich description of the process by which action research impacted instruction and the school culture: “As teachers found ways to either formalize what they were already doing or learn new ways of problem solving, classroom research became institutionalized within the school” in a “renewable professional growth cycle” where each iteration of the course “nurtured and strengthened the culture of professional development that existed within the school” (99–101). Additional findings of the study pointed to the time-consuming nature of participation and the integral role of principal support for action research.

Gallimore et al. (2009) conducted a five-year, two-phased quasi-experimental study of grade-level teams in fifteen Title I schools, serving 14,000 mostly low-achieving, limited-English-proficiency students. This was the largest of the studies reviewed on action-research PD, and it also was designed to assess the impact of the research teams on student achievement. Nine of the 15 schools involved voluntarily chose to use the grade-level-teams approach, and the remaining six continued business as usual and served as comparison schools. In the intervention schools, principals and teacher leaders used explicit, inquiry-based protocols for leading grade-level learning teams at all levels and subject areas of the school. These inquiry protocols were designed with the goal of increasing student achievement. The first two-year phase of the project did not result in any statistical differences between the intervention and comparison group on the Stanford 9 achievement tests. Thus for the second phase, Gallimore et al. (2009) report that the PD program was ramped up to include a summer (2.5-day) and winter (one-day) institute for teachers, and a two-hour monthly training session for principals. Research staff also attended monthly leadership meetings and met with struggling grade-level teams. Gallimore et al. (2009) found that over the three years of the second phase of the PD and study, the intervention schools significantly outperformed comparison schools on the Stanford 9. Even though they had started out well below the district average before and after the first phase, intervention schools surpassed the comparison schools and the district average by the end of the second phase, while comparison schools made no significant gains relative to district performance throughout the five years of the project. Analysis found that students performed at higher rates when their teachers were in teams that used the inquiry protocol, taught similar content, were led by a peer facilitator, and had stable settings. Qualitative data from focus groups and interviews indicated that teachers who utilized the inquiry protocol attributed improved student performance more to their teaching than to external causes, and credited having enough time to focus on instructional problems and develop solutions as the reason for this shift.

Finally, Reeves (2008, 2010) conducted a study of 81 schools in Clark County, Nevada, each of which involved a team of faculty participating in action research during the 2006–2007 school year. The study, which examined student achievement data and formal observations of professional practices, provided the basis for the author’s New Framework for Teacher Leadership (Reeves 2008). Regarding the impact of action research on student outcomes, Reeves (2010) states: “the results suggested that it not only was widely applied and replicated by teachers but also had a positive effect on student achievement in more than two-thirds of the action research projects in which it was used” (80). Detailed information is not provided on the specific methodologies used to arrive at these findings by teams, but Reeves (2008) suggests that the action-research projects were successful because they involved teachers in collaborative learning, as “the educators in this study reported that they were more likely to be influenced by the professional practices and action research of their peers” (2) than by other PD activities, such as graduate courses and professional reading.

Problem-Based Learning (PBL)

To some degree all inquiry-based PD involves addressing complex problems of practice, as Lassonde and Israel (2010) explain: “Collaborative teacher research is collaborative problem solving” (7). Problem-based learning, or PBL, however, is a distinct form of PD that structures all group activities around “studying, evaluating, and often proposing possible solutions” to complex, real-world problems found in actual practice” (Colby et al. 2003, 135). Pioneered in the 1960s at McMaster University in Ontario, Canada, this pedagogical approach was originally conceived as the basis for that institution’s new medical school curriculum. PBL stood in sharp contrast to the traditional information-dominated, rote-learning pedagogy used in the medical field, and has since been implemented at medical schools around the world. Further, it has been adapted in multiple professional preparation programs, including education,
science, math, and business. (See Wilkerson and Gijselaers 1996 for formulations in multiple settings.)

Wilkerson and Feletti (1989) explain that PBL can be used in small group discussions, collaborative learning groups, inquiry labs, and independent study. Regardless of its exact formulation, the authors claim there are generally three processes involved in PBL: confronting the problem, engaging in independent study, and returning to the problem. In the initial process of confronting the problem, participants must identify its nature and procedures to resolve it, formulate hypotheses, and set the agenda for independent study. As they engage in independent study, participants locate resources, manage information, use technology, ask questions, and develop “active study strategies, including peer discussion, note taking, charting” (Wilkerson and Feletti 1989, 53). The final process, returning to the problem, involves “sharing new learning and tackling continuing questions … examining and prioritizing original hypotheses in light of new learning; selecting and critiquing potential solutions; raising new questions for additional study; and summarizing, organizing, and synthesizing what is known” (53).

Learning in this approach is not only active, but also learner-centered in that participants “must take responsibility for their own learning, identifying what they need to know to better understand and manage the problem on which they are working, and determining where they will get that information” (Barrows 1996, 5).

Regarding the literature on PBL, Walton (2014) states there is “little research, however, on PBL and student outcomes in K–12 settings” (69) and a “corresponding paucity of research on professional development programs in this area” (71). This synthesis found that the majority of PD programs that utilize PBL do so with the purpose of teaching participants how to use PBL with their own students. In other words, PBL is viewed as a specific classroom instructional approach that teachers can learn and practice through PD sessions. The premise behind this design is that a teacher must first become an “effective PBL practitioner … [who] acts primarily as a model learner” (Walton 2014, 70). In keeping with this goal, much of the evaluation of PBL as a PD method examines the degree of fidelity with which teachers ultimately implement PBL in their own classrooms with their students.

For the present synthesis, a total of five studies were identified for review, three of which involved an examination of how teachers implement PBL in their classrooms as a result of PD for that purpose (Cooke and Weaver 2015; Walker et al. 2012; Kanter and Konstantopoulous 2010). Two studies, which are presented at the end of this section, examine PBL solely as a PD method and not as an instructional practice which teachers hone through PD (McConnell, Parker, and Eberhardt 2013; Foutz et al. 2011).

In the most recent study identified, Cook and Weaver (2015) conducted a qualitative case study of the NSF-funded Research Goes to School program. The program targeted STEM subjects and involved seven participants—who mostly taught high school biology in a rural area—in a 2012 summer workshop and then implementation of PBL in their classrooms during the following year. As discussed, this study was one of the more common approaches that examined how teachers implement PBL in their classrooms as a result of PBL-based PD. During the summer institute, teachers collaborated in small groups to develop PBL units addressing state standards in science. During the school year, follow-up activities included webinars, virtual field trips, an online group hub for exchange of information, reference books, and stipends for materials needed in order to implement PBL units. Data collection involved recorded observations, which were rated using a rubric to gauge fidelity to PBL, as well as semi-structured interviews. Three participants were chosen for the case study analysis, after which a cross-case summary was generated for all the participants. Cook and Weaver (2015) report observational data showing that teachers did implement the PBL units they developed at the summer institute, but they did so “with partial fidelity of implementation to the instructional features of PBL identified for this study … most of the PBL features were implemented in a less than optimal manner where elements of best practice were present but not consistently implemented” (31). Data from the interviews indicated that the participants were aware of this lack of full fidelity and the specific features of PBL that they did not fully implement. The researchers suggest that possible reasons for this include not enough practice modeling in the workshop, not enough time spent focusing on science content (as opposed to PBL approaches), and a need for face-to-face (vs. online) collaboration during the school year. They conclude that the PD had positive though limited impact on teachers’ instructional practices, and that future PD should enhance teachers’ science content knowledge in addition to PBL strategies.

In a similarly focused study, Walker et al. (2012) conducted a quasi-experimental investigation comparing the impact of two PD designs for junior high school science and mathematics teachers, to assist them in designing online PBL activities for instruction. The first design, or “tech only,” focused on the technology skills teachers need (e.g., identifying resources and utilizing online resources in classroom settings), while the second design, or “tech + PBL,” added to this focus instruction in designing PBL activities. Both designs consisted of a series of three face-to-face workshops, with classroom implementation and activities between each, sustained over three months. Participants were 36 volunteer mathematics and science teachers (in grades 7–9), from 15 junior high schools in one large suburban school district in the western United States. Teachers were assigned to one of the two designs based on scheduling preference, but blind to the condition. Data collection sources included a teacher presurvey and postsurvey of self-reported knowledge, web usage data, assessment of PBL alignment of projects, and a student questionnaire. In terms of changes in teacher knowledge, both designs showed large pre/post gains for teacher knowledge relevant to technology, but unsurprisingly, teachers in the tech +
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PBL condition also had larger gains in self-reported knowledge of PBL (as well as significantly larger gains in PBL alignment scores). For student outcomes, students of tech + PBL teachers showed statistically significant gains in scores for all three targeted student outcomes (behavior, knowledge, and attitudes) but students of tech-only teachers only showed gains in one outcome (attitudes).

In a third study of PD for PBL implementation in the classroom, Kanter and Konstantopoulous (2010) conducted an evaluation of a for-credit, graduate-level course which met for three hours each week for ten weeks, at the same time that teachers were teaching a problem-based science curriculum (“I, Bio”) in their schools. The researchers explain that they used “practice-based approaches to professional development … to support teachers in applying what they are learning to their own practice, to resolving problems they are experiencing in their own classrooms. In short, we are situating professional development in the real practices of teaching” (859).

Nine sixth-through-eighth-grade urban science teachers participated in the course, all of whom taught in eight public schools in a large, urban school district in the Midwest. Most of the participants’ students were underrepresented minority students as well as students of low socioeconomic status. For preparation for each class, teachers reviewed their classroom lessons, completed readings relative to the content, reviewed video clips of “puzzling student concepts” (861) about the science content, and then discussed the clips to ascertain students’ levels of understanding. During the weekly class, participants engaged in discussion, content lectures, laboratories, peer critique, and modeling of learning. Teachers would then record data from their own classroom by notes or video and provide an analysis. Data collection included a pretest and posttest content assessment of teacher knowledge, as well as qualitative review of teachers’ analyses. In terms of student outcomes, 197 minority students of the participating teachers took normed pretests and posttests to measure student achievement, along with presurveys and postsurveys measuring their attitudes toward science and their educational and occupational plans.

Kanter and Konstantopoulous (2010) report that findings relative to teacher knowledge indicated statistically significant gains during the course, and their students’ achievement gains were 5.5 times the statistically anticipated increase for students on national normed science tests. The researchers found, however, that about 60% of the variance in student achievement was not accounted for by the variables of teachers’ science content knowledge or pedagogical content knowledge, which means that other variables in teachers’ instructional practices needed to be examined. Finally, there was an inverse relationship between teachers’ content and pedagogical knowledge and students’ science attitudes and plans to pursue science careers, whereas other practice-related variables (such as having students conduct experiments, analyze data, and explain concepts to each other) was positively correlated with these student outcomes. The researchers report their study’s limitations as not including a control group or classroom observations.

In the most recent of two studies that utilized PBL strictly as a PD approach—and not as a classroom practice that teachers learned to use with their students—McConnell, Parker and Eberhardt (2013) examined the outcomes of a program for secondary teachers in science. Participants were 41 secondary teachers (27 middle school and 14 high school) from across Michigan, in a representative sample of geographic regions and school type (including public, private, and charter schools). The PD experience included a two-week summer intensive plus a full academic year of ongoing collaboration (and monthly meetings). During the summer intensive, teachers engaged in a three-day PBL session to deepen their own content knowledge, in which they identified content areas on which to focus and worked in facilitated small groups to solve complex and ill-structured problems. Teachers’ content knowledge was the key outcome studied, via participants’ preintervention and postintervention written responses to a general science question and an application question. Analysis of teachers’ responses indicated that 80.5% of the participants (85.1% of middle school teachers, and 71.4% of high school teachers) showed improved science content knowledge from pretest to posttest (when variations in incoming content knowledge were controlled). While gains in teacher knowledge were found, the study did not assess changes in teacher practice as a result of participation.

Finally, in a second study of PBL as a PD method, Foutz et al. (2011) evaluated a five-day workshop held annually in June for Jackson County School District (GA) teachers in mathematics and science (grades 6–12), facilitated by faculty from the University of Georgia. The authors report themes from five years of workshops, in addition to specific findings for the 33 participants in the 2008 workshop. Workshop participants used PBL methods to address a complex, community-relevant problem and develop solutions and models using mathematics and science principles (e.g., operating a farm subdivision, in the case of the 2008 workshop). The goal of the workshops was to improve mathematics and science teaching. Data sources included qualitative responses from workshop participants on the effectiveness of the PD, criterion-reference tests administered to teachers before and after the workshop, and students’ scores on standardized mathematics and science achievement tests. In terms of teacher knowledge increases, average scores in 2008 and in 2007 improved by almost a third from pretest to posttest. The researchers reported that students’ mathematics and science achievement significantly increased from being below the state average in 2002 to above the state average in 2008, though causality cannot be established through this study nor the degree to which teacher involvement in PD contributed to these gains.
Lesson Study

Lesson study is a specialized form of inquiry-based PD that originated in Japan, where it is commonly practiced in education. According to Lewis, Perry, and Murata (2006), lesson study was introduced in the U.S. in 1999, and within four years had been instituted in over 335 schools across 32 states. The authors explain the origin and key features of the practice:

Lesson study is a translation of the Japanese words jugyou (instruction, lessons, or lesson) and kenkyuu (research or study). The term jugyou kenkyuu encompasses a large family of instructional improvement strategies, the shared feature of which is observation of live classroom lessons by a group of teachers who collect data on teaching and learning and collaboratively analyze it. (3, emphases in original)

While other types of inquiry-based PD programs may incorporate activities found in lesson study—such as teachers observing their peers, or working together in teams to examine student data—lesson study is a distinct practice that typically requires participants to be trained in the approach.

Because lesson study is a relatively new form of PD in the U.S., Lewis et al. (2006) assert that educators “have praised lesson study’s potential for improving instruction but questioned whether it might become one more short-lived fad” (273). Hill (2009) suggests that even in the many schools in which lesson study is being tried, it is often one of many PD activities offered to teachers, as opposed to an intensive and ongoing process for improving learning and teaching as it is in Japan. Perhaps for these reasons, the literature on lesson study is limited and primarily involves descriptive research on how it is conducted in Japan, rather than evaluative studies of implementation in the U.S. This is problematic for determining whether lesson study is an effective form of PD for U.S. teachers, particularly because “early evidence suggests that U.S. lesson study practitioners may alter key features of Japanese lesson study” including focusing on teacher activities versus student learning, making anecdotal as opposed to thorough observations, and engaging in debate rather than reflection (Lewis, Perry, and Murata 2006, 4). Hill (2009) likewise reports the results of a survey in which 51% of middle school math teachers reported engaging in lesson study during the preceding year, but the majority did not do so at the same intensity as the original practice demands; 60% of those who participated spent eight or fewer hours during the year in lesson study, and only 4% reported engaging in over 80 hours throughout the year.

For the present synthesis, two studies conducted by the same researchers provide evidence of the benefits of lesson study on teachers’ and students’ mathematical knowledge. In the most recent, Lewis and Perry (2013) investigated the impact of lesson study on mathematics instruction on fractions with 39 groups of educators, of which 87% were elementary teachers and the remaining 13% were administrators, coaches, and middle school teachers. Forty-one percent of participants were new to lesson study. After baseline assessments of fraction knowledge were administered, groups were randomly assigned to three different PD conditions: first, experimental groups that received mathematical and lesson study resources and written instructions; second, control groups that engaged in PD on self-study topics with lesson study; and third, control groups that participated in another local form of PD, not involving lesson study. A total of 73 teachers in 13 groups participated in the experimental condition, where they conducted lesson study independently over an average of 91 days. A total of 140 teachers participated in the control groups. Data collection included video recordings of lesson study meetings and research lessons, along with artifacts (e.g., lesson plans, student work) and written reflections. Participants again took the fractions assessment after the lesson study cycle. Study findings indicated that both experimental-group and control-group teachers showed significant reductions in fractions errors from pretest to posttest, but that greater reductions were evident in the experimental group. Qualitative data suggested that these gains were mediated by experiences like group discussion, analysis of student work, reviewing curricular materials, and planning, observing, and reflecting on lessons.

A second and older study, also by Perry and Lewis (2011), had a focus similar to their 2013 study but involved 213 teachers and their 1,059 students from 27 U.S. school districts. Participants in the 2011 study were assigned to one of three research conditions: (1) lesson study with a resource kit on fractions and lesson study; (2) lesson study only (without the kit, and focused on a topic other than fractions); and (3) local PD as usual. In the experimental condition, teachers met 12 to 14 times over five months during the school year to observe and analyze lessons that they had designed collaboratively. Teachers took turns leading the group by following the lesson study cycle outlined in the kit provided. Instructors and consultants were available to answer these teacher leaders’ questions as they led their groups. Data collection was designed to examine the impact on teachers’ and students’ knowledge of fractions, as well as teachers’ attitude toward PD. A 33-item scale of items drawn from established assessments was developed for teachers, and three different student assessment forms were developed for students in grades two and three, grade four, and grade five. Teachers in the experimental group reported positive impacts in the areas of collegial learning effectiveness, expectations for student achievement, and perceived relevance of research for practice. Additionally, both lesson study groups rated their PD experiences significantly higher on a number of impact indicators (e.g., intellectual rigor and application to the classroom) than did teachers in the PD-as-usual group. In terms of knowledge outcomes for teachers, after controlling for teacher differences (such as pretest fraction knowledge), a statistically significant positive effect was found for the experimental group on fractions knowledge. For
students, statistically significant increases in fraction knowledge were found for grades two, three, and five, but not for grade four. While both of these studies point to positive gains for the experimental groups, it is important to note that these groups were the only ones that received content-related materials on fractions. Comparison groups in both studies did not receive these materials. Assessment, however, was specifically aimed at teachers’ and students’ content gains in these areas. It is difficult, therefore, to isolate the effects of lesson study versus the effects of receiving content materials on changes in teacher knowledge and student achievement.

**Video-Based Inquiry**

A final type of inquiry-based PD involves the use of videos and analysis of teacher practice. In this approach, teachers typically videotape themselves teaching, and then engage in collaborative reflection and discussion on the taped sessions with the goal of improving instruction. Video analysis of practice is sometimes used as an ancillary activity in other PD approaches (cf. Gregory et al. 2014 and Allen et al. 2011 for incorporation in coaching; Polly et al. 2014 and Rushton, Lotter, and Singer 2011 for use in intensive institutes). This section of the synthesis examines video-based inquiry in three studies where it featured as the primary or sole PD activity.

Most recently, Roth et al. (2011) report on a yearlong PD program that used video-based analysis of instruction to improve teacher and student learning at the upper elementary level in Los Angeles. A quasiexperimental design involved 48 teachers in fourth, fifth, and sixth grades and their 1,490 students (who were divided into two cohorts: 725 students in cohort one, who were taught before the PD, and 765 students in cohort two, who were taught after teachers participated in the program). All participants were volunteers who had previously attended a three-week summer institute, where they received the same 44 hours of science content instruction addressing California science content standards from university scientists. Teachers then self-selected into an experimental (n = 32) or control (n = 16) group. Those in the experimental group spent an additional 58 hours meeting in small groups throughout the year, facilitated by a PD program leader, and examining video cases from outside their study groups, and then eventually from their own classrooms. Data collection included a teacher content knowledge test, video-based lesson analysis task, and videotaped science lessons (at beginning of program before the summer session, and again at the end of the yearlong program). A student science content knowledge test was also used to gauge student achievement (however, student learning was only examined in classrooms of those teachers participating in the PD).

From this study, Roth et al. (2011) found statistically significant gains in teachers’ content knowledge and ability to analyze science teaching, with significantly higher means for the experimental group at the midtest and posttest points. Changes in teacher practice—as measured by increased usage of the science teaching strategies aligned with the summer PD—were also observed for the experimental group. And in terms of gains in students’ content knowledge, the average science learning of students taught by the experimental group teachers was higher (by more than twice) after participation in the program than for students taught by the teachers before they participated. These gains were statistically linked to teachers’ increased science content knowledge, lesson analysis ability, and teaching practices in line with the PD.

Grant and Kline (2010) conducted an impact study involving 189 elementary teachers in six school districts who participated in PD based on video analysis. The goal of the program was to promote teachers' reflection on their decision making as they planned and implemented mathematics lessons with a new curriculum. During group PD sessions, teachers watched and analyzed video recordings of their own lessons and then completed post-session questionnaires regarding the experience. The researchers then interviewed and observed a subset of teachers after the PD. Data analysis indicated teacher self-reported gains in their abilities to question their students and probe students’ thinking, as well as their motivation to improve their teaching. Classroom observations provided evidence that teachers were altering their practice and trying approaches discussed in the PD sessions.

Finally, van Es and Sherin (2009) investigated the impact of a yearlong video club facilitated by a university partnership with an urban school. Participants were 7 fourth and fifth grade teachers, 5 of whom were classroom teachers, and 2 who were special education co-teachers. The focus of the PD was developing student mathematical thinking, and teachers met once or twice a month throughout the year for an hour, for a total of ten meetings. During the PD, two video segments (of about seven minutes each) from two teachers’ lessons were viewed and discussed. The segments were preselected for inclusion and were also transcribed. Data sources for the study included coded tapings of the video club meetings, teacher interviews, and classroom observations. Study findings indicated that as the year progressed, teachers paid increased attention to student mathematical thinking during the PD sessions. Additionally, teachers self-reported increased learning regarding student mathematical thinking. Observational data showed that instructional practices were also impacted, as by the end of the year teachers demonstrated instructional practices more aligned with those that were promoted in the PD.

**Inquiry in PD Practice**

When taken together, the literature on action research, problem-based learning, lesson study, and video-based PD suggests that inquiry-based PD is an effective way to engage teachers in collaborative efforts to improve their practice. While the majority of studies on these practices are small-scale and unique to a specific setting, positive changes in teacher practice, content knowledge, and student outcomes were reported across studies. Some of the drawbacks of this approach as noted in the research are that it is time-consuming...
and requires supportive scheduling structures. Further, some of these approaches—notably, problem-based learning and lesson study—require a knowledge base in which teachers must receive specific training, typically from an outside expert. This can be costly, and may not be successful if follow-up support is not provided while educators work to implement the model on an ongoing basis. Despite these challenges, inquiry-based PD provides teachers with opportunities to collaborate, reflect, and problem-solve as they work to address real-world issues in their own teaching.

### Online Formats

The last decade has witnessed extensive migration of PD to online or technology-mediated formats. Online PD has several advantages for schools as well as individual educators. This approach can “bridge distance and time” by allowing teachers from different schools to benefit from PD without extensive travel and often on their own schedule, and also can “provide a new means to interact with experts and colleagues; enable educators to experience for themselves new forms of teaching and learning; and make participation in coaching, mentoring, and professional learning communities more accessible” (Russell et al. 2009, 443–444). Marzano, Frontier, and Livingston (2011) note the rise in particular of virtual professional learning communities (VPLCs) in recent years:

> With the recent explosion of Web technologies, schools have slowly begun to move from professional learning communities located within schools to global virtual communities encompassing diverse groups of teachers… Technology can create powerful opportunities to organize teachers within schools, across the district or state, or nationally or globally to supplement and expand face-to-face professional learning communities. (78)

Like PLCs, VPLCs can take many formats, including bulletin board discussion groups, wikis, and blogs. VPLCs can also utilize electronic platforms like course management or videoconferencing software (McConnell et al. 2013).

Despite the popularity of online PD formats, the research base has yet to catch up with their increase in practice. Lawless and Pellegrino (2007) remark that most published work on this PD method involves “descriptive pieces detailing individual programs and lessons learned from implementations or studies …The paucity of empirical research … is astonishing” (584). Russell et al. (2009) echo this finding in the literature and assert that “most existing recommendations lack a base in solid experimental research” (446).

One possible and obvious reason for this lack of research is the relative newness of online approaches, but a second potential reason is the remarkable diversity in online formats. Fishman et al. (2013) describe the state of online PD approaches and the ramifications for related research:

> “Online PD” is not monolithic … The term describes a vast range of designs, from single-session workshops … to extended experiences spanning weeks or years. It can describe PD that is completely online or “hybrid” environments that blend face-to-face and online elements … It makes little sense to ask questions about whether [OPD] is more or less effective than any other PD modality. (429)

Keeping this in mind, the present synthesis identified two different threads of research on online formats: first, studies that examined a single PD program, but compared the effects of the program when delivered online vs. face-to-face; and second, studies that examined specific online PD practices by themselves (with no face-to-face corollary). The findings of studies in the second category, while informative, make it difficult to parse out whether any benefits observed were due to participation in the specific online format, or just the type of PD itself (for example, whether gains in teacher knowledge can be attributed to a content-based workshop in general, or what added benefit—if any—is provided by the online format). To this end, four studies of comparative research on online versus face-to-face versions of PD programs are reviewed in this section (Malanson et al. 2014; McConnell et al. 2013; Fishman et al. 2013; Fisher et al. 2010). These are followed by studies of exclusively online practices, including five of synchronous workshops and courses (O’Dwyer et al. 2010; Dash et al. 2012; Masters et al. 2012; Marrero et al. 2010; Russell et al. 2009); one study of asynchronous webinars (Shana and Ellsworth 2013); and three studies related to PD for teachers’ use of instructional technology (Skoretz and Childress 2013; Walker et al. 2011; Lawless and Pellegrino 2007).

#### Comparative Research

Malanson et al. (2014) conducted a very small-scale study to determine whether an online mentoring program coupled with a science course had the same impact on teacher knowledge and self-efficacy as the same program (course plus mentoring) provided in-person, by the same mentor. Three teachers participated in the online format, and one in the in-person format, with a total of 175 students between them all. The program was called “Modeling for Fidelity” (MFF) and involved mentoring between teachers and biomedical scientists in conjunction with a six-week curriculum in neurological disorders and extensive online educative materials. Results of the study show not only high satisfaction with the online program, but also large and significant changes in knowledge and self-efficacy regarding neurological disorders for both online and in-person mentoring. Additionally, student performance was equivalent for teachers in both groups. Malanson et al. (2014) explain, “The results show that teachers’ abilities to implement the critical instructional components of the module, as reflected by the significant gains in student achievement on all matrices, occurred regardless of the form of PD the teachers had experienced” (4). The major limitation of this study is its small sample size, but the studies described below find much the same results with larger sample sizes and more rigorous methodologies.

McConnell et al. (2013) investigated the impact of a virtual PLC (VPLC) as part of an NSF-funded project for middle and high
school teachers to learn about the implementation of inquiry-based science lessons. One cohort of 54 teachers from across central Michigan participated in the study, and teachers were grouped to form 11 VPLCs. All participants attended a seven-day conference and an additional three-day practice session. After that, nine of the groups met face-to-face on a monthly basis, while two of the groups met via an online group videoconference (n = 5 teachers for each group). At these meetings, with the help of a facilitator, one teacher shared evidence from the classroom and led a discussion to analyze practice and reflect on ways to improve teaching. Sources of data included recordings of the videoconferences, focus group interviews with participants from both groups, and reflections from the two online groups. As all data collected for the study was qualitative in nature, the researchers provided a description and illustrative quotes of the study findings. Both groups (online and in-person) described the PLCs as promoting collaborative inquiry, collegial relationships, and accountability to the group. While teacher reflections revealed a preference for face-to-face meetings, “the virtual and face-to-face meetings provided teachers with similar social interactions in the PLC experience. The findings suggest that teachers perceive videoconferencing as an effective tool for facilitating PLCs when distance and time are practical barriers to face-to-face meetings” (McConnell et al. 2013, 267).

Fishman et al. (2013) conducted a randomized experiment to examine differences in teacher and student learning from online PD in science (comprising an initial 16-hour orientation session, and an additional 20 hours over time) versus face-to-face (comprising 48 hours of summer PD). Both formats utilized a common set of curriculum materials as content for the training. In creating the PD designs, the researchers explain, “In short, we ask which PD modality is most effective when comparing between online and face-to-face, all other things being equal” (426). Using a sample of 49 secondary teachers across the U.S. in 45 schools from different regions of the country, the researchers assigned 24 teachers to the face-to-face PD condition and 25 to the online format. Participants in the face-to-face format taught a total of 522 students and those in online PD taught 610 cumulatively. Using a survey and a science content test, the study found no statistically significant differences between the two groups in terms of gains in teacher knowledge and beliefs. In terms of student learning outcomes, as measured by a test of content knowledge in science (pretest and posttest), students in both conditions improved; students of teachers in the online PD had higher gains on average, though again the difference in means between the two conditions was not statistically significant. The authors conclude that teacher and student gains for both PD formats were similar and that “there was no significant difference between conditions” (426).

Finally, Fisher et al. (2010) conducted two studies involving a randomized controlled trial of a multimedia software program in a computer lab in the Midwest. The first study involved 59 certified high school teachers in a graduate-level course on increasing access for students with disabilities to general education curriculum, with 30 participants in the experimental group and 29 in the control group. Those in the experimental group participated in a virtual workshop using a multimedia software program in a computer lab in a high school, while the in-person workshop was held in a classroom. Both groups learned about the same instructional practice using the same content, and had the same coaching and opportunities to practice. The researchers administered a pretest and posttest of teacher knowledge to measure recall and understanding of PD content, along with a concept diagram test (to apply knowledge learned) and a teacher satisfaction questionnaire. They found that teacher knowledge about the instructional practice significantly improved after both workshops, but no significant difference was found between the groups. Both groups also reported equal levels of satisfaction with the PD. A second study reported by Fisher et al. (2010) involved the same PD programs, but examined changes in teacher practice as well as student achievement. To this end, the researchers selected eight volunteer teachers—four in the online format, and four in the face-to-face format—and conducted classroom observations, as well as administered a concept acquisition test and satisfaction survey to students. (A total of 76 students were taught by participants in the online PD group, and 49 students were taught by teachers who were in the face-to-face PD.) Findings of this smaller but more in-depth study found that both groups of teachers showed significant gains in performing the instructional routine. Further, student performance on tests of concept knowledge in both groups also improved significantly; likewise, students from both groups expressed satisfaction with the instruction.

All four of the comparative studies identified for this synthesis suggest that no significant differences were identified between online and in-person formats of the same PD program. Gains in teacher and student knowledge were statistically equivalent for both formats. This lends support to the idea that online PD can be viewed more as a “delivery format” (Fishman et al. 2013, 436), than as a specific approach. In other words, a PD program is likely to have the same effects whether conducted online or face-to-face, and the effectiveness of the PD is likely more attributable to the PD design itself versus the delivery approach.

Synchronous Courses and Workshops

Five studies identified for this synthesis involved evaluations of synchronous courses and workshops, without comparison to an equivalent face-to-face program. Three of these studies involved a set of randomized controlled trials with teachers from multiple states to evaluate changes in teachers’ knowledge and instructional practices, as well as students’ knowledge and practices, as a result of participation in online professional development (OPD) (Dash et al. 2012; Masters et al. 2012; O’Dwyer et al. 2010). Each of the four
In the final study under consideration, Russell et al. (2009) assigned data collection method, as well as the lack of a comparison group. The researchers identified the ability to interact and collaborate with other educators, as well as pretests and posttests of student knowledge. The researchers found that across the four trials, larger changes in teacher content knowledge and instructional practices were observed for the treatment group, with most effects being medium or large. Each of the four trials also provided evidence of impact on student learning, though smaller and less consistent across the subdomains measured. Dash et al. (2012) noted that for one of the trials, "the positive changes in teacher outcomes did not translate to any meaningful differences in students' mathematics achievement" (1), and Masters et al. (2012) observe where significant treatment effects were found for some of the student outcomes, the effect sizes were small.

In a fourth but separate study, Marrero et al. (2010) conducted a mixed-methods case study of seven synchronous online short-courses by U.S. Satellite Laboratory, Inc., with funding from NASA. Each course comprised four to six one-hour sessions, with independent assignments between sessions providing follow-up. The format for the courses was simultaneous log-in to an online classroom and dialing in to a conference call. The sample consisted of 248 program participants, who taught science mostly in fourth and ninth grades. Of that number, 59 teachers responded to the research questionnaire, which primarily assessed teachers’ opinions of their experiences in the courses and whether they applied their learning in their own teaching. About 10% of the participants took the courses for graduate credit, in which case their reflective essays submitted for the courses were also analyzed by the researchers. Of the questionnaire respondents, 79.6% reported that they were using what they learned from the short courses (e.g., content, activities, and strategies) during the current school year, while 96.6% of respondents reported that they anticipated using their learning during the current school year. From both the essays and the questionnaire responses (at 54% of respondents), teachers identified the ability to interact and collaborate with other educators as a positive feature of the PD. The main limitations of this study include the use of self-report data in a posttest design as the only data collection method, as well as the lack of a comparison group.

In the final study under consideration, Russell et al. (2009) assigned 231 middle school algebra teachers to four experimental conditions surrounding an eight-week online workshop. The first group was highly supported (with a math education instructor, online facilitators, and asynchronous peer interactions); the second group was self-paced (no supports available); and two additional conditions were provided with intermediate levels of support. Each group utilized the same learning materials and activities. Groups ranged from 57 to 59 teachers, which were then split into two cohorts of two equal sections of each course. Data collection utilized teacher surveys, content knowledge assessment of teachers, student surveys (of teacher instructional practice), teacher logs, and course evaluations by teachers of the PD experience. The outcomes were comparable across all four conditions, and included: positive effects on teacher instructional practices and pedagogical beliefs; changes in teacher practices and learning activities as reported by students; and increases in mathematical knowledge scores of teachers. Russell et al. (2009) state, “The similarity of effects across the four versions is surprising given the emphasis in the literature on the importance of interactions among participants in online courses” (462). Limitations of the study included a high attrition rate (with 46% of participants not completing the course and/or data collection instruments), so it is likely that data collected was from the most motivated participants and therefore was not representative of the entire sample.

Across these five studies, researchers found evidence that participation in synchronous courses and workshops was correlated with gains in teachers’ content knowledge and classroom practices. Data for student achievement was either not collected, or showed small and inconsistent effects. Thus, while these formats appear to be promising in terms of teacher outcomes, little is known regarding the impact on student outcomes.

Asynchronous Webinars

Shana and Ellsworth (2013) conducted a study of 734 schools in 39 states, which were randomly selected from schools using a structured, online application that provided on-demand viewing of commercially available PD. Only schools that had a minimum of 90 minutes per teacher of PD viewing were included in the sample. The study design utilized a quasi-experimental approach, by contrasting pre-PD (year one) student performance with post-PD (year two) student performance. Usage data was provided automatically from the online application. Public web sources were utilized (with verification calls to district personnel) to gather data on student performance, teacher retention, dropout rates, student discipline, and number of college-bound students.

When year-over-year improvement was calculated, Shana and Ellsworth (2013) identified statistically significant relationships between higher utilization of the on-demand PD in these measures of school success. While schools with both higher and lower levels of engagement saw gains, 14 out of 22 metrics were statistically significant for higher means for schools with higher utilization. Higher rates were also observed on the remaining eight metrics,
but the correlation was not statistically significant. Though the researchers conclude that there is “significant predictive strength between the quantity and quality of educator utilization, participation, and engagement [in the webinar-based PD] for better student results and school-related outcomes” (24), findings from this study are correlational, and the impact of other variables on outcomes (e.g., school and student differences) is not known.

**PD for Instructional Technology**

Integrating technology into classroom instruction has become an important focus of PD for teachers. Reflecting this trend, two-thirds of public school teachers were found to have participated in PD on instructional technology in the 2007–2008 school year (U.S. Department of Education 2008). Many of these PD programs incorporate technology into program design; in other words, teachers who are learning how to incorporate technology in their classrooms often participate in technology-mediated PD towards that end. Regarding the effectiveness of these kinds of PD programs, this synthesis identified two studies (Skoretz and Childress 2013; Walker et al. 2011) and one literature review (Lawless and Pellegrino 2007) that investigated the effectiveness of this PD approach on teacher usage of technology in their classrooms.

Most recently, Skoretz and Childress (2013) evaluated an online, wiki-based PD program for elementary and middle school teachers for technology integration. The study evaluated whether the PD experience had an impact on teachers’ sense of self-efficacy as well as their actual practice of technology integration in the classroom. The study involved 65 teachers in four elementary and four middle schools in West Virginia, with 37 teachers in the experimental group (who received a year of the PD intervention) and 28 teachers in comparison group (who had not yet participated in the PD intervention). After five days of on-site PD featuring modeling and hands-on practice with technology, the PD continued throughout the school year by using a wiki as an online journal and discussion platform. Wiki postings included PBL lesson descriptions, biweekly reflections on effectiveness, and feedback by other participants and a mentor (who also met monthly with participants to provide support). A technology integration survey was used to measure teacher self-efficacy for technology integration between the intervention and the comparison group, and bi-weekly journal postings were analyzed to determine changes in levels of technology integration in the classroom. Higher degrees of self-efficacy were found for the intervention group, with statistically significant effect sizes ranging from moderate to large. However, no statistically significant differences were identified for actual technology integration in classroom practice.

Walker et al. (2011), in a study of a two-year PD program based in problem-based learning (PBL), compared the learning of teachers from two different groups: those who received training on the technology of utilizing a web-based tool for creating instructional activities at the same time as PD on PBL; and those who received the technology training and the PBL separately (with tech first, and then PBL). Twenty-three teachers participated in the first group (concurrent technology and PD on PBL), while 19 participated in the second group (technology PD, followed by PD on PBL). All teachers were from the same rural district. The researchers analyzed web tool usage data, teacher pre-PD and post-PD surveys, ratings of PBL activities designed with the web tool, and reflection papers for both groups. Walker et al. (2011) report, “Quantitative results from the study indicated that participants in both enactments showed large gains in terms of their knowledge, experience, and confidence after participating in their respective professional development enactments, with results from the second enactment, tech-prior PBL, showing larger effect sizes” (88). Thus, the more effective form of PD provided technology training to teachers separately and first, and then followed up with content-related PD. The authors also found that students of those teachers who received tech training prior to PBL also visited their projects more often. These differences may be due to the fact that teachers who participated in the second group (technology PD, followed by PD on PBL) had an opportunity in each program to create a PBL project (for a total of two projects), whereas the other group had just one such opportunity. One of the limitations of the study was its reliance on teacher self-report data and journals, without direct observation of teaching practice.

Finally, Lawless and Pellegrino (2007) conducted a literature review on PD for integrating technology in instruction. In their analysis of 21 studies published between 2000 and 2005, the authors found that teachers generally expressed satisfaction with the experiences as well as increased comfort and confidence with using technology as a result of participation. Nine of the 21 studies identified gains in teachers’ technology skills; however these studies all utilized teacher-self report data only and did not measure actual impact in practice. Only two studies collected any student outcome data, but Lawless and Pellegrino (2007) found that the results either weren’t reported or that they solely examined artifacts (classroom projects). The studies thus provided “little insight into how technology is affecting our classrooms” or how student technology use “has improved as a result of the professional development opportunities” (598).

The results of these studies suggest that PD specifically designed to develop teachers’ abilities to utilize technology in instruction contributed to teachers’ self-reported gains in knowledge, experience, confidence, and self-efficacy. Findings regarding actual change in teacher practice as a result of the PD were mixed, and still relied on self-report data as opposed to direct observation of practice. Finally, data on student achievement was not provided by these studies. Thus, further study is needed regarding best practices in technology-mediated PD aimed at training teachers in the use of instructional technology.
V. School Leadership

As this synthesis examined best practices for PD for teachers in Chapters III and IV, the present chapter evaluates what is known about effective PD for school leaders. In a discussion of how school leaders can promote adult learning in their schools, Drago-Severson (2009) describes the challenging educational context in which school leaders work and asks the central question that guides this chapter:

In today's global society, both the implicit and explicit expectations of what leaders are supposed to accomplish, within and across education, have changed. Many acknowledge how complex the work of teaching and leadership in the school has become and how expectations are changing constantly. Educators are expected to lead in ways in which they were never taught to lead and they themselves have never experienced. How can we help each other to develop the capacities needed to lead through the complex demands of teaching and learning? (11)

In order to stay current with new demands as well as routine responsibilities, school leaders—like teachers—are in need of additional learning opportunities throughout their careers. PD opportunities for school leaders can provide an important means of accomplishing this.

However, as Spanneut, Tobin, and Ayers (2011) assert, “Compared to the literature and research about the professional development of teachers, less information existed about school leaders’ professional development” (3). This holds true for each of the four different types of school leaders—heads of school, principals, teacher leaders, and school boards—discussed in this chapter. Most of the literature on PD for school leadership is found in handbooks, guides, and opinion pieces that are based on years of educators’ experience and practice, but that nonetheless is not based in systematic research. As opposed to teacher PD, which has a well-developed theoretical base, expansive body of research, and recommendations for practice, PD for school leadership in essence has only the latter.

This lack of research on effective PD for school leaders is curious, as there is substantial evidence that school leaders have an important impact on the quality of education (including student outcomes and teachers’ experiences). For example, Marzano, Waters, and McNulty (2005), in their meta-analysis of 69 studies, identified a significant, positive correlation of .25 between the leadership behavior of the school principal and the average academic achievement of students, meaning that one standard deviation increase in a principal’s leadership ability would be accompanied by a ten percentile increase in student achievement. In a second study, using the same methodology, Waters and Marzano (2006) analyzed 27 studies and found a significant, positive correlation of .24 between superintendent leadership and student learning. And in their extensive review of the literature on school leadership and student achievement, Leithwood et al. (2004) report that the “total (direct and indirect) effects of leadership on student learning account for about a quarter of total school effects” (5), and are second only to classroom instruction in terms of impact on student learning.

The literature also offers insight into why and how school leaders have such a substantial impact on student outcomes. Whalstrom et al. (2010), in a five-year, mixed-method study of 180 schools in 43 school districts across nine states, found the relationship between leadership and student achievement to be significant but indirect: “Leadership effects on student learning occur largely because leadership strengthens professional community; teachers’ engagement in professional community, in turn, fosters the use of instructional practices that are associated with student achievement” (10). Thus, as school leaders promote professional communities within their schools, teachers are able to better teach, and in turn, student learning increases. The authors also found this process was amplified where collective leadership was practiced; in high-performing schools, teachers, parents, principals, district office staff, and community members all tended to have “greater influence on school decisions than is the case with people in low-performing schools” (8). They similarly found that when “principals and teachers share leadership, teachers’ working relationships are stronger and student achievement is higher” (10).

Through their meta-analysis, Marzano, Waters, and McNulty (2005) also identified 21 leadership responsibilities that had statistically significant and positive correlations with student achievement. These 21 responsibilities included the following: school leaders’ affirming teachers; serving as change agents; using contingent rewards to recognize teachers’ accomplishments; communicating well; cultivating school culture; keeping teachers disciplined and focused on teaching and learning; having a flexible leadership style; focusing on clear goals; having strong educational ideas and beliefs; obtaining teacher input; intellectually stimulating faculty and staff and informing them of educational trends; being directly involved in and knowledgeable of curriculum, instruction, and assessment; monitoring and evaluating the effectiveness of school practices and their impact on school learning; being an optimizer (inspiring and leading innovation); establishing operational order; conducting outreach and serving as a school advocate; being attuned to relationships; supplying teachers with needed resources including PD; demonstrating situational awareness; and being visible in the school (42–43). In addition to these responsibilities and actions, the literature also identifies a link between the degree of distributed leadership within a school and academic achievement (Leithwood et al. 2004).

That more is not known about how PD opportunities can help develop these capacities is surprising, as certainly they are not capacities which are easily acquired. Leithwood et al. (2004), in discussing the findings of Marzano, Waters, and McNulty (as reported in an earlier publication by Waters, Marzano, and McNulty 2003), remark that “just one of the 21 practices, increasing ‘the extent to which the principal is knowledgeable about
current curriculum, instruction and assessment practices’ is a major professional development challenge by itself” (22). Waters and Marzano (2006) likewise conclude that PD is essential for principals as well as teachers:

“[I]t is clear from our analysis that a meaningful commitment of funding must be dedicated to professional development for teachers and principals. The professional development supported with this funding should be focused on building the requisite knowledge, skills, and competencies teachers and principals need to accomplish a district’s goals. (13, emphasis in original)

To this end, the present study looks at what is known regarding effective PD practices for four groups of school leaders: heads of school, principals, teacher leaders, and school boards. Findings regarding PD for school leadership will be integrated with those for teachers in the final chapter, in a discussion of conclusions from the research (in the section Professional Development for Instructional Leadership).

Heads of School

While arguably the position of head of school has always been a challenging one, Drago-Severson (2009) describes the increasingly “complex” demands faced by superintendents over the past few decades: “Recently, their work has changed: no longer only primarily responsible for running the school system, they are now responsible for transforming the school system in response to new demands. Yet in their training, many superintendents have not been prepared for this role” (11, emphases in original). In addition to reacting to the demands of the current educational environment, heads of school also “have the tremendous responsibility of shaping the culture in which all members of the school system operate” (11). Heads of Christian schools share most if not all of the responsibilities of their public school counterparts, but serving in a Christian school comes with an added layer of responsibility. Banke, Maldonado, and Lacey (2012) interviewed a nominated sample of twelve Christian school leaders regarding their spiritual experiences as heads of school, and found:

Today’s school administrators are expected to lead and manage schools. They balance the budget, attend to students’ personal and academic needs, evaluate personnel and curriculum planning, and all the while attempt to inspire the community and accomplish the objectives, mission and vision of the school. Besides all the daily duties, administrators are expected to be influential leaders within the school community… Christian school leaders are responsible for all these same tasks and responsibilities as other school administrators but are also responsible for the spiritual development of the school. (238–239)

While this is true for heads of Christian schools regardless of whether they work in an independent or church-sponsored school, in the case of the latter, heads of school must also work with varying forms of church governance, leaders, and polity.

Despite the pressures and importance of the role, several authors report that there are few PD opportunities available to heads of school. As Orr (2007) explains from research and work with heads of school, “Superintendents are interested in their professional growth and development, but resources available appear to be insufficient” (328); the few programs that do exist are mostly offered by state agencies or professional associations “to orient new superintendents to their position and state policy requirements and create a professional community among superintendents” (328). Teitel (2006), who conducted a study in 2004 to identify “long-term executive training programs that provided more than one-shot workshops, but that were sustained for a year or more” (3), could only identify 23 programs across the entire U.S. Of that number, eight programs were sponsored by universities, six by nonprofits, four by superintendent associations, three by foundations, and two by for-profit companies. In addition to being few in number, Teitel found that little information on their effectiveness was available: “Formal evaluations of these programs that go beyond the satisfaction of the members are rare to nonexistent … Much of this work is in the early stages, and the task of ascribing impacts on district processes or on teaching or learning to any of the interventions offered in these programs is methodologically daunting” (10).

Given the small number of formalized PD opportunities for heads of school and the lack of evaluation for many of these experiences, it is not surprising that there is little research that points to best practices for PD for heads of school. For the present synthesis, a handful of anecdotal descriptions of programs without any evaluation were found, as well as a number of dissertations on superintendents’ professional development (both of which were excluded from this review, as per the inclusion criteria outlined in Chapter I). The remaining literature falls into the categories of needs assessment (three studies), program evaluation (one study), and a descriptive survey of superintendents’ PD involvement (one study).

The largest needs assessment survey was conducted by Spanneut, Tobin, and Ayers (2011), who surveyed 66 superintendents of public school systems in the western-central region of New York. The survey asked participants to identify their levels of need for their personal PD for each of the 31 functions contained within the six Educational Leadership ISLLC Policy Standards. In addition, superintendents were asked to identify their level of preference for eight different PD delivery methods. The greatest need identified by respondents related to instruction leadership, specifically in the areas of “developing assessment and accountability systems to monitor student progress, monitoring and evaluating the impact of instructional programs, creating a comprehensive, rigorous, and coherent curricular program, maximizing time spent on quality instruction, and creating a personalized and motivating learning environment for students” (12). In terms of PD methods, the highest-ranked in terms of
preference were workshops, small study groups, and mentoring/coaching. Given that two of the top three preferred methods reflected “direct involvement by the superintendents in their professional development activities … [PD] delivery methods should offer and provide participation that is more active, interpersonal, and collegial” (Spanneut, Tobin, and Ayers 2011, 12).

A second smaller, qualitative study was conducted by Ripley, Mitchell, and Richman (2013), and involved case studies of five superintendents new to their districts in a suburban region of the northeastern U.S. While all participants had been in the superintendent for less than five years, most were newly appointed or in their first year in the role. Through interviews with the superintendents, the authors found that participants identified building relationships with multiple stakeholders as a significant challenge. Superintendents reported practicing approaches like modeling respectful behavior and focusing on a good flow of communication, but they “did not articulate clearly ways of bridging relationships with diverse and disenfranchised groups” (65) and “seemed ill equipped to engage the less vocal and more disenfranchised members of the community” (67). Additionally, “Newer superintendents were also not as comfortable with instituting cultural change” (65) and “seemed to struggle with confronting existing norms that were detrimental to the success of all children” (67). Ripley, Mitchell, and Richman (2013) conclude by describing the need for superintendents to engage in ongoing and sustained professional development to bridge the gap in their knowledge base in these areas: “While superintendents are typically knowledgeable in the area of human, technical, and political leadership, many do not understand the concepts and subsequent power of applying culture and symbolic leadership as they lead their districts, as we found in this study” (68). The authors recommend that superintendents’ associations, working with local universities, provide ongoing workshops to superintendents on building trust and social capital.

A third study by Petersen and Short (2001) was not an explicit needs assessment, but the study’s findings confirm those of Ripley, Mitchell, and Richman (2013) regarding the importance of social capital in superintendents’ roles. The researchers conducted a study of school board presidents’ perceptions of the district superintendent and his or her ability to influence board decision making. Research was conducted via a survey of school board presidents from 131 randomly chosen districts in a Midwestern state and followed up with in-depth interviews (with five school board presidents and two executive directors at the state school board association). Document analysis of school board agendas was also conducted. Study results suggested that “the ability of the district superintendent to be influential (e.g., to have the board decide favorably on superintendent-supported agenda items) was related to his or her personal attributes of expertness, trustworthiness, attractiveness, assertiveness, and emotiveness” (561). The authors recommend that district leaders be aware of the perceptions board and community members have of their leadership, and “how these perceptions affect their ability to be viewed as compatible, empathetic, and trustworthy in their leadership of the district organization” (561–562). Though not an explicit needs assessment related to heads of school and their PD, this study’s results regarding social capital considerations suggest that heads of school would benefit from the kind of PD advocated in the study by Ripley, Mitchell, and Richman (2013).

In the sole program evaluation study identified in the literature, Orr (2007) reports on a qualitative evaluation of a yearlong “New Superintendents Seminar” series, which comprised five weekend sessions and a weeklong summer institute provided by a research university. The program was intended to assist participants with their role transition and leadership growth and involved six participants, all with less than three years of experience as superintendents. Each session and the summer workshop utilized collaborative inquiry, content-based learning sessions, networking, and reflection, as well as engagement with experts. Using an action-research design for evaluation, data collected included participants’ application materials (demographics and three short essays about leadership perspectives prior to the program), participants’ debriefing discussions and feedback ratings for the trainings (collected after each seminar and the weeklong summer institute), observer documentation, analysis of participant correspondence and e-mail feedback, post-session debriefings of staff, and post-program interviews and evaluations. Data analysis indicated that the participants highly valued the experience, with many pointing to “the collaborative inquiry component as the most valuable part of the series, and their use of the collaborative inquiry process developed substantively over time” (338). Regarding superintendents’ accounts of the PD experiences, Orr (2007) explains:

The design and organization of the learning strategies used in this new program proved to be instrumental in rapidly advancing the superintendents’ leadership learning. By their admission, the superintendents came to the seminar series feeling “underdressed” for the role of superintendent, and gained support through a shared sense of vulnerability while developing a new confidence. Not only was their isolation reduced, but also their horizons about the nature and scope of their leadership were broadened. They learned they could survive the transition, establish credibility as a leader who would be effective, and facilitate high leverage change through their vision building and educational leadership work. (343)

Orr (2007) suggests that the program could serve as a model not only for new superintendents but also for more experienced heads of school, with the goal of developing a learning community that provides superintendents with a venue to develop in their “leadership ideas as well as a network of support to shape their leadership approaches and face their challenges” (345).
Finally, in a much older study, Ovando, Harris, and Menefee (1998) examined the individual PD behaviors of superintendents in 80 public schools in south-central states. Of that number, 40 had attended a workshop on superintendent leadership assessment at a university, and the other half had not. A questionnaire was sent to the two groups that asked about specific PD behaviors in five categories: activities, resources, motivation, self-assessments, and timeframes. The results indicated that there were no significant differences in PD behaviors of the two groups, with all respondents reporting participation in a wide range of activities and regular self-assessment. Both groups reported the most frequent PD activities to be use of education service centers, involvement in peer networks, and use of the state educational agency; the activity with the lowest frequency was mentor relationships. In terms of motivation to engage in PD, the most frequently cited reasons were student improvement, district improvement, and self-improvement. Both groups, however, cited rewards and incentives as low sources of motivation.

Taken together, the findings of these studies suggest that little is known about effective PD for heads of school. Further, all of the studies involved public school superintendents, so the applicability of these findings to heads of Christian schools is not known. The studies reviewed suggest that superintendents highly value collaboration with peers and that they have developmental needs in the areas of instructional leadership and managing social capital. But while Ovando, Harris, and Menefee (1998) conclude from their research that “professional development appears to be a major concern of public school superintendents” (86), there appear to be few formal opportunities available to heads of school (Orr 2007; Teitel 2006). Those activities that are available are primarily workshops, while heads of school have less opportunity to engage in mentoring, intensive institutes, and in-depth programs that might provide the collaborative support for which they express a desire.

**Principals**

Similar to the position of head of school, the role of principal is a challenging one that involves many responsibilities and roles: “Principals need to create and sustain a competitive school, empower others to make significant decisions, provide instructional guidance, and develop and implement strategic school improvement plans” (Leithwood et al. 2004, 26–27). The literature calls for PD that is commensurate with the complexity of that role. For example, the report *Learning to Lead, Leading to Learn* (National Staff Development Council 2000) echoed recommendations that were also made for teachers: that principals’ professional development experiences should be long-term, job-embedded, and focused on student achievement. Regarding the latter, as discussed in Chapter II, the emphasis in principals’ roles has shifted to instructional leadership over time, with commensurate changes in PD for principals. Honig (2012) explains this as a “move away from occasional professional development for principals to prioritizing ongoing, intensive, job-embedded support to school principals to help them improve classroom instruction—roles for principals sometimes called ‘instructional leadership’” (734).

Kearney (2010), in discussing PD for principals in California, suggests, “Effective professional development for principals focuses on improved teaching and learning, is standards-based, is research-based, examines personal practice, employs coaching for support, provides differentiated learning activities based on years in the position and principal needs/strengths” (23-24). Augustine et al. (2009) identify state and district programs, mentors, networks of principals, and coaches as types of PD available for principals; however regarding coaching, Corocan et al. (2013) observe that “principal coaches are typically assigned only to novice principals or to principals who are struggling. Few districts have created a coaching corps to support principals throughout their careers” (35).

Rather than a piecemeal approach, Kearney (2010) recommends that schools employ “a coherent principal development system” (21) that begins with recruitment and extends through preparation, induction, and “continued professional growth” throughout their careers (21). Thomas and Kearney (2010) expand on this view by suggesting that principals have different PD needs based on their career stages, including principal candidates (those preparing for the role and seeking licensure), novice principals, developing principals, and expert principals. The authors note that for novice principals, “In theory, a hiring district assumes responsibility for orienting its new principals … But many beginning principals never have the opportunity to go through a focused and ongoing induction process beyond the credentialing process” (10). In the next career stage, the authors posit that developing principals need “high quality professional learning tied to their individual leadership growth and enhanced professional performance” (10). Finally, expert principals still need PD support for their individual goals as well as help in learning how to mentor principals in earlier stages of development.

Despite the importance of principal PD as emphasized in the literature, Grissom and Harrington (2010) assert that, “While a relatively large amount of literature has been devoted to understanding the importance of teacher professional development … few studies have analyzed the importance of professional development for school principals” (583). This is particularly true with regard to empirical research; Payrio (2012) conducted an analysis of research designs in articles on principal PD and found that the highest percentage of articles were conceptual papers. Nonetheless, more empirical studies were identified for principals than for any other category of school leaders.

For the present synthesis, the following studies on principal PD were identified for inclusion: one large-scale study linking principals’ PD experiences with academic achievement (Whalstrom et al. 2010); one study that analyzed SASS survey data for links between principal PD and teachers’ ratings of principal effectiveness...
investigated links between principal PD and school effectiveness by analyzing quantitative data from the national 2003–2004 Schools and Staffing Survey (SASS). After linking teacher responses to those from principals, the study sample consisted of 37,960 teachers in 7,410 schools. Analysis focused on self-report data from principals regarding their involvement in four PD activities: university course taking (related to the principal’s role); participation in formal mentoring and/or peer observation and coaching; participation in principal networks (organized by an outside agency or through the Internet); and attending workshops, conferences, or training. Teacher data included levels of agreement with seven statements about principals’ actions in leading the school. Finally, a simple ordinal measure of student performance was used, that described how many state or district performance standards the school achieved (none, some, most, or all). Extensive controls were utilized in data analysis to account for both school and participant differences.

In summarizing the study’s findings, Grissom and Harrington (2010) assert that “results for teachers’ ratings of their principals’ effectiveness and the rough measure of school performance imply that not all principal professional development opportunities are created equal” (606). Specifically, “Principals who participate in mentoring and coaching opportunities are rated more effective by the teachers in their schools” (601). The relationship between mentoring or coaching and teacher ratings was statistically significant, with data analysis suggesting that “participating in mentorship is worth about 7 percent of a standard deviation on the principal effectiveness scale, a moderate relationship” (601). In contrast, analysis indicated that principals who take university courses are rated approximately 3% of a standard deviation lower on the effectiveness scale than principals who do not. The researchers also identified a negative but statistically insignificant relationship between networking as principal PD and effectiveness, while the effect of attending workshops, conferences, and training was null for principal effectiveness. In terms of correlation with student achievement, the same results were found for mentoring and coaching (a statistically significant positive correlation) and taking university courses (a statistically significant negative correlation); however no statistically significant relationship was observed for either networking or attending workshops, conferences, and training.

Grissom and Harrington (2010) discuss reasons for the differentiated effect of PD at length, such as the possibility that university coursework is not directly applicable to principals’ work or that taking university courses may detract from principals’ availability at their schools (it should be noted that geographic location was not considered a possible reason, as descriptive statistics indicated that urban school principals tended to participate in mentoring and coaching more frequently, whereas rural school principals tended to take university courses with greater frequency). As with other studies that utilized SASS data, the findings from this study rely on self-report of participants and are correlational in nature, and as such do not establish causality between specific forms of PD and school effectiveness.
of principal PD and principals’ effectiveness. However, the findings suggest that “principal performance does not benefit equally—and, in fact, may not benefit at all—from all modes of professional development” (609). And, much like other authors (e.g., Darling-Hammond et al. 2009) who utilized SASS data and described their findings in terms of providing preliminary guidance to practitioners, Grissom and Harrington (2010) assert, “While the current research is in too nascent a stage to make recommendations about policy, these results underscore the need for a much closer look at districts’ principal professional development programs” (609).

In a separate study, Darling-Hammond et al. (2007) examined eight pre-service and in-service principal development programs which they identified as exemplary for preparing school leaders. Data collection methods included: interviews (of program faculty, administrators, participants, and graduates, as well as district personnel and teachers); document analysis of program materials; and observations of meetings, courses, and workshops, as well as graduates in their workplaces. Surveys were also conducted of both participants and graduates (regarding their preparation, practices, and attitudes), the results of which were compared with those from a national random sample of principals. Student achievement trends were also examined. The four programs providing in-service PD for principals were the Hartford (CT) Public School District’s LEAD Initiative, the Principal’s Institute at Bank Street College (NY), the Jefferson County (KY) Public Schools Jefferson County (KY), and the Educational Leadership Development Academy (ELDA) in San Diego, CA. The researchers identified a number of common features across these programs. First, they found “the use of professional standards for licensing administrators as highly influential in improving their programs” (18) such as the ISLLC standards. Common activities across programs included support such as mentoring, principals’ networks and study groups, collegial school visits, and peer coaching. Beyond these features, however, the researchers identified a similar approach to PD content and pedagogy:

We found that the exemplary in-service programs offered a well-connected set of learning opportunities that were informed by a coherent view of teaching and learning, grounded in both theory and practice. Rather than offering an array of disparate and ever-changing, one-shot workshops, these programs had a clear model of instructional leadership. They organized continuous learning aimed at the specific professional practices the model requires. These practices typically included developing shared, school-wide goals and direction, observing and providing feedback to teachers, planning professional development and other learning experiences for teachers, using data to guide school improvement, and managing a change process. (7)

Additionally, many featured a “learning continuum that operated systematically from pre-service preparation through induction and continuing careers and included using mature and retired principals as mentors” (7). Finally, the authors claim that each of these programs featured “extensive, high-quality learning opportunities focused on curriculum and instruction” (7).

In terms of the impact of participation in these programs, Darling-Hammond et al. (2007) report that principals demonstrated “far more participation in a wide range of learning opportunities than principals in the comparison group” (9), including district-supported PD, peer observations, visits to other schools, principals’ networks, conferences, and PD activities with teachers. Compared with a national random sample of principals, graduates of these programs (both practicing principals and those not yet practicing) on average reported feeling better prepared for principal practice, having more positive attitudes about the principalship and intentions to stay in the position, and spending more time on instructionally-focused work. A separate analysis of current principals found that program participants were more likely to report their participation in a broader range of learning opportunities, and prioritizing developing and supporting their teachers. They also reported schoolwide gains in organizational functioning and increases in teacher effectiveness and engagement in the preceding year. These findings were confirmed when researchers followed a sub-sample of principals in their schools, as teachers from these schools were significantly more likely “to view their school leaders as encouraging professional collaboration, facilitating professional development for teachers, and encouraging staff to use evaluation results in planning curriculum and instruction” (10).

Additionally, new principals in these programs “reported more positive beliefs, and fewer negative ones, about the principalship than new principals in the comparison group,” and all participants reported “holding a stronger commitment to remaining in the principalship” (13) at higher rates than the comparison group.

In addition to this cross-program evaluation by Darling-Hammond et al. (2007), two studies were identified in the literature that provided single-program evaluations of partnerships for principal PD. First, Hoffman and Johnston (2005) examined the results of a Union Pacific Railroad Foundation program called the Principals’ Partnership, which involved a network of consultants, a summer leadership institute, local PD sessions, and principal networking. The program involved 800 principals in 17 states, and principals themselves planned all PD activities, including the summer institute. The authors report the program results in very broad terms from the results of interviews, surveys, and case studies with 11 partnership principals. Specifically, principals reported that participation led them to think differently and treat people differently, increased their networking activities, and facilitated dissemination of innovative ideas and programs across principal networks (e.g., sharing of approaches to AP teacher training, implementation of small learning communities).

Similarly, Buck and Arterbury (2007) reported on the impact of principal participation in a yearlong leadership program at a
In addition to these studies regarding principals' PD, three studies focused on those of assistant principals. Oleszewski, Soho, and Barnett (2012) conducted a literature review on the topic and reported that there are very few PD programs for assistant principals as compared with those for teachers and principals. The authors found that the major source of PD for assistant principals tended to be a mentoring relationship with the supervising principal, as well as participation in PD associations. Challenges identified by many assistant principals include lack of clarity as to the assistant principal's role, as well as the broad scope of duties. Oleszewski, Soho, and Barnett (2012) assert that PD can be aimed at addressing these challenges, as well as the socialization needs of assistant principals.

Enomoto (2012) conducted a study of eight assistant principals from six different schools in a rural community in Hawaii, all of whom participated in a yearlong university-school partnership PD program to prepare them to become principals. Assistant principals attended seven meetings during the school year that were focused on networking, introduction of content, and reflection on their experiences. Data collection included observations and school visits during the year, though no formal data collection (e.g., surveys or interviews) was conducted. The study found that changes in assistant principals' schedules—often due to conflicts with building duties—made it difficult for the assistant principals to attend sessions consistently. The same scheduling challenges often prevented participants from conducting observations at their schools, which were intended to be the basis of reflection activities at PD meetings. While this study was not rigorous or in-depth, it does provide insight into the kinds of challenges that assistant principals may face in terms of scheduling and juggling multiple responsibilities, and how those challenges may impact PD delivery.

In the third study of the assistant principalship, Oliver (2005) conducted a longitudinal trend study on the PD needs of assistant principals at all levels in Orange County, California. Surveys were completed by assistant principals in 2000 (with 344 participants), 2002 (332 participants), and 2004 (265 participants). Over the three years, there was a significant increase in assistant principals' ranking of student learning, instruction, and curriculum as PD needs. Management skills and knowledge were ranked as important by respondents over the course of the study, but that ranking was higher in the earlier years of the study. Assistant principals also consistently indicated a strong desire to participate in PD, but “indicated that time, location, and mode of delivery, as well as topic relevance should be considered in the design of professional development programs. Otherwise they indicated such activities merely represented ‘one more thing to do’ and often had little relevance to their growth as instructional leaders” (96).

Finally, three studies were identified that examine those who are employed in a coaching or instructional supervision capacity for principals. It is likely that these kinds of positions do not exist...
outside of large public school settings, which tend to have the resources and large administrative structures to support such positions. Thus while the findings may not be directly applicable for most private school settings, considering these studies may help provide an understanding of the benefits of coaching for principals. For example, if coaching is determined to be a potentially beneficial form of PD for principals, Christian schools may opt to consider facilitating coaching through informal means (as opposed to creating paid positions, as do many large public school districts).

Corocan et al. (2013) conducted a study to explore the role and PD support of principal supervisors, as well as these individuals’ perceptions of the effectiveness of their principal evaluation systems. The authors surveyed 135 individuals in 41 urban public school districts, with the survey first sent to district superintendents who were asked to forward it to staff members who best fit the principal supervisor role. Following the survey, the researchers conducted daylong site visits to six districts, where they interviewed school superintendents, deputy superintendents, principal supervisors, principal coaches, curriculum and instruction directors and staff, research and accountability directors, human resources directors, project directors, and principals. Corocan et al. (2013) also analyzed district documents including organizational charts, job descriptions, personnel evaluation forms, meeting agendas, classroom observation rubrics, and school improvement plans. Data analysis indicated that, “While the process of matching coaches to principals and the professional development provided to these principal coaches varies from district to district, the coaches themselves are widely perceived to be an invaluable resource—and in some cases to be of more use in terms of providing instructional support than the supervisors themselves” (35). Study findings also identified a positive correlation between PD on observing classrooms with a focus on student learning, and principal supervisors’ engagement in “tasks involving visiting schools, coaching principals, and convening principals to discuss instructional issues” (43).

A second study by Honig (2012) employed a comparative case study methodology to examine three urban districts and their efforts to transition their central office staff from “business and compliance to supporting district-wide teaching and learning improvement” (734). In these districts, “Instead of delegating responsibility for such principal support to coaches or mentors located within other central office units, executive-level staff—those reporting directly to superintendents, deputy superintendents, or the equivalent—work intensively with principals to strengthen their instructional leadership” (734). Honig called these individuals “instructional leadership directors,” or ILDs, which differed from external coaches in that they were permanent fixtures in the district structure, and reported directly to the superintendent or the superintendent’s cabinet. Data collection involved 283 interviews, approximately 265 observation hours, and analysis of 200 district documents. The kinds of support ILDs provided to principals included joint work in instructional leadership, modeling of thought and action, defining high-quality instruction, engaging in challenging conversations to strengthen principals’ practice, and serving as a broker between central office support and principals. ILDs who provided these kinds of support were more likely to be identified by their principals or other central office staff as supporting principals’ instructional leadership (the converse was also found to be true). However, Honig (2012) also found that there was uncertainty as to the specific role of these individuals and the expected outcome of their work, as none of the districts had identified “an explicit definition of how ILDs should go about that work or what specifically the work of principals’ instructional leadership involved” (760).

Finally, Celoria and Hemphill (2014) conducted a study of six coaches of new principals in California, all of whom were retired principals who coached first- and second-year principals as part of an established induction process. Over the course of the year, the researchers conducted 28 initial telephone interviews with coaches and then selected six coaches to interview face-to-face. Although the study does not provide any information on the outcomes of coaching or the coached principals’ perspectives on the experience, it describes “the role of the coach as defined from the point of view of the coach” (74). Analysis of interview data indicated that, “Process-oriented coaching, rather than specific, skill-focused content, was the main mechanism coaches used to support new principals” (72). This approach was perceived by coaches to be “the most effective way to help new principals become more reflective and confident practitioners” (76), and enabled coaches to be “in-the-moment when working with the new principal” (80) so as to deal with real-life, complex situations that arise (versus following a set curriculum). The most common processes used included “questioning, paraphrasing, reflection, instructional approaches, and facilitative approaches” (76). As this study did not examine principals’ experiences of these methods of coaching, it is not possible to gauge the degree to which a process approach is effective in providing coaching to principals.

When taken together, the studies discussed here suggest that principals’ participation in systematic PD may have positive benefits for student achievement and teacher perceptions of principal effectiveness. Principals’ greatest PD needs, as self-reported in these studies, relate to their roles and responsibilities in providing instructional leadership in their schools. Finally, looking across studies, the PD methods of mentoring, coaching, and participating in leadership programs appear to be validated by principals as particularly beneficial and effective for their development.

Teacher Leaders

Teacher leadership is a concept in the literature that arises from theories of distributed leadership, in which responsibility for leading the school is shared at different levels throughout the institution.
While a traditional model of leadership in a school or district would feature those in administration (such as superintendents and principals) acting as the primary leaders, a distributed leadership model involves teachers in a number of formal and informal leadership roles. These roles can include department chairs, grade-level leaders, instructional specialists, curriculum specialists, learning facilitators, and mentors (Harrison and Killon 2007). By enabling teachers to serve in leadership capacities, teachers can gain a sense of self-efficacy and recognition of the professional nature of their role. This can be beneficial for teachers and the educational culture as a whole, as Maxfield and Flumerfelt (2009) explain: “Too often teachers are frustrated when their training as leaders is not acknowledged and they are not given opportunities to exert leadership” (40).

One of the key roles identified in the literature for teacher leaders is in shaping PD opportunities for other teachers at their schools. The Teacher Leadership Exploratory Consortium (2012) standards for teacher leaders include promoting professional learning for continuous improvement, described as follows: “The teacher leader understands the evolving nature of teaching and learning, established and emerging technologies, and the school community. The teacher leader uses this knowledge to promote, design, and facilitate job-embedded professional learning aligned with school improvement goals” (16). In order to meet this standard, teacher leaders must take a key role in planning PD that is “team-based, job-embedded, sustained over time, aligned with content standards, and linked to school/district improvement goals” (16). In addition, the standard requires teacher leaders to recognize the diverse learning needs of educators, integrate technology into PD, analyze and utilize data regarding the quality of PD and its effects, advocate for time for team-based PD, provide feedback to colleagues on teaching and learning, and utilize information on educational trends to inform PD planning.

Although there are a number of books that offer theoretical perspectives as well as descriptions of exemplar schools engaged in teacher leadership (cf. Katzenmeyer and Moller 2009; Crowther et al. 2009; Reeves 2008), there is very little research on best practices in teacher leadership, let alone PD that supports teacher leaders. A search of the literature identified five studies for inclusion in this synthesis: one study on department chairs (Bredeson 2013); one study of university-school partnerships to develop teacher leadership teams (Vernon-Dotson and Floyd 2012); two studies on a single teacher leadership program (Maxfield and Flumerfelt 2009); and one study of teacher leadership teams in a single large school district (Reeves 2008).

Bredeson (2013) conducted a study of PD for distributed leadership with principals and department chairs of six high schools in two urban districts that participated in a leadership PD partnership with university faculty. As Bredeson (2013) explains, “High school department chairs are also typically members of school leadership teams. In addition to the expertise that department chairs bring to these leadership teams, department chairs benefit from their participation on them especially through professional development opportunities, collaboration, and joint work” (366). Over a two-year period, the study involved leadership teams at each school, composed of principals, department chairs, and unit coordinators. (The total number of participants was not identified in the study, nor were details on the design of the PD activities.) Data collection involved observation notes, interviews, document collection, and survey instruments, and found “substantial evidence that professional learning was at the heart of transforming the work of department chairs from traditional managerial roles to instructional leadership roles” (371). Four categories of PD content were identified that contributed to this process: ethical knowledge (of inequalities in urban high schools); propositional knowledge (of roles and responsibilities of instructional leaders, as well as research on achievement gaps); procedural/process knowledge (involving the range of knowledge and skills needed for leadership); and pragmatic knowledge (meaning discretion and judgment about when and how to act, given the culture, norms, and history of the school). While insufficient information is provided in the article regarding the PD design and the research methodology, the author’s findings do provide suggestions for topics for PD for department chairs.

Vernon-Dotson and Floyd (2012) conducted a collective case study to examine the impact of leadership teams and school-university partnerships on teacher leadership and PD. The study followed three grant-funded leadership team projects that involved school-university partnerships in six schools in Pennsylvania, North Carolina, and Virginia. One project developed PD at an alternative school to address teacher turnover, another involved mentoring teachers to help them meet the academic needs of a diverse student population, and the third centered on improving educational opportunities for students with disabilities through PD. Data sources for the study included focus groups (of 44 individuals, both team and nonteam members), interviews (with 18 leadership team members), participant reflections, team self-evaluations, field observations, and products of teams’ work. Through qualitative data analysis, three results of the leadership teams were described: transformation of teacher roles, increased collective efficacy, and improved, meaningful professional development. Regarding the transformation of teacher roles, the authors explain, “Teachers participating in these projects began not only to emerge as teacher leaders within their respective buildings but also to take on formal leadership roles within their districts” (44). Along these lines, 73% of team members described new roles they assumed as a result of participation in the projects, and a total of 15.8% of participants moved into formal administrative or central office positions. Teachers attributed these new roles directly to their involvement in the project, and they further reported an increased sense of professionalism and collective efficacy, which “was the
belief that faculty and staff have the ability to achieve important goals of the school” (45). Finally, teams reported that PD efforts themselves were transformed, as teams were able to select “meaningful professional development based on the data that they collected and the conversations with colleagues that they initiated. The professional development was meaningful to them because they had a voice” (46).

Maxfield and Flumerfelt (2009) reported on the findings from four cohorts of The Galileo Academy, a teacher leadership program that began in 1997 in southeastern Michigan and that over ten years grew to include 17 school districts, two community colleges, and two regional service agencies. Approximately 400 teachers completed the two-year program at the time of the study. Anecdotal observations of administrators indicated that graduates went on to assume roles as teacher leaders in their districts (whether formally as project leaders, or informally as role models) and to work collaboratively within their schools to improve student achievement. Survey data from academy participants from the first two cohorts indicated that teachers felt they were equipped as teacher leaders to change traditional teaching practice, generate new ideas, and empower others for change. Data from the third and fourth cohorts indicated that teachers viewed their role as leaders as involving influencing policy, providing feedback to other teachers, planning PD, mentoring new teachers, and participating actively in school decision making.

A related study on The Galileo Academy by Wells et al. (2010) examined principals’ perceptions “to see what differences, if any, resulted between districts that had participated in targeted teacher leadership training and those that had not” (677). A 2008 survey of 176 principals in 17 participating districts and 17 nonparticipating districts specifically assessed principals’ perceptions of their superintendents’ influence on supporting teacher leadership at their schools. The survey asked participants to rate a list of superintendents’ supportive actions using a four-point Likert-type scale, ranging from highly significant to not significant at all. Statistically significant results included the finding that “shared leadership, with the category of allowing teachers to have prominence in decision making” (683) was rated more highly by principals from districts participating in the academy, as opposed to those from districts which did not. When compared with principals’ ratings of superintendents’ actual performance, results indicated that superintendents in districts affiliated with the academy tended to support teacher leadership at higher levels. However, these same principals indicated that they desired “more support and involvement for teacher leadership than what they currently experience from their superintendents” (683). Although this study only examines principals’ perceptions (as opposed to observing superintendents’ actions), findings suggest that a district’s participation in a teacher leadership program can positively impact principals’ valuing of shared leadership and their teachers’ involvement in decision making.

Reeves (2008) reports on a study with 81 teams of teacher and school leaders from Clark County, Nevada, a district that enrolled 330,000 students (as discussed earlier in Chapter IV, in the section on action research). Although in-depth information on the nature of the study and data analysis are not provided, Reeves’ study resulted in a framework for teacher leadership, and the accompanying book (Reframing Teacher Leadership to Improve Your School) is a well-known handbook for administrators on how to support teacher leaders. Regarding the study findings, Reeves asserts, “Although many research conclusions are equivocal, the results of this study are clear and striking. Teachers not only exert significant influence on the performance of students, but they also influence the performance of other teachers and school leaders” (Reeves 2008, 2). In order to develop this influence in a positive and impactful way, Reeves makes suggestions for structuring PD for teachers; specifically, he claims the “most important finding of the study … is that direct observation of the professional practices of teachers by teachers must become the new foundation of professional development” (3).

Finally, although not examining PD for teacher leaders specifically, Leithwood et al. (2004) found in their review of the literature that distributing leadership throughout the organization can contribute to improved student outcomes in underperforming settings. The authors provide a description of how this process may work:

One of the hallmarks of districts that have succeeded in moving from low to high performing is an intensive long-term investment in developing instructional leadership capacity at the school and district levels. At the school level these efforts focus at least on principals…. District reform efforts often include the establishment of new school-based teacher leader positions (e.g., literacy coaches) to work with principals and with district consultants to provide professional development assistance (e.g., demonstrations, in-class coaching, school professional development, or PD, arrangements) to individual teachers and teams of teachers in the targeted focuses of reform. Professional development is also provided to teacher leaders in the content areas that local reforms focus on, as well as in change process strategies. (43)

Although there is a lack of concrete evidence in the research for best practices in these areas, it is likely that much of the research on coaching, mentoring, and teacher inquiry as PD methods (discussed in Chapter IV) is applicable for understanding teacher leadership, as teachers are required to take active roles as facilitators and decision makers in these kinds of PD efforts.

School Boards

The literature on school boards and their leadership roles consistently points to the need for systematic board development, both for individual members and boards as groups, as an important means to facilitate effective governance and proper board functioning. Walser (2013) explains that “high-functioning school boards train themselves continually … these boards see learning
as essential to doing their job well” (73). Similarly, Smoley (1999) describes the ideal format and goals for board PD:

Board development should provide a collective and comprehensive experience. But typical board training is in the form of short, single-topic courses in board responsibilities and educational policy, offered to individual board members from a number of districts. Ideal board development is a sustained program for a full board, with an integrated approach to topics and an emphasis on self-assessment, basic purposes, and board functioning. The end results are an understanding and commitment to shared purposes and effective board performance. (103, emphasis in original)

According to Smoley (1999), boards that engage in this kind of PD “develop systematically” (113) and are better equipped to lead schools efficiently and effectively. The converse, however, occurs when boards “do not seek out self-improvement opportunities, and their performance is uneven and unpredictable” (14).

Parallel endorsements of systematic board training are found in the literature on Christian school governance. In discussing PD for Christian school boards, Keenan et al. (2007) assert, “The role of the trustee is so important to the ongoing health of a school that it should be done increasingly well” (49). The authors discuss the benefits of board training not only for the board’s functioning and role, but also for the entire school: “A board that pursues regular training strongly encourages the school staff, parents, and donors as trustees model their own need for professional development” (49). Keenan et al. (2007) suggest “joint board member and administrator training” (83), as well as new member induction involving an orientation and ongoing mentoring, as effective components of comprehensive board PD. Further, they recommend that the cost of training be included in the school budget, and that the board conduct a yearly self-evaluation that can provide the “groundwork for seeking board development conferences and seminars” (25). Lowrie and Lowrie (2004) recommend that school boards receive “in-service training” specifically through conferences and seminars, on-site workshops by educational consultants, videos and books for Christian school boards, and visits to strong Christian schools to meet with exemplary boards and administrators (75).

Many states require public school boards and/or individual board members to attend a certain number of PD hours, though private schools are often not similarly bound. Walser (2013) explains, “The growing importance of school board training is also being acknowledged by state governments. Twenty states now mandate training for new and/or veteran members, which is usually provided by the state board association” (73). Moreover, in the remaining states that do not have a training requirement, state school board associations typically offer voluntary training. The National School Boards Association (2010) conducted a survey of school board members across the country and found that state school boards associations provide training in all of these states, though in 19 of these 20 states other approved training providers are allowed. Six of the 20 states mandate training for new board members, and 14 out of the 20 require both new members and existing members to attend trainings. Eleven of the 20 states have enforcement provisions (e.g., removal from the position of board member) for those who do not attend required training. The survey indicated that topics for PD varied from state to state, and included areas like board member roles, relationship with the superintendent, procedures, budgeting, legal issues, and employee relations. The total number of training hours was also variable and ranged from 2 to 16 hours. Oftentimes, mandated board training entailed “workshops, sometimes with the superintendent, aimed at improving the effectiveness of the school board in raising student achievement” (Education Commission of the States 2002, 1).

Despite the attention given to the importance of PD for school boards, as with the other types of school leaders discussed in this chapter, there is a shortage of research on effective approaches for providing that PD. Land (2002) conducted a review of twenty years of literature on the role and effectiveness of school boards, and found it to be “populated with opinion-based articles and guidebooks that cover a range of topics from how to formulate education policy to the improvement of board meeting minutes” (17). Only one quantitative study on the linkages between school board governance and academic outcomes was identified, and that was in the Netherlands. Land (2002) asserts, “Despite the frequent and urgent calls and requirements for training/development, there is little data to prove the effectiveness of the various training/development materials and activities” (32). More recently, Johnson (2012) found the state of research to be largely unchanged: “Surprisingly, although the educational literature is saturated with many opinion-based articles regarding effective school board governance, there has been little quantitative or qualitative research conducted regarding board of education influence on student achievement” (81). This literature synthesis found much the same. Further, as Brenner, Sullivan, and Dalton (2002) observed, “most of the research on school boards is contained in unpublished doctoral dissertations, which have often been normative or prescriptive in nature” (3).

A search of the literature identified a total of four studies on school board PD for inclusion in this synthesis, and are presented as follows: one qualitative study and one quantitative study of the effects of school board PD on student achievement (Korelich and Maxwell 2015 and Roberts and Sampson 2011, respectively); an evaluation of state-wide required leadership training for school leaders (Seiler et al. 2010); and a comparative study of board behaviors in districts with differing achievement levels (Delagardelle 2008 and the Iowa School Boards Foundation 2005).

Most recently, Korelich and Maxwell (2015) conducted a single qualitative case study in one south-central Texas school district.
that involved semi-structured interviews of three individuals: the superintendent, the president of the board of trustees, and the secretary of the board of trustees. The interviews were intended to solicit participants’ views of board development and its relationship to student achievement. Analysis of coded interviews uncovered themes related to defining board members’ roles, the positive effects of board PD, and the prevalence of board members’ personal agendas. With regard to the importance of PD, the study found an interrelatedness with the first theme, of understanding roles:

The theme of the school board members’ perceptions of the importance of professional development targeted not only concern about increasing student achievement but even more so about educating the board about their roles and functions as members. Without effective professional development, board members cannot understand their roles making it difficult to forge sound decisions regarding the district; consequently, increasing student achievement would falter. (13)

The researchers also found that participants experienced “frustration” at an unmet expectation that “all board members should embrace and apply professional development, clearly understand and stay within their roles, and base every decision on what is best for students in order to increase student achievement” (13). While the study does not provide information on what forms of board PD are more effective for boards, it does point to linkages in participants’ perceptions between board training and student achievement. The obvious limitations of this study are the small sample size, single setting, and use of interviews as the only source of data collection, which make it difficult to determine to what degree these perceptions are prevalent among school leaders.

In a quantitative and broader study that still utilized self-report data, Roberts and Sampson (2011) sent a questionnaire to 50 directors of state school board associations to assess PD practices as well as whether they felt board PD had a positive effect on student achievement. The authors then compared the 26 responses with Education Week’s 2009 ratings of state education systems to determine if there was any correlation between ratings and specific board PD practices. Descriptive findings of the study indicated that while most respondents’ states did not require PD for school boards, 31% did require PD in members’ first year in the position (ranging from 8 to 16 hours) and 27% required PD after the first year (with yearly required hours ranging from 4 to 15). All respondents reported a belief that board training is linked to increased student achievement. When comparing survey responses with the ratings of state education systems, the authors found that states requiring PD received an overall rating of “B” or “C,” whereas those states not requiring PD received an overall rating of “C” or “D.” However, several limitations of this study make it difficult to draw conclusions from these findings. First, the data is correlational in nature and the study did not examine the myriad of potential mediating factors (such as between-state differences in curricula, teacher licensure and education requirements, education funding, and so forth) that could account for differences in ratings. Second, the use of the rating system as a proxy for student achievement is questionable (as opposed to comparisons on the same assessment instrument or instruments), as is the units of measurement in that system and overlap in the two groups’ ratings. Further, the study does not provide information on which forms of PD are effective, but only examines the correlation between ratings and states’ either requiring or not requiring board PD.

Seiler et al. (2010) conducted a study of a statewide required leadership training for school leaders (including superintendents, principals, and school boards) in Kentucky, and while this study does not provide information regarding effective PD for school boards, it does provide insight into the types of self-reported learning needs and levels of knowledge that school boards may have. Surveys were administered to leaders throughout the state to assess leaders’ perceived value of the mandatory leadership training in preparing them for duties. Respondents included 150 superintendents (86% response rate), 414 principals (33% response rate), and 317 school board members (44% response rate). Results indicated that most participants were satisfied with the leadership training initiative, with more than 70% of respondents strongly agreeing or agreeing that the training prepared them for their duties. Interestingly, there appeared to be a discrepancy between school board members’ assessment of themselves as knowledgeable about duty-related topics (with 85% considering themselves knowledgeable) and superintendents’ perceptions (with 60% of superintendents considering their school boards to have very high or high knowledge levels). Areas in which school board members reported the lowest degree of knowledge included curriculum standards (with 73% indicating having knowledge), assessment data analysis and interpretation (78%), and addressing achievement gaps (78%). However, a subsequent analysis did not find a statistically significant relationship between students’ performance on the Kentucky Core Content Test and self-reported high levels of leadership capacity of study participants. Again, as this study utilized self-report data, it is difficult to draw conclusions from the data. However, it does provide a sense of the potential PD needs of school boards, all of which appear to be related to instructional leadership functions.

Finally, Delagardelle (2008) and the Iowa School Boards Foundation (2005) reported on a multiyear, multiphase study of the Lighthouse Project, which designated school districts as “Lighthouse” districts if they generated significantly and unexpectedly high levels of student achievement, given their profiles. The studies sought to ascertain if there were differences in board behaviors between Lighthouse districts and a comparison group of districts (with similar characteristics, but which had low levels of student achievement). Data collection involved extensive interviews, surveys, and tracking of student achievement data. The studies
found that although the boards of high-achieving districts engaged in multiple behaviors that likely contributed to gains in student achievement (e.g., focusing on improving district performance, understanding the multiple inputs to student performance), one key difference cited was time spent learning together as a group. Although not characterized as formal PD, opportunities to learn together were described in terms of joint inquiry, discussion about district data, and problem-solving around student achievement. In contrast, board members from low-achieving schools only reported learning together when external presenters (such as school administration) shared student achievement data. Because the project did not measure the direct impact of board learning on changes in student achievement (as compared to or separated from many other district-specific activities), it is not possible to draw a conclusion about the actual effect of board PD, nor whether this type of board learning (inquiry and discussion centered on district data) is more effective than other forms of PD in which districts may have engaged.

VI. Conclusions

The research on PD over the past forty years has generally followed the arc of reform in education over that time. The initial school restructuring era saw an importing of training methods from management and business fields to teacher PD, along with evaluative methods that were often limited to gauges of teacher satisfaction. From there, a reform era—grounded in adult learning theory, and focused on student achievement—led to the development of job-embedded PD forms, accompanied by research on components that contribute to PD effectiveness and which targeted urban and underperforming schools. During this time, the primary role of school leaders began to shift from that of managerial functions to instructional leadership. In the present accountability era, PD has been focused on CCSS implementation and related assessment (Hill, Beisiegel, and Jacob 2013) which, when combined with a faltering economy and decreased PD budgets, has driven a demand for evidence-based and cost-effective PD. At present, the need to identify PD with high return on investment (ROI) in terms of student outcomes has never been greater.

Although not constrained by the same legislative requirements as public schools, Christian schools have not been isolated from these developments over time. In fact, what little research on PD in Christian schools that exists suggests that it closely mirrors that of K–12 education writ large. Survey research from different regions of the U.S. confirms that in-service workshops still predominate in Christian school PD efforts, and that more collaborative and reflective forms of PD are least available to teachers (Headley 2003; Finn, Swezey, and Warren 2010; Neuzil and Vaughn 2010). Recent research found that PD in a sample of Christian schools did not fully meet national standards and more active, collaborative, and content-specific PD is needed (Montoro 2013). Finally, leaders in Christian education have reported that most teachers and administrators in Christian schools remain skeptical of educational research, and are not as engaged in reform efforts as their counterparts in other educational settings (Boerema 2011). Taken together, the research suggests there is a need for improvement in PD experiences in Christian school settings.

It is against this backdrop that the present synthesis turned to the literature to determine what is known about effective PD practice for Christian school teachers and leaders. A number of challenges were encountered in identifying the best PD frameworks and practices, however. These included the lack of a shared definition for most PD practices; the use of varying metrics to determine PD effectiveness (e.g., increased teacher knowledge, changed instructional practice, and student achievement gains); a myriad of program and study designs, which renders comparison of findings across studies problematic; and the complexity of PD programs that, in turn, makes PD effectiveness an equally complex phenomenon to study. Further, the lack of published, empirical research on Christian school settings necessitated that this synthesis utilize studies of public school settings; findings from these settings may not be directly applicable or transferable to Christian schools.

These challenges preclude a single, definitive answer for the central question of this synthesis: “What are the best frameworks and practices in professional development for Christian school teachers and leaders?” Nonetheless, the aim of this concluding chapter is to encapsulate what is known from three distinct lines of inquiry: first, on program components linked to PD effectiveness; second, on seven specific PD practices; and third, on PD for four types of school leaders. This is followed by a discussion of additional considerations and recommendations arising from the research, specifically the importance of cultures of continuous improvement, the need for what this synthesis is calling professional development systems in schools, and the importance of providing PD for instructional leadership.

Encapsulating the Research

The first line of research for this synthesis was conducted on components that may contribute to PD effectiveness and that ideally could be built into any PD practice (whether workshops, coaching, mentoring, and so forth) to bolster its success. The components of content focus, active learning, duration, coherence, and collaboration were suggested by adult learning theory and became the focus of research during the reform era of PD (Desimone 2009). Research findings, which suggest that there is a positive relationship between these components and effective PD, are not conclusive (Hill, Beisiegel, and Jacob 2013). While teachers generally seem to express greater satisfaction with more engaged forms of PD that have these features (Darling-Hammond 2009; Montoro 2013; others), there are a number of limitations with this research. These include reliance on self-report data, lack of an identified “tipping point” for the
components, and mixed results from programs designed using the components. However, as several researchers suggest (e.g., Darling-Hammond et al. 2009), these components are sufficiently correlated with PD effectiveness to warrant their consideration as broad guidelines for designing PD programs.

This literature synthesis also examined the research for seven specific PD practices: direct-delivery methods (workshops, conferences, seminars); intensive institutes; professional learning communities; coaching and mentoring; new-teacher induction; inquiry-based PD (action research, problem-based learning, lesson study, and video-based PD); and online formats. Because of the diversity of the practices and the research on their effectiveness, it is not possible to state conclusively which approaches are more effective than others. However, there is substantial evidence that each practice can positively impact teacher content knowledge, particularly in science and mathematics (which were the subjects most frequently studied). Some evidence also was found that teachers’ instructional practice can change as a result of participation in these PD activities, though the evidence for this is not as strong as for teacher knowledge. However, far less is known about the impact of these practices on student achievement; in some studies, a positive correlation was found (though often weak, and not isolated from other possible contributing variables), while other studies found mixed results or no correlation at all—even when gains in teacher outcomes were observed.

This last finding is key, as many PD approaches and evaluations are based on the assumption that improvement in teacher knowledge will automatically result in student gains. As Capps, Crawford, and Constanis (2012) assert, “An important challenge in education research is to establish a direct relationship between teacher learning and student learning … As of yet, no study has made this connection” (306). It is unclear why this connection has not yet been found in the literature, as it is counterintuitive to think that increases in teacher knowledge would not impact the quality of teaching and thereby increase student achievement. One possible reason might be programmatic, in that most PD designs are not sufficient for eliciting teacher change at a level that is needed to effect student learning. Or, it may be a research design issue, whether a need for more rigorous methodologies, or better measurements. For example, it has been suggested that the standardized achievement tests typically used in PD research are too far removed in time from the PD experiences, and that more proximal measures of student gains are needed to truly measure PD impact (Hill, Beisiegel, and Jacob 2013).

Whatever the possible reasons for the lack of evidence for a connection between PD and student achievement, the question of the relationship between the two is largely unanswered in the literature. This is arguably the most important question for PD design, however, and is the one that is most frequently asked by school leaders in the current accountability era. Thus while most research studies conclude with an appeal for additional inquiry, this is all the more urgent in the current synthesis. Taken together, the literature simply does not provide enough information on identifying “program models which are most effective in promoting student achievement … [and] the need for further research on the subject is apparent” (Hanover Research 2012, 13).

With regard to school leadership, far less is known about effective PD approaches for heads of school, principals, teacher leaders, and school boards than is known for classroom teachers (Spanneut, Tobin, and Ayers 2011). Although calls for training and recommendations for PD formulations are replete in the literature, these tend to come from seasoned practitioners as opposed to empirical studies. For each group of school leaders, systematic PD opportunities appear to be few and far between, and what literature exists on these programs is primarily descriptive in nature with little to no evaluation (Orr 2007; Teitel 2006). Needs assessment studies indicate, however, that school leaders identify their role as instructional leaders as a key area for personal development (Spanneut, Tobin, and Ayers 2011; Spanneut, Tobin, and Ayers 2012; Whalstrom et al. 2010; Seiler et al. 2010), and spiritual leadership is an added area in which Christian school leaders are in need of ongoing development (Banke, Maldonado, and Lacey 2012; Keenan et al. 2007; Lowrie and Lowrie 2004). More PD opportunities that address these needs, accompanied by systematic evaluation of PD, are needed before it is known what constitutes effective on-the-job learning for school leaders.

If more conclusions are to be made regarding effective PD for teachers as well as for school leaders, additional research is needed on specific components and practices of PD. Although writing in regard to PD for instructional technology, Lawless and Pellegrino (2007) encapsulate the state of the PD literature in total when they claim the majority of studies do not compare “models of professional development … [but rather] characteristics relevant to its own design … if we are to understand which types of activities and programs establish best practice, then future studies must begin to systematically manipulate the various design elements and isolate not only what works but also what does not work” (595). In the meantime, however, educators must make ongoing decisions regarding PD programs in their schools. These real-time decisions cannot await definitive answers from educational research. While the findings of research reviewed in this literature synthesis are suggestive for program design, there are three additional considerations that arise from the literature which have practical implications for schools. These are the need to situate PD within cultures of continuous improvement, the potential of implementing professional development systems in schools, and the importance of providing PD for instructional leadership.
Cultures of Continuous Improvement

While this synthesis reviewed research on components of effective PD, as well as specific PD practices for teachers and school leaders, an important question arises from the literature regarding the school cultures in which these practices are situated. Some research suggests that the success of PD efforts is not dependent on the specific formulation of PD, but rather is directly linked to the presence of a schoolwide orientation toward continuous improvement. This view does not limit PD to a single practice or even a collection of practices, but rather views PD as part of a larger approach to reshape the underlying values of the school community. For example, if the school culture highly values an ongoing pursuit of quality teaching and learning, PD efforts are more likely to been seen as mission-aligned and as an integral part of the improvement process. Conversely, PD efforts that are situated in cultures that do not value continuous improvement are likely to be piecemeal in nature and, ultimately, less sustained and impactful (Deal and Peterson 2010).

In asking the question of how to improve educator and student outcomes, it makes sense to consider whether and how cultural change can play a role. Changes at the cultural level are deep, as Deal and Peterson (2010) explain: “Culture affects all aspects of a school. It influences informal conversations in the faculty lunch room, the type of instruction valued, how professional development is viewed, and the shared commitment to assuring all students learn” (12). A cultural view holds that change at this deeper level will spur the development of new instructional practices that are reflective of new values, and by doing so effect large-scale change as opposed to sporadic, smaller changes. In their discussion of the literature on school culture and productivity, Deal and Peterson (2010) contrast the effectiveness of school efforts (including PD) that address culture, and those that do not: “In study after study, where cultural patterns did not support and encourage reform, changes did not take place. In contrast, things improved in schools where norms, values, and beliefs reinforced a strong educational mission, a sense of community, social trust among staff, and a shared commitment to school improvement” (9).

The concept of a whole-school approach to PD is not new. The school restructuring movement in the 1980s focused on schoolwide change, though it often centered on management and organizational decisions that might lead to improved student achievement. Deal and Peterson (2010) state that research from this time period “showed conclusively that changing the structure of schools (transforming governance, time use, and grouping) is not enough … To succeed, both new structures and a professional culture are needed” (10). In the 1990s, results from the School Restructuring Study (SRS) of the Center on Organization and Restructuring of Schools (CORS) came to this conclusion. CORS studies of 24 participating schools from across the country focused on the impact of increased professional community on teacher practice and student outcomes, with professional community described as having three general features: a clear shared purpose for all students’ learning; collaborative activity to achieve that purpose; and collective responsibility for student learning (Newman and Wehlage 1995, 30). Louis and Marks (1998) found that stronger professional communities contributed to higher levels of “authentic pedagogy”—or teachers’ emphasizing higher order thinking, meaning construction through conversation, and developing knowledge that can be applied beyond the classroom—and accounted for 36% of variance in the quality of classroom pedagogy. Additionally, professional community contributed to student achievement gains, accounting for 85% of the variance in student achievement in the study. Newman and Wehlage (1995) describe these findings as a cascade effect, where changes in the level of teacher professional community increased the level of authentic pedagogy and social support for student learning, which in turn positively affected student performance (32). They conclude that “effective schools have more than competent individual staff: they have the organizational capacity to work productively as a group for high quality learning for all students” (47).

More recently, the research on professional learning communities (PLCs) has focused on ways to foster a positive and productive professional culture among school staff; as one forty-year veteran of public school administration remarked, “everything old is new again” (Gaynor 2015). As discussed earlier in Chapter IV (in the section on professional learning communities), qualitative studies of PLCs provide a rich description of how professional communities develop and impact the overall culture of the school. In particular, Strahan (2003) describes the process by which PLCs in three elementary schools (which had demonstrated dramatic gains in academic achievement of low-income and minority students over a three-year period) started with conversations about school improvement and instruction, and from there:

[T]eachers and administrators at these schools used data from formal and informal assessments to target areas for improving teaching. They then initiated school-based professional development to identify and enact more effective instruction. As students became more successful, participants shared stories of their success, a dynamic that molded teachers into a stronger professional learning community. Over time, these communities developed a cultural stance that communicated expectations and values to new teachers and to new students. In each school, the shared stance became part of the personality of the school. New teachers perceived a way of doing things that was particular to that school. Practices and procedures that may have once been new and unfamiliar became the norm. Conversations about learning and teaching routinely featured formal and informal assessments. Teachers knew what students need to succeed and, when unsure of how to meet these needs, could count on their colleagues for suggestions and support. This set the stage for continued improvement. (142)

From this research, a picture emerges of how PLCs transcend a
specific PD practice to become a mechanism by which schools develop a culture of continuous improvement, ultimately leading to changes in teacher practice and gains in student achievement.

New research provides startling evidence for the link between school culture and PD practices in effecting change, and is worth discussing in detail here because of its implications for PD design. In a report entitled The Mirage: Confronting the Hard Truth about Our Quest for Teacher Development, The New Teacher Project (2015) describes findings from a study of three large public school districts and one midsize charter school network (of schools across several cities), in which the focus was to determine the impact of PD efforts and their relationship to teacher growth. The approach of this study was different from others identified in the literature, in that research began by identifying teachers as either improving or nonimproving, and then worked backward to determine if they had any PD experiences in common:

Rather than test specific strategies to see if they produced results, we used multiple measures of performance to identify teachers who improved substantially, then looked for any experiences or attributes they had in common—from the kind and amount of development activities in which they participated to the qualities of their schools and their mindset about growth—that might distinguish them from teachers who did not improve. (1)

The study involved surveys of 10,507 teachers and 566 school leaders, interviews of 127 staff members involved in teacher development, focus groups with teachers, and analyses of PD catalogs, budget data, PD session attendance, and district-provided data on coaching. All districts had implemented a multimeasure evaluation system years prior to the study, so the researchers examined two to four years of evaluative data (e.g., summative evaluation ratings, classroom observation scores and subscores, and “value-added” scores that were linked to student achievement data) and then divided teachers into quartiles based on changes in their evaluation scores. Surveys asked teachers and school leaders about their involvement in a broad range of PD activities offered by districts and schools, or sought by teachers themselves. Finally, districts’ financial investments in PD were measured in terms of direct PD expenditures as well as strategic investments, such as teacher evaluations and rewards for attaining higher levels of effectiveness.

With regard to the three participating districts, the study found that while PD was extensive—costing $18,000 and averaging 150 hours per teacher, per year—there did not appear to be substantial improvement in teaching from year to year. Instead, for every ten teachers, only about three improved in their overall evaluation scores and classroom observation scores, while five remained the same, and two declined substantially. Further, while many teachers showed improvement in their first five years (at a rate of 2.5 to 5 times faster than other district teachers studied), the average teacher in the tenth year or beyond had a growth rate barely above zero. Most teachers at the ten-year mark still needed to improve, however (with half of these teachers receiving less than effective ratings in developing students’ critical thinking skills, engaging students in lessons, and checking for understanding). Thus, in terms of teacher growth, the study found that the majority of teachers were not improving in the school districts, even though they had room to do so.

By far the study’s most surprising find, however, was that improving teachers and a comparison group of nonimprovers exhibited no difference in PD involvement. Both groups had approximately the same amount of time being coached over two years (8 hours for improvers, 7 for nonimprovers); hours of informal collaboration over two years (12 hours for improvers, 13 hours for nonimprovers); hours of formal collaboration over two years (69 hours for improvers, 64 hours for nonimprovers); and hours spent per month in PD (17 hours for improvers, 18 for nonimprovers). The two groups also had roughly the same degree of satisfaction with PD, the same beliefs that individual teachers are responsible for their development, and similar views of feedback as crucial to improving practice. From this analysis, the authors conclude, “No type, amount or combination of development activities appears more likely than any other to help teachers improve substantially, including the ‘job-embedded,’ ‘differentiated’ variety that we and many others believed to be the most promising” (2).

In contrast to findings for the three districts, however, findings for the charter management organization (CMO) were starkly different. The study found that CMO teachers improved significantly over a three-year period in observation scores (with a mean growth rate of .61 SD per year, whereas districts ranged from .02 to .11) as well as overall evaluation ratings (with a mean growth rate four times higher than that of district with next highest growth rate). For every ten teachers, seven showed substantial growth, versus three out of ten in the districts. Further, growth was evident at all levels of teacher experience and not just in the first five years (as had been the case with district teachers). Thus, the question the study sought to answer was, what was happening in the CMO context—versus the district contexts—to effect improvement among a greater proportion of teachers? The study acknowledged that the CMO was significantly smaller than the districts studied, and that it is possible that the CMO attracted different kinds of teachers (which was not assessed through the study). With these caveats, the study found two major differences: first, the nature of PD was different in the CMO versus the district; and second, the instructional culture and expectations of teachers at the CMO appeared to be more oriented toward school improvement.

Regarding the differences in PD, on the surface level, the CMO invested more funds (at $33,000 per teacher) per year than districts, and CMO teachers spent 22 hours per month on average in PD (versus 16–19 hours in the districts). But perhaps more importantly, the nature of PD activities at the CMO schools differed from that
of districts. District teachers spent an average of 24 hours per year in one-time PD workshops (which only 36% viewed as a good use of their time), but on average observed peers less than twice a year (which 75% of teachers affirmed as a good use of their development time). Thus districts did not seem to be “creating time for teachers to engage in the activities they say could be more effective” (26).

In contrast, CMO teachers engaged in a weekly observation from a coach, followed by a 30-to-45-minute debrief. They were more likely to practice teaching outside of the classroom (with 82% reporting doing this sometimes or often, versus 17% to 38% in the districts). CMO teachers also spent two to three hours per week with other teachers reflecting on practices and outcomes, trying new teaching skills, and preparing for new units. Instead of the diverse menu of PD offerings found in the districts, the CMO provided activities that consistently supported “ongoing feedback and reflection cycles … [with] several structured CMO-wide learning days throughout the year, as well as deep dives into student data outcomes” (32). In summary, at CMO schools, PD hours were “spent on activities that appear to provide substantively greater opportunities for individualized support that focuses on specific development goals” (32).

In addition to differences in PD activities, the study points to larger differences between districts and the CMOs that may contribute to teacher improvement. The study identified “differences on an institutional level in comparison to the districts we studied; specifically, a more disciplined and coherent system for organizing themselves around teacher development, and a network-wide culture of high expectations and continuous learning” (30, emphases added). Specifically, in terms of institutional structures, CMO principals viewed themselves as managers of assistant principals “whose primary responsibility is coaching teachers and ensuring that high-quality instruction is occurring in classrooms every day” (31). In terms of cultural differences, CMO teachers tended to agree at higher rates that they had weaknesses in their instruction (81%, as compared to 41% to 60% of district teachers) as well as endorse the idea that continuous improvement was expected of all teachers. It is against this larger cultural backdrop that PD activities occur in the CMO:

That [PD] strategy is rooted in a robust and deliberate culture of high expectations and continuous learning. In focus groups, CMO teachers reflected on the sense that everyone in their school community is constantly working toward better instruction, and pushing each other to do their best work ... [PD] hours are spent on activities that appear to provide substantively greater opportunities for individualized support that focuses on specific development goals—and they occur within a culture that expects continuous improvement. (32, emphasis added)

Thus, PD activities in the CMO were not simply different from those in the districts studied; rather, they were situated within and reflect a larger school culture oriented toward improvement. Not surprisingly, student achievement at the CMO schools was better than in the districts, with higher student test scores in mathematics and reading.

When taken together with earlier research on school restructuring and on the effectiveness of PLCs for developing professional community, this study raises important questions about the overall PD approach in a given school. Research on the interplay of PD and school culture suggests that improving teaching and learning “will take much more than tinkering with the types or amount of professional development teachers receive, or further scaling other aspects of our current approach” (The New Teacher Project 2015, 3). Not only do PD practices potentially need to change, but so too does the larger school culture in which they occur. This is arguably a much harder task than adding new practices to a school’s PD repertoire in a piecemeal fashion. Rather, cultural change requires forethought, intentionality, commitment of resources, and ongoing monitoring and evaluation. If schools are to accomplish change at this level, they will need a PD approach sufficient in scope and depth. A proposal for one such approach, the creation of professional development systems, follows.

Professional Development Systems

In order for schools to effect culture-level change in teaching and learning, this synthesis proposes the concept of a professional development system. Such a system has the following five key elements or process steps (as described in Table 5): an instructional-culture audit; strategic planning for instruction; PD alignment; monitoring, feedback, and evaluation; and supporting instructional leadership.
In the first element or process of a professional development system, schools engage in an instructional-culture audit, which is a cross-constituency review of instructional processes, practices, and outcomes. This entails a convening of teachers, school leaders, staff, parents, and students to analyze the school’s instructional strengths and weaknesses, as well as opportunities and threats to growth (SWOT). The richer the sources of data available during this process (e.g., on student achievement, teacher experiences, family perceptions, and so forth), the more robust the audit. While all members of the school community (teachers, leaders, staff, parents, community members) should engage in audit dialogues, it is possible that an outside facilitator may be helpful in coordinating and managing the process.

Next, based on the results of this audit, schools can engage in strategic planning for instruction. This mirrors a general strategic planning process, but focuses on goal setting, targeting outcomes, and determining metrics for success specifically related to teaching and learning. The resulting plan should be multiyear, tied to the school’s overall strategic plan, and provide for resource allocation (e.g., time, personnel, and funding). A key consideration will be to determine a realistic length for the plan, as well as to build in steps for creating a new plan in future years.

Once this overarching framework is complete, the school can then align PD practices with the major goals of the instructional strategic plan. The alignment process should be based on both the diverse needs of learners and the desired outcomes, and engage multiple constituencies (teachers, leaders, staff, parents, community members) in a “collaborative professional development model … [where] community building has become a highly valued goal” (Tallerico 2005, 49). Drawing upon findings from the literature analyzed in this synthesis, the end result of PD alignment should be a web of diverse but intentionally selected PD opportunities, employing multiple practices that reflect sufficient content focus, active learning, coherence, duration, and collective participation.

TABLE 5. Professional Development Systems: Elements and Process Steps

<table>
<thead>
<tr>
<th>Element/Process Steps</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>1. Instructional-culture audit</td>
<td>Cross-constituency review of current processes, practices, and outcomes relative to instruction (can be facilitated by outside consultant). Identifies instructional strengths, weaknesses, opportunities, and threats (SWOT).</td>
</tr>
<tr>
<td>2. Strategic planning for instruction</td>
<td>Based on results of instructional culture audit, includes goal setting, targeted outcomes, and metrics for success. Multiyear plan should be tied to overall institutional strategic plan and incorporate resource allocation (time, personnel, funding).</td>
</tr>
<tr>
<td>3. PD alignment</td>
<td>Align PD with goals of instructional strategic planning. Develop a diverse but intentional web of PD opportunities, utilizing multiple practices and reflecting sufficient content focus, active learning, coherence, duration, and collective participation. PD opportunities should include individual, small group, and whole group, and consistently engage all school constituencies (teachers, staff, leaders, parents, community).</td>
</tr>
<tr>
<td>4. Monitoring, feedback, and evaluation</td>
<td>System should be designed with mechanisms for ongoing monitoring of progress, obtaining feedback from multiple constituencies, and conducting formative/summative evaluation. Multiple measures should be utilized to assess impact on targeted outcomes. School-level action research may provide a useful framework for evaluation.</td>
</tr>
<tr>
<td>5. Supporting instructional leadership</td>
<td>Orienting school leadership around coordinating, managing, and leading the instructional culture. Involves creating and facilitating “PD for instructional leaders, to lead instructional PD.”</td>
</tr>
</tbody>
</table>

A critical element of such a system is developing mechanisms for monitoring, feedback, and evaluation at the onset. Any schoolwide approach should be designed to provide ongoing monitoring of instructional progress (for example, through appointment of a steering committee that meets regularly for check-ins and review of data). Similarly, obtaining systematic feedback from multiple constituencies—before, during, and after PD experiences, as well as at specified times during the academic year—is critical in order to inform inevitable course corrections. Finally, conducting formative as well as summative evaluation of system outcomes should employ multiple measures at multiple levels (e.g., classroom, schoolwide, communitywide) to gauge impact on targeted outcomes. Evaluative efforts can be mapped out by plotting methods, data sources, and targeted outcomes along a year-by-year timeline. Schools may also wish to consider action research as an overall framework for evaluating “systems level change” (Spaulding and Falco 2013, 17).

Lastly, but as importantly, a PD system provides adequate support for instructional leadership. The task of overseeing and shaping the instructional culture (including coordinating PD) almost always falls to school leadership, along with the accompanying accountability pressures for student achievement. Schools must be proactive in orienting school leadership around envisioning, coordinating, managing, and leading the school’s instructional culture. This can include ensuring leaders’ job descriptions focus on instructional leadership, as well as requiring an annual leadership development plan (Kearney 2010) in which instructional capacities figure prominently and are systematically evaluated. A final area of support—providing PD to school leaders in the area of instructional leadership—is discussed further in the following section.

**Professional Development for Instructional Leadership**

As examined at length in Chapter V, school leaders consistently cite their role as instructional leaders as an area in need of development; but unfortunately, formal opportunities for such development are
School leaders are in need of more systematic PD opportunities that align with the NSDC standards and facilitate the delivery of high-quality instruction. Developing and evaluating such opportunities is a promising starting point. The research suggests the possibility that more considered PD experiences that are aligned with the NSDC standards can lead to improved student achievement.

The study also found differences in principals’ perceptions of facilitative factors in implementing the NSDC standards in their schools. These differences were significant between the two groups of principals, with Torchbearer principals having higher scores than non-Torchbearer principals in 80% of the standards. This suggests that principals in Torchbearer Schools perceived higher levels of implementation of these standards in their schools than their counterparts in non-Torchbearer schools.

In addition to PD that was more closely aligned with national standards, Torchbearer schools were designated as such for their high rates of student achievement, particularly as compared with other schools with similar demographics. While in these studies causal relationships between high-quality PD and student achievement are not established, the link is nonetheless significant. Moore et al. (2011) state that while the reasons for the differences observed in the study are not known, the findings “suggest that principals in Torchbearer Schools worked to develop a school culture among teachers in which continual learning is considered an essential aspect of professional development that leads to improved student achievement” (76, emphasis added).

This research underscores the importance of instructional leadership in not only developing a school culture of continuous improvement, but also designing PD experiences that are aligned with that culture. Supporting instructional leaders in their roles should thus be a priority for schools, districts, and professional organizations. Given the lack of systematic PD opportunities along these lines, developing and evaluating such opportunities is a promising starting point. The research suggests the possibility that more considered and strategic support of instructional leaders may translate into improved instructional cultures, as well as more effective PD to support instruction.

Implications for Christian Education

As compared with public school settings, Christian schools face advantages as well as disadvantages when it comes to developing coherent and impactful PD systems. In terms of advantages, Christian schools are not encumbered by many of the demands placed on public education by legislation and district or state mandates. Like many charter schools, Christian schools have the flexibility and freedom to set their own curricula, evaluate teachers
according to their own criteria, and set the priorities of staff development according to their unique goals and needs. In short, Christian schools can be more nimble than public schools when it comes to making decisions regarding PD.

An obvious disadvantage for many Christian schools is the challenge of funding PD. While Christian schools often take advantage of Title II funding, the overall budget for PD at many Christian schools is far less than that of their public school counterparts. This may limit schools’ abilities to engage expensive and well-known presenters, send teachers and school leaders to intensive institutes, hire professional trainers and coaches, and so forth. However, even with smaller budgets, Christian schools can still be strategic with the resources they have available for PD. Put simply, a smaller budget is not an excuse for not stewarding PD resources well. If anything, a small budget makes it all the more important to spend resources strategically and wisely, in ways that will have the most ROI for teacher and student outcomes. As outlined in this synthesis, many of the proposed elements and process steps of a professional development system can be accomplished with little to no cost, beyond allocation of time (on the part of teachers, school leaders, and other school constituencies).

Finally, professional associations that support Christian educators and leaders can strategically support the development of instructional cultures that engage in continuous improvement. This might entail supporting schools in some or all of the elements and processes inherent in creating professional development systems—for example, assisting in instructional culture audits or strategic planning, offering PD opportunities that could be aligned with schools’ strategic plans, and providing PD to instructional leaders—so that they can successfully lead instructional PD in their own settings. In Christian education and beyond, this approach holds promise for fully leveraging PD to impact teaching and learning.
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