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Preparing Teachers of Young Children: The Current State of Knowledge, and a Blueprint for the Future

PART I: Teacher Preparation and Professional Development in Grades K-12 and in Early Care and Education: Differences and Similarities, and Implications for Research



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Part II, *Effective teacher preparation in early care and education: Toward a comprehensive research agenda*, is available at: <http://www.irl.berkeley.edu/cscce/>.

An *Executive Summary* of the two papers is also available at the same site.

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Introduction

When it comes to teacher preparation, the support provided to new teachers, and ongoing professional development for working teachers, Grades K-12 and the field of early care and education (ECE) are two quite different worlds. While both worlds assume that teachers' classroom skills and behavior can be influenced at multiple points in time—through pre-service education, during the first years of teaching, and over the course of a teacher's career—they differ along numerous dimensions.

This paper describes some of those differences, discusses how those differences drive divergent research agendas in the two fields, and concludes with some recommendations for improving understanding across different levels of education in an effort to forge more integrated and effective policy, research and practice. Our accompanying paper, "Effective Teacher Preparation in Early Care and Education: Toward a Comprehensive Research Agenda," reviews the K-12 and ECE research literature to identify what is known, as well as critical gaps in knowledge, about the most effective forms of teacher preparation and professional development, and proposes an agenda for future research.

In both worlds, highly politicized issues are at stake. In K-12 education, there is a great deal of ongoing controversy about the merits of certification, the value of college and university schools of education, the best ways to measure teacher effectiveness, and how to guide new teachers through the critical first five years of service. In early care and education, whether to require a college degree at all (and if so, which one)—vs. whether other forms of professional development are sufficient—continues to be a source of lively debate. To differing degrees, both fields struggle with low teacher pay, and how to reward and retain an educated, skilled, and diverse teaching workforce.

Both worlds also find themselves debating these issues within a new context of policy and research—with mounting concern about the decline in U.S. student performance compared to other nations, the school "achievement gap" between children of different backgrounds, rising calls for school and teacher account-

ability, and deepening scientific understanding of how critical a child's earliest years are for brain development and lifelong learning. Policy experts and political leaders—including the President and Vice-President of the United States—are urging an expansion of federal, state, and private investment in early education (Gormley, Phillips, & Gayer, 2008; Heckman & Masterov, 2007; Obama & Biden, 2009), but clearly any new investment must be used well if it is to be effective.

Faced with such concerns, many are looking to research for answers, but at both levels of education, research models and approaches are not necessarily designed to answer today's questions. Both fields are in urgent need of more complex, comprehensive, and rigorous research to identify the optimal content and structure of teacher education programs, teaching work environments, and ongoing teacher support.

Ideally, the scientific wisdom and evidence accrued in one sector of education should inform and advance research, policy, and practice in the other. But because infrastructures and career pathways are so different in these two fields, researchers in K-12 and in ECE have tended to pose questions and formulate answers in dramatically different ways. The purpose of this two-part report, *Preparing Teachers of Young Children*, is to help bridge the worlds of ECE and K-12, and to help shape a coordinated research agenda, by examining their differing vantage points, language, terminology, and current state of knowledge as related to research and policy.

1. The Worlds of K-12 and Early Care and Education: Differences and Similarities

The differences between K-12 and ECE begin with terminology—for example, teacher preparation vs. professional development—and they extend to the routes by which individuals become teachers, the threshold levels of education and training required, and the extent to which individuals receive support once they become teachers. The largest differences are driven by the requirement in all states that K-12 teachers earn BA degrees and meet additional credentialing criteria, typically before they can become teachers, or within a specified time frame after they begin teaching.

In early care and education, by contrast, educational requirements for teachers are not at all uniform across states, and they typically are set at much lower levels. Requirements can also vary *within* states, for programs located in different settings or subject to different regulations (e.g., public school-based preschool, Head Start, subsidized child care, or privately funded early childhood programs), with the result that many practitioners do not hold college degrees, and most are not certified.

This section examines differences and similarities between the K-12 and ECE worlds along the following dimensions:

- Delivery systems, standards, and educational requirements;
- Teacher education, certification, and career pathways;
- Teacher preparation vs. professional development;
- Fieldwork;
- Induction, mentoring, and professional development; and
- Teaching environments (including the number of adults in a classroom, class size and adult-child ratios, compensation, unionization, teacher retention and turnover, and administrative climate).

Delivery systems, standards, and educational requirements

The ECE and K-12 delivery systems differ significantly, reflecting historical differences in their missions and in society's overall acceptance of those missions. The differences in delivery systems have implications for funding, program standards, expectations for teachers, and the extent to which regular and uniform reporting for accountability occurs across the two systems.

The public K-12 education system was established to provide access to education for all children in the nation, free of charge, because a well-educated populace was seen as a public good, something that generates benefits to society. In general, states and communities have structured public K-12 education in similar ways. Schools are organized into districts, with local governing bodies, state and federal oversight, and a mixture of

local, state, and national funding. Federal funds constitute a minority portion of K-12 financing, but federal legislation such as No Child Left Behind (NCLB) sets standards for K-12 teacher qualifications, and requires accountability and reporting from states and school districts.

By contrast, early care and education programs have their origins in two separate historical traditions (Beatty, 1995; Michel, 1999). Some programs were established primarily to care for children while their parents worked, while others were created primarily to promote children's early development and learning. American society has not yet fully embraced the notion of early childhood education as a public good that ought to be publicly supported and available to all the nation's children. The result of this historical ambivalence toward early childhood programs has been a welter of ECE program types that operate in a variety of settings, under many different administrative and governance structures, and that are funded by multiple public and private sources. At the federal level alone, there are more than 20 early childhood funding sources, each with different regulations, and all 50 states have their own array of differently funded and governed programs. There are no organizational structures akin to school districts for all ECE programs, no overarching federal laws analogous to NCLB that set expectations about ECE teacher qualifications and preparation across differently funded programs, and no uniform accountability or reporting requirements.¹

These differences drive the research, policy, and practice issues in each arena. K-12 researchers have recently focused on questions related to provisions in federal legislation such as NCLB, while ECE researchers consider a range of issues related to the dictates of their own funding sources. K-12 researchers can make use of administrative databases that states and school districts create and maintain in order to meet accountability requirements; most ECE research, on the other hand, is much more limited in scope, and often must be undertaken one program at a time. Teacher preparation, support, and professional development services

¹ Teachers in public schools using Title I funds to support pre-kindergarten programs, however, must meet the same qualifications set by their state for K-12 teachers if the pre-K program is included in the state constitution. Otherwise, pre-K teachers in Title I-funded programs must meet the federal Head Start teacher qualifications.

in K-12 can be structured on the assumption that all teaching staff share a basic foundational level of education and training, while planners of similar efforts in ECE must assume a much greater variability in the teaching workforce, rather than any kind of shared baseline of professional preparation (Barnett, Hustedt, Friedman, Boyd & Ainsworth, 2007; National Child Care Information Center, 2007c).

Teacher education, certification, and career pathways

Not surprisingly, the two contrasting systems have yielded very different expectations for teacher qualifications, and very different levels of support for teacher training and development.

The field of K-12 education sets professional standards that define teachers in relatively uniform ways across school districts and states, and that require all K-12 public school teachers to have achieved at least a BA degree, and provisional or actual certification, before they can begin teaching.

All states have procedures for certifying public school teachers, and all public schools are expected to hire teachers who are state-certified (Boyd et al., 2007). The most common route to initial certification is a teacher preparation program in a college or university school of education, plus (in all but two states) at least one exam covering general knowledge, subject area knowledge, and pedagogy (Loeb, Rouse, & Shorris, 2007). More than 600 different exams are used across the U.S. to assess candidates for certification, and states set their own standards. In most states, teachers seeking certification must also complete a period of student teaching. Because of the variation in state certification requirements, simply knowing that a teacher is certified does not indicate the kind of preparation that the teacher has received or the actual qualifications that he or she has met (Zumwalt & Craig, in Cochran-Smith & Zeichner, 2005).

Some institutions of higher education build the teaching certification into a four-year undergraduate pro-

gram, while others require a fifth year for certification. Although there is currently limited involvement by community colleges, some are working in concert with four-year institutions to begin teacher preparation at the lower-division level. In addition, experienced teachers may seek National Board Certification from the National Board for Professional Teaching Standards in one of 25 different subject areas and covering different age groups.²

Further, to meet NCLB requirements, various states and school districts have implemented “alternate route” programs as incentives to attract a greater variety of teaching candidates, creating new pathways into the profession with fewer initial requirements. These programs potentially attract career changers, retirees, or other individuals interested in teaching in urban schools or other high-need areas (Zumwalt & Craig, in Cochran-Smith & Zeichner, 2005). Requirements for alternate route programs vary among states; pre-service training can range from two weeks to as much as an academic year, but typically range from four to 12 weeks in the summer before one begins teaching. About 20 percent of teachers enter the profession via an alternate route to certification (Walsh & Jacobs, 2007), although this percentage is higher in some states—e.g., more than one-third of new teachers in California, New Jersey,³ and Texas (Boyd et al., 2007).

In ECE, however, standards for teacher qualification vary quite widely, based on program types and funding stream requirements. Teacher standards range from little or no pre-service preparation, all the way to a BA degree or higher, and there is wide variability in the actual qualifications of the teaching corps within any one program type or setting. Each of the 50 states sets different teacher standards for ECE programs; the only exceptions are nationwide federal government programs such as Head Start, Early Head Start, and Military Child Care.

By contrast with K-12, there is a far greater emphasis in the ECE field on in-service training, and/or on part-time attendance at an institution of higher education

² For ECE teachers, an Early Childhood Generalist certificate is also an option from NBPTS; information available at: <http://www.nbpts.org/>.

³ In recent years, New Jersey expanded alternative certification programs for preschool teachers in order to meet new four-year degree and certification requirements established for its court-ordered Abbott Preschool Program (Whitebook, Ryan, Kipnis, & Sakai, 2008).

while already working as a teacher, whether to achieve a degree or to complete a required number of college credits. In ECE, in most states, the central roles in teacher education and professional development are played by community colleges and by community-based training organizations, such as resource and referral agencies, that may or may not offer college credit for their courses. School districts or county offices of education may also be involved in teacher education or professional development.

Teachers working in publicly funded preschools that operate within public school systems are often required to meet education and certification requirements comparable to those of their K-12 counterparts; the 2008 Head Start reauthorization also requires a greater number of Head Start teachers to hold a bachelor's degree. But for other teachers in ECE, four-year degrees and/or student teaching are rarely a pre-service requirement. State standards may or may not require certification; most do not, and even when they do, these generally demand much less academic and student teaching experience than a K-12 certification. Most ECE teachers do not complete a degree in advance of service. In California, to take one example, 25 percent of center-based teachers in early care and education hold a bachelor's or higher degree, but no information is available on what portion of that group received degrees prior to working in the field (Whitebook et al., 2006a). Higher education-based ECE training can occur in many different schools or departments, such as Education, Child Development, Human Development, Psychology, or Family and Consumer Sciences (Ackerman, 2005; Maxwell, Lim, & Early, 2006; Washington, 2008; Whitebook, Bellm, Lee, & Sakai, 2005).

A further difference is that, while K-12 teachers are certified to teach at certain grade levels, ECE certification might cover working with children from birth to age eight, birth to age five, ages three to eight (pre-K to Grade 3), or another age range, depending on state or program standards, and there is little agreement in the field as to which type of certification is most useful or desirable. While a move toward pre-K-to-Grade-3 certification is embraced by many, particularly in public schools, it is less favored by others because it excludes working with infants and toddlers.

Teacher preparation vs. professional development

In the K-12 literature, training and education are seen as occurring in a “professional learning continuum” that spans pre-service, induction, and continuing professional development (Feiman-Nemser, 2001). “Pre-service” constitutes all training and education that occurs before an individual begins employment as a teacher, including enrollment in and graduation from an institution of higher education with a bachelor's or master's degree. “Induction” is the term used to refer to the supportive services—most commonly, an orientation process and a certain period of working with a mentor—that occur when a teacher begins teaching at a new school. “Professional development” is a term reserved for the in-service training or continuing education units that existing teachers complete. State law typically requires a certain amount of professional development per year, and teachers' union contracts typically include a certain number of paid professional development days per year.

In stark contrast, “professional development” in ECE is a catchall phrase that can cover nearly the entire spectrum of education and training opportunities and pathways available in the field—from introductory training, to informal workshops or other continuing education, to college-level work for credit or a degree. Many ECE settings do not have an ongoing continuing education requirement for teachers, in part because many states do not mandate it, and only a small segment of the ECE workforce receives ongoing financial support for such continuing education or in-service training.

In this paper, we use the term “professional development” as it is used in the K-12 literature: to refer only to the in-service training or continuing education that teachers undertake when they are already in the workforce. When we refer to studies that working teachers undertake in order to complete a degree in the field, we call it “professional development for a degree.” For any pre-service training that teachers receive, we use the term “teacher preparation,” and we refer to supportive services for new teachers as “induction.”

Fieldwork

Recognizing that prospective teachers need opportunities to put into practice what they have learned in their coursework, 38 states require beginning K-12 teachers to engage in fieldwork experiences, such as student teaching, ranging in length from five to 20 weeks (Boyd et al., 2007). These can vary from placements in community settings that begin early in one's educational career, to stints of student teaching that occur only after completing most of one's coursework. Teachers who begin employment through an "alternate route" program generally meet their fieldwork requirements through work experience.

In ECE, by contrast, since many teachers enter the workforce with little or no pre-service training or education, one's first teaching job typically doubles as "fieldwork," but rarely with the formal structure that this term implies.

Induction, mentoring, and professional development

In K-12 education, it is widely assumed that new teachers need a period of support in order to develop into effective practitioners who will remain in teaching careers. Federal funding from Title II of the Higher Education Act provides support for teacher quality improvement activities, including induction programs.⁴ Such programs frequently pair the new teacher with a mentor—a more experienced practitioner who can model teaching practices, observe the teacher in the classroom, provide feedback and opportunities for reflection, and offer other technical assistance and support.

By contrast, induction is generally not a familiar concept in ECE teacher preparation, and induction services tend to be offered only to those who are teaching in publicly funded preschool programs, often those in school-based settings subject to No Child Left Behind. As in K-12, however, ECE professional development may include mentoring and coaching, whether as a means to help teachers improve the quality of their

programs, refine their instructional styles, or learn to implement new curricula.

K-12 education has also institutionalized ongoing systems of professional development for teachers, in the form of training or courses designed to build individual skills and meet individual career needs, or training for teams of teachers within a school or district aimed at improving instruction more broadly, perhaps as part of school reform efforts (Miles, Odden, Fermanich, & Archibald, 2005). Ongoing professional development is typically provided by school districts, unions, institutions of higher education, and other organizations.

In ECE, professional development is often much less systematic, covering a wide range of workshops, classes and other programs. ECE teachers undertake professional development to improve their skills, increase their knowledge of a particular subject area, or learn to implement a specific curriculum, but increasingly, they are participating in professional development for a degree. These teachers typically work in Head Start, are seeking positions in publicly funded preschool programs, and/or are participating in programs, such as T.E.A.C.H.,⁵ that provide scholarships or stipends covering a portion of tuition and/or other costs (Dukakis, Bellm, Seer, Lee, 2007; Whitebook, Sakai, Kipnis, Almaraz, Suarez, & Bellm, 2008).

Teaching environments

Despite its significance, the teaching work environment is relatively rarely considered in the research literature on teacher effectiveness and quality—and again, typical teaching environments in K-12 and ECE vary along numerous dimensions. The teaching environment includes such variables as the number and professional status of adults working in a given classroom, class size, adult-child ratios, compensation (including pay and benefits), whether or not teachers are unionized, teacher turnover and retention, and the administrative leadership of a school or program.

⁴ Information at: <http://www.ed.gov/programs/heatqp/gtepheatqp.pdf>.

⁵ The T.E.A.C.H.® Early Childhood Project, first developed in North Carolina and now licensed in more than 20 states, offers scholarships to ECE practitioners to complete coursework and increase compensation. <http://www.childcareservices.org/ps/teach.html>.

Adults in the classroom

Most often, teachers in Grades K-12 are the only teachers in their classrooms, although they may work with an assistant, aide, or other paraprofessional. Co-teaching by peers with the same professional status is uncommon. While some professional development programs seek to link teachers together within a school, these are not the norm.

In ECE, however, co-teaching among a group of adults is frequent in classrooms and centers, because even a small number of young children requires the presence of more than one adult. The main exception is home-based programs, but in California, to take one example, at least one-half of these settings typically have more than one adult present as well (Whitebook et al., 2006b). While co-teachers may have different titles, such as teacher, assistant teacher, or aide, there may be minimal differences between them in actual teacher preparation and education. Rigid role distinctions between teachers and assistant teachers are also less likely in early childhood settings, depending on the curriculum, which is more likely to integrate instruction and caregiving.

Class size and adult-child ratios

“Class size” refers to the maximum number of children permitted in a given classroom. An “adult-child ratio” is the maximum number of children permitted per adult. When class sizes are too large or adult-child ratios too high, teachers at all age and grade levels are less able to provide individualized attention to students, or to manage children who present behavior problems or other challenges, which can cause disruption for all students in the classroom.

For Grades K-12, each state sets its own regulatory standards in both of these areas. In K-12, a single teacher often works in a classroom environment with no assistant or aide, and adult-child ratios are rarely calculated or reported at the classroom level. Instead, such calculations—reported at the level of the entire school—typically include all licensed educators working in the facility, including counselors, librarians, and resource teachers (Murnane & Steele, 2007).

In ECE, class or group size, and adult-child ratios, are governed by state licensing regulations; these also vary by the age of the child, with younger children typically in smaller groups with a higher adult-child ratio. State regulations, however, are often less stringent than the consensus judgment of the ECE field about how to define high-quality programs. The National Association for the Education of Young Children, for example, has established a voluntary accreditation system for ECE centers that sets a maximum group size of 20 and an adult-child ratio of 1:10 for programs serving pre-schoolers—vs. at least 31 states allowing lower ratios (as low as 1:18 in Georgia and South Carolina, and 1:20 in Florida), and at least 15 states allowing larger groups (as large as 35 in Texas and 36 in Georgia) (National Child Care Information Center, 2007a).

Compensation

Largely because of the influence of teachers’ unions, public schools in Grades K-12 offer uniform pay scales, typically subject to collective bargaining, which detail benefits, raises, and rewards linked to teachers’ educational levels, completion of continuing education, and tenure. Discussions of merit pay, through which teachers earn differentials based on some kind of measure of performance, are on the rise in many states and school districts.

Teachers in ECE, by contrast, typically work for much lower wages than teachers in Grades K-12, and many do not have a salary schedule at their places of work. The primary exceptions in which ECE teachers have reached or approached parity with K-12 teacher compensation are public school-based ECE and pre-K programs, as well as some of the relatively few ECE centers that are unionized. Salaries and benefits in the field vary by funding source, and often carry little or no reward for education or ongoing professional development.

Of the scant available data on compensation for the ECE workforce, the only routinely collected national information is published by the U.S. Department of Labor, Bureau of Labor Statistics, which releases annual wage and salary information on over 800 occupa-

tions. As of 2006, the most recent year for which data are available, the median annual salary was \$17,630 for a child care worker and \$22,680 for a preschool teacher, in contrast to \$43,580 for a kindergarten teacher and \$45,570 for an elementary school teacher (Bureau of Labor Statistics, 2008). Typically, child care workers, and many who identify as preschool teachers, work a 12-month rather than a 10-month year, suggesting an even greater gap between their salaries and those of K-12 teachers.

These federal data, however, should be taken only as rough approximations of current compensation in the ECE field—in part because these separate data collection categories of “child care worker” and “preschool teacher” bear little relation to actual terminology or staffing structures used in the ECE field today. Further, federal occupational wage data do not allow for other distinctions among job titles in the ECE field, such as teachers vs. assistant teachers in preschool programs. State and local research studies on ECE compensation suggest that wages are significantly higher for teachers than for assistants, in part because many teachers have more education and responsibility in the classroom (Whitebook et al., 2006a). Finally, the data do not allow for distinctions among individuals with the same job titles but with different levels of education; e.g., a preschool teacher with no college background, vs. a preschool teacher with a bachelor’s degree. These federal data do, however, highlight the longstanding problem of low wages for ECE professionals, which carries major implications for recruitment and retention of this workforce.

Unionization

A key difference between the K-12 and ECE systems is the extent to which these workforces are unionized. All 50 states have teachers’ unions and tenure laws, and 35 states and the District of Columbia have laws guaranteeing collective bargaining rights for K-12 teachers (Loeb et al., 2007). In addition to salaries and benefits, unions can advocate for aspects of the work environment that contribute to effective teaching, such as paid preparation time and ongoing professional development. By contrast, there is little research on the effects

of unionizing the ECE workforce (Brooks, 2003), primarily because unions do not have a strong presence in the field, with the exception of some Head Start programs and public school-based preschools. While unionization efforts in ECE appear to be increasing, especially in home-based settings (Chalfie, Blank, & Entmacher, 2007), further research is needed on union membership in the ECE workforce and its effects.

Teacher retention and turnover

The K-12 and ECE communities share concerns about retaining teachers, but the extent of the problem differs between the two fields. Turnover is potentially negative for children for at least two reasons: (1) if it results in a relatively inexperienced or unskilled teacher taking the place of a more experienced or skilled teacher; and (2) if the emotional attachment that children have formed with their teacher is disrupted, an issue of particular concern for young children because of the critical importance in the early learning years of establishing attachment and trust (National Scientific Council on the Developing Child, 2004).

U.S. Department of Labor data indicate considerably differing turnover rates in K-12 and ECE. Total replacement needs in 2006—i.e., the estimated job openings resulting from the flow of workers out of an occupation—were 29.5 percent for those identifying themselves as child care workers, a figure more than double that of preschool teachers (13.5 percent) and three times that of elementary school teachers (9.8 percent) (Bureau of Labor Statistics, 2008). And because of differences in the structure and delivery of ECE vs. K-12 programs, children in ECE are even more likely to be affected by turnover than these differences in turnover rates would suggest. ECE programs typically run continuously throughout the year, rather than on the academic year of a K-12 program, and ECE classrooms also rely more heavily than do K-12 classrooms on a team approach. Both of these factors make a child in ECE more likely than a child in K-12 to experience the departure of one or more teachers in a given year. In K-12 research or data collection other than that conducted by the Department of Labor, teacher turnover can refer to the percentage of teachers who change

particular teaching assignments within a school, change schools, or leave the profession altogether (Strong, 2005). While K-12 research tends to describe turnover as important because of its relationship to student outcomes, many studies also examine the effects of various aspects of teacher preparation—e.g., traditional or alternate routes to certification, scores on certification exams, or participation in an induction program—on retention rates (Boe, Cook, & Sunderland, 2006; Ingersoll & Kralik, 2004).

In ECE, no routinely collected data sets provide equivalent information across the whole field, although occasional or periodic studies of ECE settings report the percentage of teachers who have left their programs in the last twelve months, and some workforce studies include data on teacher tenure. Because of disturbingly high rates of teacher turnover in ECE, researchers have explored and linked turnover to poor program quality and poor outcomes for children, and have demonstrated a strong correlation between low compensation and high turnover (Helburn, 1995; Mill & Romano-White, 1999; Whitebook, Howes, & Phillips, 1998; Whitebook & Sakai, 2003).

Administrative climate

Principals and center directors serve somewhat similar roles in K-12 and ECE. They set the tone with respect to expectations for teachers, students, and parents. They hold responsibility for setting budgetary priorities to ensure that expectations are met. They hire and fire staff, decide on professional development opportunities, and provide flexibility in hours so as to enable teachers to undertake such opportunities. They can help create an atmosphere in schools and centers that encourages teachers to work collaboratively to improve their skills and share what they have learned.

But like teachers, administrators in the two fields are subject to much different sets of professional requirements. Only 20 states have some type of ECE director credential, and many set few or no pre-service training or education requirements (National Child Care Information Center, 2007b), whereas K-12 school principals typically need an administrative credential, and/or a master's degree, and some prior teaching experience.

Administrators in both fields must also comply with regulations that govern their systems and funding streams, of course, and these may limit their autonomy in decision-making. Principals, for example, operate within school districts that may set policy on curricula to be used, professional development to be offered, or academic goals. The federal No Child Left Behind Act drives much of the decision-making in schools and school districts today. Further, personnel decisions about individual teachers usually do not rest solely with principals, but must follow negotiated agreements between the school administration and the unions representing teachers and other school personnel.

But while ECE center directors may have more autonomy than K-12 principals with respect to such decision-making, especially if they are not part of a school-based preschool system or a national system such as Head Start, they are also much less likely to have the dedicated funding that is available to those larger systems for decent compensation, health and retirement benefits, or professional development for their staff.

2. Implications for Research: Defining and Measuring the Quality and Effectiveness of Schools, Programs, and Teachers

The central importance of teachers in helping to shape student outcomes is unquestioned in both the K-12 and ECE arenas. Studies of K-12 students and teachers, for example, have demonstrated that students who have effective teachers for several years in a row outperform those who do not, and as one research team has concluded, “Students who have even two ineffective teachers in a row are unlikely to ever recover” (Sanders & Rivers, 1996, p. 3, as cited in Huang, Yi, & Hancock, 2002). At least two research reviews in ECE have drawn similar conclusions (Bowman, Donovan, & Burns, 2001; National Research Council & Institute of Medicine, 2000).

Where K-12 and ECE research differ, however, is in how instructional quality has been defined and measured, spurred in part by differences in the policy concerns of, and types of data available in, the two fields. K-12 research has focused a great deal on teacher quality and teacher effectiveness as measured

by student outcomes, but less on program quality or teacher behavior in the classroom. In contrast, ECE research has focused much more on program quality and teacher-child interactions.

Research on teacher quality and effectiveness

In the K-12 arena, higher-*quality* teachers are seen as those whose students perform better on standardized achievement tests at any single point in time. But since a student's performance in a given year is the product of many factors, including the effects of the student's previous teachers, K-12 researchers have used a technique called "value-added modeling" to measure teacher *effectiveness*: i.e., how much a given teacher's students gained on achievement test scores based on the year of instruction they received from that teacher. (See Goe, 2007, for a description of teacher quality and teacher effectiveness; see the Appendix for a description of the methods and uses of value-added modeling.)

In order to answer questions about teacher quality and effectiveness, K-12 researchers generally rely on administrative data collected by school districts, and on federally supported national surveys that assess teacher preparation, teacher qualifications, and student achievement. Where available, such data allow researchers to track teachers and students over time, and to link student performance to the performance and background of specific teachers—with teacher quality and effectiveness primarily measured by student achievement test scores. K-12 researchers are therefore able to pursue answers to such pressing policy questions as the following, all measured by student outcomes:

- Are teachers with advanced degrees more effective than those with only BA degrees?
- Are teachers who have graduated from a traditional school of education more effective than those who have taken a nontraditional "alternate" route?
- Are teachers who are certified more effective than those who are not?
- Are teachers with more years of teaching experience more effective than those with fewer years of experience?

Using some of the same data sources, researchers have also examined the effect of teacher preparation on

teacher retention (i.e., the likelihood that a given teacher will remain in the field). Researchers have examined such questions at the school, school district, state, and national levels. The results of these studies on teacher effectiveness and teacher retention are summarized in the companion document to this paper, "Effective Teacher Preparation in Early Care and Education: Toward a Comprehensive Research Agenda," but the key points are these:

- The K-12 literature distinguishes between teacher quality and teacher effectiveness.
- The methods used to gauge teacher effectiveness rely on statistical modeling, the complexity of which means that different results can be obtained from the same data sets, depending on the models used.
- There is a wealth of regularly collected K-12 data in many school districts and states available for cross-sectional and longitudinal analyses linking students and teachers.
- Most analyses seek to associate teacher qualifications and teacher preparation with one of two primary outcomes: student test scores or teacher retention.

By contrast, the ECE field begins with few standardized approaches to collecting or reporting data about individual teachers or children, or about children's progress, either in a single year or over time. The data available in ECE are much more limited, and much less likely to be linked to child outcomes, than in K-12. This has led to an emphasis on *program* rather than *teacher* quality, with many analyses focusing on the effects of teacher preparation or background on program quality and, until recently, fewer focusing on child outcomes.

While data from student standardized tests are widely used and available in K-12, the appropriateness of basing funding and teacher retention or pay decisions on such data remains hotly debated throughout the educational community. Although standardized test data are much less available in ECE, their use in administrative decision-making is even more controversial in that field, because of additional concerns about the developmental appropriateness of standardized testing of young children, and the reliability of such assess-

ments—e.g., depending on whether the person administering them is familiar to the child, whether the child is rested, etc. (Guddemi, 2003; Meisels, 2006; Snow & Van Hemel, 2008).

Further, because there are no regularly, consistently collected data sources about teachers or students in ECE, as there often are in K-12 school districts, ECE research is much more likely to be drawn from smaller-scale studies, local experiments in a single program, or specially commissioned studies of a group of programs. Results of these studies are not necessarily representative of a state or of the national picture. Longitudinal data linking teachers with children's performance are not available in ECE for the more sophisticated statistical techniques that are used to measure teacher effectiveness in K-12.

Research on Program Quality

Traditionally, ECE program quality has been conceptualized as consisting of structural and process aspects. "Structural" quality has been measured by assessing such aspects of the environment as adult-child ratios, group size, and classroom size and materials. "Process" quality has been measured by assessing teacher-child relationships. Certain measures of global program quality, such as the Early Childhood Environment Rating Scale (ECERS-R; Harms, Clifford, & Cryer, 1998), as well as similar rating scales developed specifically for infant/toddler care, family child care, and school-age child care programs, have been widely used in ECE research. Over the years, many studies have demonstrated that smaller group sizes, higher teacher-child ratios, higher scores on these global measures of quality, and certain types of teacher-child relationships are all associated with better developmental outcomes for children (e.g., Bowman, Donovan, & Burns, 2001; Helburn, 1995; National Institute of Child Health and Human Development Early Child Care Research Network, 1996, 2000, & 2002; National Research Council & Institute of Medicine, 2000; Phillips, Mekos, Scarr, McCartney, & Abbott-Shim, 2000; Whitebook, Howes, & Phillips, 1998; Whitebook, Sakai, Gerber, & Howes, 2001).

In recent years, measures of ECE program quality have expanded to include more of the instructional practices in which teachers engage, and have also become specialized in measuring aspects of the environment associated with the development of particular skills. For example, the Early Language and Literacy Classroom Observation (ELLCO; Smith, Dickinson, Sangeorge, & Anastasopoulos, 2002) and the Preschool Classroom Mathematics Inventory (PCMI; Frede, Weber, Hornbeck, Stevenson-Boyd, & Colon, 2005), respectively, assess a program's ability to promote children's early literacy or numeracy skills, while the Classroom Assessment Scoring System (CLASS; Pianta, La Paro, & Hamre, 2004) is increasingly used to assess the socio-emotional climate and quality of teacher-child interactions, classroom management, instructional support, and academic content.

Throughout the years, however, there have been attempts to link characteristics of teachers with program quality, as measured by one or more of the standardized measures of program quality. Among the characteristics most frequently examined has been the teacher's educational background, such as completion of a bachelor's degree or not (Bogard, Traylor, & Takanishi, 2008; Early et al., 2007; Early et al., 2008), but relatively few studies have examined such other aspects of teacher preparation as the type and extent of coursework completed, mentoring, or fieldwork experience prior to teaching (Zaslow & Martinez-Beck, 2006).

Conclusion

This paper has examined teacher preparation, induction, and professional development in Grades K-12 and in early care and education, identifying the two arenas' differing vantage points, language, and terminology as a starting point for helping to bridge them, and to help shape a coordinated research agenda. As we have discussed, teacher preparation, and research about it, differ in the two fields for at least two central reasons: (1) all beginning K-12 teachers must meet minimal educational and background requirements, including possessing a BA degree, while most beginning ECE teachers do not have to meet such requirements; and (2) K-12 must meet more accountability and reporting

requirements due to federal legislation such as the No Child Left Behind Act.

As a result of these two main differences, the two fields differ widely in the quality and quantity of data regularly collected about teachers and student performance, and in the research questions typically posed and methods employed. But there are areas of commonality, too. Research in both arenas has explored questions related to teacher quality, preparation, and retention, although perhaps in different ways. Further, researchers in both fields increasingly report that gauging teacher quality and effectiveness requires a sophisticated understanding of three sets of factors: the pre-service preparation of the teachers; the induction, professional development, and support they received after they began teaching; and whether the workplace environment allows them to put into practice the skills and knowledge they have gained in teacher preparation and professional development (Darling-Hammond et al., 2006; Howes, James, & Ritchie, 2003; Vu, Jeon, & Howes, 2008).

Policy shifts are also driving the two arenas together. Public preschool programs have flourished in recent years, embraced by both the K-12 and the ECE sectors, at least in part because they are seen as ways to promote school readiness and assure better progress for all children throughout their K-12 school years. Many such efforts include as key elements the alignment of curricula and standards, and a number of recent public preschool initiatives have explicitly sought parity in wages and educational requirements for preschool and K-12 teachers. As such initiatives are extended, intersections between the two fields become ever more likely: ECE and K-12 teachers will attend the same teacher preparation programs at the same colleges or universities; they will have to meet the same requirements for certification and continuing education; and they will probably face the same approaches toward ongoing professional development.

In other words, while large differences between K-12 and ECE exist, these may shrink as policy drives

changes in practice within the two systems, and, indeed, as the two systems begin to merge in school districts that adopt a pre-K-to-Grade-12 approach (Foundation for Child Development, 2008). In the meantime, research from K-12 can inform policy and practice in ECE, and vice versa.

As a starting point for building a coordinated research agenda, we propose the following two general recommendations. More detailed research recommendations are included in our accompanying paper, “Effective Teacher Preparation in Early Care and Education: Toward a Comprehensive Research Agenda.”

(1) We encourage researchers, policymakers, and practitioners to abandon the “silo” view of K-12 as one world, and ECE as another, and to approach all of their efforts with an eye to recognizing and understanding differences, working toward shared terminology, and building collaborative research agendas that will enable both arenas to learn from one another.

(2) We recommend the development of a national ECE workforce data system to provide information that is compatible with state and nationally collected data about K-12 teachers.

The accompanying paper describes research findings from the two fields—and charts a shared research agenda for the coming years—with respect to all stages of teacher preparation and professional development, and to the impact of the work environment on teacher and program quality, teacher effectiveness, and teacher retention. Understanding these findings can help practitioners, administrators, policy makers, and researchers learn what needs to be done to build bridges across ECE and K-12, transform the ECE teaching system, and fashion strong and effective programs for the nation’s youngest students.

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APPENDIX

Value-Added Modeling

In “value-added modeling” studies, an individual student’s progress is tracked over time, and that progress is compared with the hypothetical progress the student would have made had he or she been taught by another teacher—such as the average teacher in the district, or the least effective teacher in the district. This hypothetical progress is determined through complex statistical modeling, with results of the analyses completely dependent on which factors are included or excluded from those models. Models can try to control for:

- the effects of students’ prior achievement—for example, the achievement a student displays at the end of fourth grade is partly the result of his or her learning in the first to third grades and the effects of those first- to third-grade teachers;
- the non-random sorting of teachers into schools, and students into classrooms with particular teachers;
- the effects of schools and the school environment on teachers and students; and
- the effect that a single teacher has on multiple students, and that students have on their peers.

A recent review concluded that value-added modeling can identify the one-quarter to one-third of teachers who are either much more or much less effective than other teachers, but it cannot achieve more precise rankings (Murnane & Steele, 2007).

No matter the methods used, the key teacher characteristics that researchers have attempted to link with student achievement are the aspects of teacher preparation that have been captured in many school- or district-level databases or national surveys: postgraduate education, work experience, college quality, certification, and teacher performance on standardized tests such as the SAT.

In summary:

- Value-added modeling to gauge teacher effectiveness can be conducted on K-12 teachers, because the K-12 system collects a great deal of data on teachers and student outcomes, and on the students in a teacher’s classroom. Those data are collected in such a way that the progress of individual students can be tracked over time and linked with their teachers.
- The results of value-added modeling vary depending on the variables that are entered into the models, which means that different researchers analyzing the same or similar data sets can sometimes reach different conclusions.
- Value-added modeling has been used for multiple purposes, such as comparing the effectiveness of teachers within or across schools or districts, or assessing the impact of teacher preparation on teacher effectiveness.

There is disagreement within the field over the appropriate use of the results of value-added modeling. Should such results be used to set teacher salaries, for example, or to make decisions on hiring or firing? Some researchers say that the results are sturdy enough that they can and should be used to make such judgments about individual teachers, or, at the very least, that they should be part of what goes into judgments about the performance of individual teachers. Others contend that these research methods have not yet been sufficiently refined, and that they should be used to explore questions such as the value of particular professional development or teacher education programs in connection with student outcomes, but not to make judgments about individual teachers.