

Increasing the Application of Developmental Sciences Knowledge in Educator Preparation

Policy and Practice Issues



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NCATE

The Standard of Excellence
in Teacher Preparation

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Preface

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This brief is a summary of *Increasing the Application of Developmental Sciences Knowledge in Educator Preparation: Policy Issues and Recommendations* by Robert C. Pianta, Randy Hitz and Blake West. It includes highlights and policy recommendations contained in that paper. The authors also thank Susan Zelman for her contribution to that paper.

This brief and the longer paper were commissioned by the National Council for Accreditation of Teacher Education (NCATE), with funding from the Strategic Knowledge Fund, a partnership between the Foundation for Child Development and the W. K. Kellogg Foundation. The Strategic Knowledge Fund supports projects that increase knowledge about children from birth to eight years old and their families, particularly children who are at risk for poor educational outcomes. The Strategic Knowledge Fund provided support to NCATE to promote “integration of child and adolescent development deeply and concretely into the preparation of America’s teachers.” The A. L. Mailman Foundation also supported this project.

NCATE conducted a reputational study and, with the support of the Foundation for Child Development, created a National Expert Panel on **Increasing the Application of Knowledge about Child and Adolescent Development and Learning in Educator Preparation**. The Panel met four times during 2008-2009 and produced two commissioned papers (briefs of which are designed for policymakers as well as educators), as well as a final report, entitled *The Road Less Traveled: How the Developmental Sciences Can Prepare Educators to Improve Student Achievement*. All are available at www.ncate.org. The papers may be downloaded from the website or are available as publications by clicking on Publications at www.ncate.org, or clicking on “Public” and “Research Reports.”

This work was preceded by a collaboration between the National Institute of Child Health and Human Development and NCATE to determine the current state of integration of child and adolescent development in educator preparation programs and the current state of developmental sciences knowledge. The effort found gaps between what is known and what is taught in educator preparation programs. The report is at www.ncate.org; click on Public, then Research/Reports. The Foundation for Child Development took a next step by initiating the effort that produced this paper and other related materials to set forth actionable recommendations to the education and education policy communities.

It is the strong desire of the Strategic Knowledge Fund leadership that the recommendations contained in the briefs, papers, and final report of this effort receive the utmost attention in the education and policy communities and that the organizations named in the section on policy recommendations, as well as other education stakeholders, take concerted and timely action to implement the recommendations.

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Increasing the Application of Knowledge About Child and Adolescent Development and Learning In Educator Preparation Programs

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Introduction

For over a century, our nation has made numerous efforts to reform our system of public education. Many would agree that these reforms have met with too little success. Public school systems across the country are failing many of our children. A 2009 Editorial Projects in Education nationwide study shows the average high school graduation rate in the nation's 50 largest cities is only 53 percent, signifying hundreds of failing city schools that some call dropout factories. Yet the rate is far greater in some areas. In Cleveland only 38 percent of high school freshmen graduated within four years, while in Baltimore only 41 percent of students graduate from city schools. Reforms instituted over the last decade have attempted to improve student outcomes by focusing on high standards and measurable goals for student learning. These goals and standards are aimed particularly at improving students' basic skills and are set individually by each state. Recently, the educational reform movement has begun to move past a narrow focus on basic skills to a new "deeper, broader, higher" set of skills and outcomes for students via new "common core" standards. The first set of common core standards has been introduced in mathematics and English language arts. Others will be forthcoming. Samples of the skills associated with the standards include the capacity to work in teams, leadership and motivation skills, communication skills, and proficiency in digital media and technology. Federal education policy initiatives are focusing on common standards across the states that will help prepare students for work and life in our increasingly complex society.

At the same time that our country is moving toward new and promising education reforms, the education field has become increasingly aware of two decades of rigorous scientific study about the nature of child and adolescent development and its relevance for education. As articulated in a recent report from the National Institute for Child Health and Human Development (NICHD), "current research points to the fact that aspects of development—neural, cognitive, social, psychological, physical, and ethical—have far-reaching effects on children's ability to learn" (NICHD, 2007). Unfortunately, little of this new knowledge is reflected in educator preparation programs.

This brief argues that teachers and education administrators need access to developmental sciences¹ knowledge—specifically about child and adolescent development—in order to make the most of students' abilities to engage with and benefit from the new policy reforms. In addition, we believe that if teacher education is to be a relevant factor in coming education reform, we must do a far better job of incorporating the developmental sciences knowledge into the fabric of programs and the process of teacher licensing. In this brief,² we lay out evidence that indicates there is currently no consistent, systemic, or programmatic linkage between the developmental sciences and educator preparation and describes the issues and barriers that must be overcome to create the necessary linkages. The paper and this brief end with concrete recommendations for how developmental sciences knowledge can be integrated into federal and state policy, educator preparation programs, and accreditation practices—for the benefit of our children, our schools, and our society.

¹ The term "developmental sciences" includes the science of child and adolescent development as well as cognitive science and neuroscience. We have used the term developmental sciences in the title to emphasize the necessity for educator preparation programs to infuse current and established knowledge in these sciences into curricula for prospective teachers, while emphasizing knowledge of child and adolescent development.

² This document summarizes a longer paper of the same title by R. C. Pianta, R. Hitz, and B. West, available at www.ncate.org. All research references are contained in this longer paper.

Developmental Sciences Knowledge and Its Implications for Educator Preparation

What has the scientific research revealed about child and adolescent development?

Two decades of research have resulted in a solid, well established body of scientific evidence on how children and adolescents develop and the role that classroom instruction and home experiences can play in that development. This research includes scientific discoveries by such notable organizations as NICHD and the National Early Literacy Panel about how children develop specific skills such as early language, literacy, and mathematics. For example, studies have identified specific skill “targets” (alphabet knowledge, reasoning, problem solving) that are particularly responsive to intervention and that are linked to language, literacy, and math development in preschoolers. This science is extremely important since there is also evidence that these skill targets are likely to be underdeveloped among at-risk pupils, and early intervention in these areas could boost academic achievement (NELP, 2004).

Another area of critically important scientific discovery, particularly in the last decade, is adolescent development. In nearly every area—cognition, brain development and neuroscience, physiology, endocrinology, and social development—our understanding of basic developmental progress has deepened and broadened substantially. This new knowledge of adolescent development is especially important since the adolescent years are one of the most important periods of human cognitive, biological, and social growth and change. According to developmental research, adolescents have four basic developmental needs:

1. Relationships: I want to connect with others.
2. Autonomy: I want to be independent.
3. Competence: I want to experience success in what I do and feel like a worthwhile, significant person.
4. Relevance: I am more motivated and challenged by skills and content that relate to my life experiences.

A range of studies show the connections between these needs and students’ academic achievement and sense of social connection. Recent study results show that a youth’s sense of isolation can have a powerful effect on learning. Feelings of alienation can be powerful enough to temporarily depress results on tests and increase irrational and risk-taking behavior (Twenge, Catanese, & Baumeister, 2002). The power of peer interactions can be used either to promote or detract from academic pursuits, depending on the structure of the classroom (Berndt & Keefe, 1996). Further, research on teachers’ behavior in the classroom shows that it has a significant impact on student learning. Studies show that more cooperative, developmental methods, particularly those that reward the learning of all students in the classroom, have consistently been found to increase levels of student achievement and engagement (Slavin, 1996).

As indicated above, research shows that adolescence is a time when autonomy and self-expression are basic developmental needs. Experiments in secondary classrooms show that teachers make an avoidable error when they attempt to control youthful energy with punitive teacher-driven methods that discourage exploration and curiosity. Teachers can support autonomy by giving students opportunities to show independence—for example, to choose the types of projects to complete. In fact, involving students in real-world learning experiences, such as community service projects accompanied by ongoing class discussion, has been shown to reduce failure rates by 50 percent with profound [positive] effects on behavior (Allen, Philliber, Herrling, & Kuperminc, 1997).

How are teacher preparation programs integrating developmental sciences knowledge?

In spite of this explosion of developmental sciences knowledge, too little of this important research is influencing how schools of education prepare teachers for the classroom. For example, regarding the skill targets discussed above, research indicates that early language and literacy curriculum interventions can be used in classrooms and integrated into teacher preparation programs to address these areas directly (Justice & Ezell, 2002; Wasik & Bond, 2001). However, observational studies show little evidence that such interventions are used in many early education classrooms. Even when these literacy and language approaches are available in a classroom, they often have no effect on child outcomes because of the low quality of instruction and the (likely) limited support teachers receive for how to apply this knowledge (Dickinson & Brady, 2005; Howes et al., 2008). Therefore, in the area of literacy, where there is so much information about how to improve early learning and so much need, particularly among underserved populations, and where education research has focused for over a decade, this knowledge has yet to penetrate teacher preparation and practice.

A very similar situation exists for early math development. Recent advances in understanding mathematics development and the ways in which instruction and interaction with adults can foster progress are not well reflected in teacher preparation, or teacher knowledge and application in the early grades. Most scientists and educators agree that this is a consequence of teachers' own lack of math knowledge and skill, lack of knowledge about math development, and lack of knowledge and skill in how to teach and support math. On the other hand, a recent National Academy of Sciences (NAS) report outlines



Clearly there is a disconnect between the developmental sciences and teacher preparation programs.

a very clear set of parameters for mathematics development as well as for cognitive skills that, as with the literacy skills described above, could serve as high-priority skill targets for intervention (Cross, Woods, and Schweingruber, 2009). Moreover, the NAS report and several controlled studies reveal quite clearly that teachers can be trained in knowledge of math and how to teach it and can be supported in their classroom practices around math in ways that dramatically improve children's mathematics performance (Clements and Sarama, 2008; Ball and Cohen, 1999). Unfortunately for our children, there is scant evidence that this is happening.

There is additional evidence to support the argument that teacher preparation and the developmental sciences are not connected. In 2008, NCATE surveyed its accredited schools of education and found that while commonly used texts on child development reflected basic knowledge, most contained little to no information linking these advances to PreK-12 teaching applications. The survey found that while 80 percent of respondents indicated that their teacher preparation candidates were required to take at least one child and adolescent development course, half stated that this requirement was insufficient for effective practice. Most respondents also noted that required texts had little to do with applying the developmental sciences knowledge to teaching and learning in the classroom, and most professors had to supplement material on their own. Clearly there is a disconnect between the developmental sciences and teacher preparation programs. Further, some state laws and regulations have capped the number of education courses that can be taken for initial licensure, making it more difficult for teacher candidates to increase their knowledge of child and adolescent development science and to practice applying it. The challenge to teacher preparation programs is threefold:

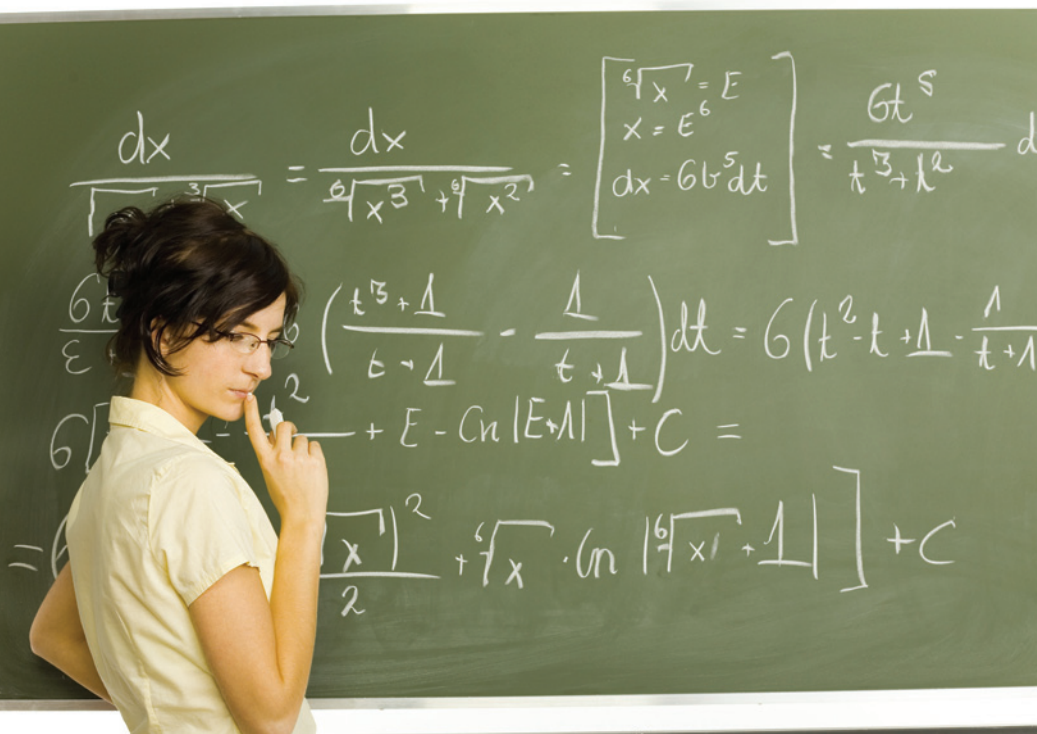
- *Teacher candidates must be provided with a depth of current developmental sciences knowledge.*
- *Teacher candidates must not only be exposed to this new science but must be taught to apply this knowledge in schools and classrooms.*
- *There are too few tools available to guide teachers in learning and or/improving developmentally sensitive instructional techniques.*



What are the implications of the disconnect between the developmental sciences and educator preparation?

The bottom line is simple: the lack of exposure to developmental sciences knowledge in educator preparation programs is having a negative impact on our children and youth. In spite of all the available new scientific knowledge, disengagement and alienation of our youth are at an all-time high. Classroom experiences are too often disconnected from their developmental needs. According to a 1997 study by Public Agenda, most students do not feel that their teachers care about them personally. By high school, as many as 40 to 50 percent of students become chronically disengaged from school (Klem and Connell, 2004). A visit to many schools will show that many of today's middle and secondary school classrooms are not settings for positive youth engagement. At a time when the world is becoming a more complex place, adolescents are confined to a classroom for hours a day with too little vision of how what occurs in that classroom relates to the larger world. The youthful energy, excitement, and enthusiasm often reside in the hallways and lunchrooms—not in the classroom.

A 2010 Shott Foundation report reveals that the overall 2007-2008 graduation rate for Black males in the U.S. was only 47 percent. Cities perform poorly. New York City only graduates 28 percent of its Black male students with Regents diplomas on time, as does Philadelphia. These dropout statistics speak for themselves. However, some areas perform better. For example, in Montgomery County, Maryland, 68 percent of Black males graduate on time. Montgomery County has long had in place a systematic, intensive strategy based on developmental principles and strategies from Pre-K through high school.



The Need for a New Approach and What It Means for Educator Preparation

Following is an excerpt from an observation of a teacher and her eighth-grade class as they prepare for a debate:

The teacher makes eye contact and warmly greets students by name as they enter the class, which elicits students' attention and many smiles in return. The teacher takes time to ask students about time or activities out of class that she knows are important to them, and her questions show evidence that she values and respects personal information about their lives. The students engage actively with peers while they also appear to follow an organizational routine as they gather materials, take their seats, and prepare for class until the teacher says it is time to begin. The teacher begins the debate activity by situating it within a "big idea" that is relevant to contemporary eighth-graders and reflects her knowledge of these students' lives. So that the students will be able to apply their thinking to a real-world event, she asks her students which debates they have seen in person or televised. As students respond, the teacher is looking around the room to notice body language as a gauge for if students look confused or are nodding in agreement with their classmates' comments. Several times the teacher responds to the student remarks with probing prompts like "tell me more about what you mean" or by asking another student to rephrase what has been said; e.g., "Can you say in your own words what Christa is referring to?"

The session now turns to setting the stage for the students to prepare for and conduct a debate. Students quickly move to their debate team, and the teacher compliments the class for their cooperation, noting specific behaviors. The teacher provides each team with their side of the debate they will need to argue and then provides direction for what the team will need to present in the debate. She then allows the teams to talk together to decide what they will present. She reminds the team that even though only one person will present the opening argument of the debate, any of them could be called on so they all should know well what the team point is.

Once the teams start their discussions among themselves, the teacher moves from one group to another. When she joins a group, she crouches down to their eye level, looks around the group at each of them, and is smiling. In one group, a student asks her for clarification on a point. The teacher first asks the group members to see if they have a response that will help their teammate. When no one replies, she says, "Let's go back to yesterday's discussion to see what might give us a better idea about this." At that point, after giving them the cue that what they covered yesterday will be helpful to them now, several students are able to provide clarifying information based on their class conversation from the previous day. The teacher asks the original student to restate what he heard. When he responds, the teacher affirms he seems to understand the information now, and restates it again in a different way. All of this has happened in less than 15 minutes.

This classroom experience highlights a teacher who understands critical adolescent development needs: connection in relationships; autonomy, competence, and relevance (see page 2). The teacher exhibits intentional behaviors that have been linked to effectiveness

in observational trials. This teacher supports relationships and creates a positive and engaging classroom environment by knowing the students and showing respect when she greets them. The positive relationships are also reflected in the ways the students talk to one another. In support of autonomy and competence, the teacher makes it clear both in what she says to students and in the way she interacts with the students that their viewpoint is important and that they are also responsible for their learning as a group. The teacher also shows multiple examples of being aware of and responsive to what students know and provides different types of supports (students' clarifying ideas for one another, her restating information in different ways) to ensure they are continuing to participate and learn. By grounding the debate activity in relevant, real-life experiences, and then encouraging a deep understanding of the content through interactive discussion, the teacher is able to go beyond the recall of bits of information to help her students gain an understanding of concepts at a broader level. The feedback that she gives her students, and that they give one another, extends their learning and understanding and encourages a higher level of student engagement. Applying knowledge of adolescent developmental principles helps the teacher use intentional behaviors that are designed to increase student engagement and motivation.

While evidence shows that the current standards-based approach has meant increased attention to student outcomes and the connection between outcomes and what is taught in the classroom, as the dropout rates above show, it has not significantly improved student performance. More than a decade into standards-based reform, far too many students still fail to complete high school or are not prepared for college or a career. Even those who are ready for college often engage in their schoolwork on a superficial level. Increasingly, experts agree that today's students not only need to be proficient in basic academic skills, they need the advanced skills and dispositions necessary to thrive in the 21st-century workplace. A 2009 report of the Center for Workforce Preparation says that workers must be competent in three "foundational" skill areas to succeed in the new workplace:

- Basic skills: reading, writing, listening, and mathematics;
- Higher-order intellectual skills: reasoning, creative thinking, decision-making, and problem-solving; and
- Motivation and character: personal maturity, responsibility, sociability.

Applying knowledge of adolescent developmental principles helps the teacher use intentional behaviors that are designed to increase student engagement and motivation.

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These skill areas are the focus of nearly every discussion of contemporary education policy reform and are likely to play a central role in the reauthorization of the Elementary and Secondary School Act. Activity is also underway to develop new common core standards across states that emphasize advanced cognitive and group collaboration and other higher-order thinking skills. In addition, there have been recent parallel efforts to develop ways to measure student development and learning that go beyond standardized tests and include observations of student engagement and social interaction. These endeavors are timely since they emphasize the approach to learning recommended by the new science on child and adolescent development—integrating academic, social, and emotional development as a way of engaging students and improving academic performance.

Amber Damm, *Minnesota Teacher of the Year for 2009*, puts it this way:

Unlike the quick fixes often promoted, the best programs in education take time. Thoughtful implementation requires deep insight, continual learning from the theory to practice and back to theory, and a grounding in the human values that create a true learning culture. The need to integrate social and academic curriculum is urgent. The work of integrating the ethical and the intellectual, the moral and the academic, the social and the personal, is the heart of our mission as teachers.

Lessons from developmental science show that children and youth are far more capable of learning advanced skills when given the opportunity to learn them—and they can do so with considerable ease. At the same time, experimental trials show that teachers are able to be more effective in the classroom and produce higher student learning gains if they have the benefit of developmental courses and coaching approaches. The fundamental question is, recognizing the singular role that teachers play in fostering student gains, what can be done to ensure that they are equipped with the most current knowledge of how children develop and learn? How can we ensure more classrooms like the ones described above? This is not a call for courses in self-esteem or advocacy of a position that has no basis in solid scientific research. As has been argued throughout this paper, the best science demonstrates with great clarity that there is a knowledge base in child and adolescent development that relates to the education of young people. If the best science in education identifies teachers as the key to student performance, then we must connect the science with teacher preparation. For the benefit of our children, educator preparation programs must integrate child and adolescent development science into candidates' coursework and field experiences. Teachers in the field should then be held accountable for their performance, based on that set of knowledge and skills.

The remainder of this paper outlines issues and challenges involved in effectively integrating developmental sciences knowledge into teacher preparation. Four policy areas are covered: policies related to educator preparation programs, policies related to national accreditation, and education policy at the state and federal level. We offer policy recommendations addressing the challenges in each area.

Policy Issues and Challenges in Four Key Environments

A. Educator Preparation Programs

Although there are notable and a growing number of exceptions (e.g., Teach for America, the Teaching Fellows programs in New York City and Boston, and Troops to Teachers), the vast majority of teachers in the United States are prepared in educator preparation programs in institutions of higher education, with about 70 percent of them prepared in professionally accredited programs. This infrastructure, consisting of a vast array of institutional, personnel, and programmatic resources, is unwieldy, complex, and often resistant to change, and it has been increasingly the focus of critiques for its failure to provide evidence of its benefits to teacher candidates and the students they serve in PreK-12 classrooms. Educator preparation programs in colleges and universities can and should be the main mechanisms for integrating knowledge about child and adolescent development science and practice into the classroom, and can strengthen their curricula by cross-fertilization with, for example, developmental psychology departments. However, the fundamental nature of university-based educator preparation poses barriers to policy implementation that are critical to address if the full benefits of key policy shifts are to be realized.

Issues and Challenges

Offering coursework in developmental science: No one would argue that all teachers should not have a deep understanding of the subjects they will teach as well as the knowledge and skills necessary to help all students learn. The challenge of adequately preparing teacher candidates for the classroom within a time-limited program is also understandable. However, it is not clear whether recommending additional coursework in child and adolescent development, in and of itself, would improve teachers' knowledge, the quality of their teaching, or their students' learning. Courses vary considerably in nature and quality. What is clear is that educator preparation programs must determine the best strategies for making child and adolescent development science an explicit, fundamental part of their curricula, including deciding on content, skills development, practice approaches, and skills assessment strategies **woven throughout the programs.**



Faculty capacity: Perhaps one of the greatest challenges to increasing emphasis on contemporary knowledge in child and adolescent development in the teacher preparation curriculum may be the lack of knowledge on the part of the majority of teacher education faculty and PreK-12 school partners. In a high-quality teacher preparation program, goals, activities, and assessments related to child and adolescent development knowledge and skills must be clearly stated and easily identified throughout the curriculum—in courses, practica, assessments, and preparation milestones. Teacher education faculty members must engage in regular review of the program based on evidence collected from assessments and must regularly update the curriculum on the basis of new knowledge in the scientific literature. Most educator preparation programs have different groups of faculty, each with a different status in the institution and a different role in and influence on the curriculum. These include faculty who provide coursework; faculty who supervise student teaching; and cooperating/supervising PreK-12 teachers. Accreditation standards and some reform initiatives have motivated many programs to improve communication among these different faculty groups to ensure better overall coherence and preparation for teacher candidates. Nevertheless, the distinctive faculty roles remain, and they challenge the creation of a coherent, effective, and efficient curriculum. Add to this the fact that many educator preparation programs employ large numbers of adjunct faculty. This makes reaching agreement on goals and curriculum priorities and communicating these effectively to all instructors much more complicated.

Instructional resources and partnerships: Field experiences and student teaching are crucial parts of the development of any new teacher. Coursework in child and adolescent development must be integrated with ongoing opportunities to experience key principles firsthand. Further, opportunities to practice skills such as identifying the developmental needs of a student, adjusting instruction to meet individual needs, and reflecting on practice, must be extensive and intensive. Developing these types of rich practice opportunities for students will be a challenge for many programs. For field experiences to be most effective, they must reflect a coherent design and implementation—a design that requires placement sites and cooperating teachers to carefully align classroom experiences with developmental concepts and coursework. Programs must address not only the learning and experiences for the candidate but also the ongoing development and support for field supervisors and cooperating teachers.

In order to provide rich practice opportunities for candidates, educator preparation programs must identify and select PreK-12 school placements that already reflect an understanding of developmental issues. This requires higher education institutions to have a working knowledge of school sites for all placements and for field experiences associated with coursework. The way in which university structure and policy are now set up hinders faculty members from having the time or resources to develop the collaborations with field placement sites. It is, however, attention to the quality of collaboration between teacher preparation programs and PreK-12 schools that will result in child and adolescent development becoming a central tenet of the new teacher's development.

Further, whether through use of video or visits to classrooms, candidates should have the opportunity to see and discuss teaching and learning strategies, so they can begin to experiment with their own planning and instructional delivery. At present, there is a dearth of such opportunities. Even more important, however, is the need to establish a

set of evidence-based “common denominators” that identify effective practice and are applied consistently in all candidate observation sessions. If candidates do not see common developmental principles being applied consistently, whether through classroom observation or on video, it is unlikely that these principles will take sufficient hold. This requires that PreK-12 schools and university partners share a common understanding of key principles to be observed and collaborate to design meaningful opportunities for candidates to experience those principles in action.

B. National Accreditation Agencies

Every profession must have command of the knowledge required to perform competently in that area and must certify that professionals have mastered that knowledge in contemporary forms. Professionals are routinely prevented from engaging in practice and enjoying the benefits of a profession when they fail to demonstrate knowledge or skill related to that profession’s standards. The teaching profession lags far behind many others in the creation and regulation of knowledge and skill standards, leaving most regulation to states and certifying organizations. Teaching, as a profession, needs to reach clearer consensus on how to measure standards directly and with appropriate stakes attached, and the consequences of either success or failure to attain standards. This must include not just the developmental sciences knowledge but also the ability to use the principles of development in teaching.

Issues and Challenges

Setting Accreditation Standards: National accreditation is widely accepted and expected in medicine, pharmacy, law, engineering, nursing, architecture, and social work. But in education only around 70 percent of all schools of education are nationally accredited; fewer than 50 percent of the top *U.S. News and World Report* schools of education are nationally accredited. National accreditation, as well as clear, measurable knowledge and performance assessments for the contemporary developmental sciences knowledge, would be a major move forward in teacher preparation and certification. The oldest and largest national accrediting body for teacher education programs, NCATE, has six broad unit standards that have fairly widespread acceptance in the education field. However, none of these standards makes reference to candidate knowledge of child and adolescent development or the ability to apply it, although it is referenced in a few rubrics, including one on PreK-12 student learning. Thus it is conceivable that educator preparation

*The Panel
recommends a
revision of the
unit standards to
incorporate the need
for developmental
sciences knowledge
and how to apply
it in PreK-12
classrooms.*





programs can meet NCATE standards and actually not prepare candidates to understand and apply knowledge of child and adolescent development.

Developing a Shared Vision: In addition to the six standards, NCATE requires that schools of education create a conceptual framework for their programs which “establishes a shared vision for the school’s efforts to prepare educators to work in PreK-12 schools.” This is a very broad requirement that currently lacks explicit reference to child and adolescent development knowledge. A program’s conceptual framework is of prime importance, since it forms the foundation for all candidate and program assessment. Therefore, requirements for the framework need to be strengthened to expect schools of education to specifically articulate the ways in which contemporary knowledge of child and adolescent development will ground all instructional and teacher preparation experiences.

Specialized Professional Association Standards: NCATE also includes in its accreditation system 21 sets of disciplinary standards developed by specialized professional associations. Some of these standards already include a heavy focus on child and adolescent development, such as those for early childhood, elementary, and middle schools. Many others, including some secondary and specialty areas, do not include clear expectations for the application of child and adolescent development knowledge. Because many states utilize these disciplinary standards as a basis for approval of teacher preparation programs, it is critical that contemporary knowledge of child and adolescent development be explicitly reflected in the standards. This includes attention to assessment and instruction as well as knowledge.

Given NCATE’s considerable influence in the design and delivery of educator preparation, the organization must place the need for clear standards, relevant and authentic assessments tied to practice, and the tools for developing these approaches at the core of any effort to infuse child and adolescent development science into teacher preparation. Otherwise, efforts are likely to be superficial and lack any real impact. The panel recommends a revision of the unit standards to incorporate the need for developmental sciences knowledge and how to apply it in PreK-12 classrooms.

C. State Education Policy

Much policy pertaining to teacher preparation and performance is made at the state level. For the most part, there is a close and coordinated connection between state policy requirements for teacher certification, licensure, and preparation and the work of major accrediting organizations such as NCATE. Perhaps the area with the most immediate potential to drive policy for infusing child and adolescent development science into teacher preparation is evaluation of teachers. Teacher performance assessment is on the cutting edge of a

whole assortment of second-generation education reforms and is being advanced through innovations in districts and some states, and with strong support of major foundations. There is scant evidence that child and adolescent development is included in these innovations.

Issues and Challenges

Teacher evaluation: States play a major role in driving teacher preparation and quality through the ways in which they evaluate teacher performance. Appraisal of teachers' professional practice is typically required by policy at the state level and designed and implemented at the district/local level. There is little evidence that knowledge of child and adolescent development, or its application, is present in these state systems for evaluating teachers. Currently there are two wide-scale, scientific efforts to extend the developmental sciences knowledge into teacher performance assessment: the Gates Foundation's "Measures of Effective Teaching" study and the William T. Grant Foundation's efforts to develop assessments of the quality of settings serving youth. In both of these efforts, there is a pronounced focus on developing rigorous assessments of teachers' actual performance in classrooms that, at least in part, reflect their understanding and application of child and adolescent development. To the extent these large-scale rigorous studies yield assessments that are reliable and valid, they hold promise for state certification and licensure systems to integrate knowledge of child and adolescent development into their assessments.

Tiered licensure systems: The Council of Chief State School Officers (CCSSO) released model core teaching standards in 2010 for field comment. These standards are a step forward in recognizing the importance of integrating principles from the developmental sciences in educator preparation and in the P-12 classroom. We urge all states to adopt these model core teaching standards. CCSSO is working across states to adopt a national system of teacher assessment that builds off the work of Connecticut's BEST (Bureau of Educator Standards and Certification) and California's PACT (Performance for California Teachers). Such a model implemented in state policy might include assessments for licensing, career growth, and National Board certification. NCATE, the National Board for Professional Teaching Standards, the National Education Association, the American Federation of Teachers, and the National Commission on Teaching and America's Future could, and perhaps should, come together to design and advocate for a national system of teacher assessments and a tiered licensure system. However, unless the system explicitly articulates the content of child and adolescent development that teachers are to know, as well as standards for measuring that knowledge and its application, this promising reform could easily fall short of expectations and fail to change teacher performance or children's learning.

D. Federal Education Policy

In what may be an unprecedented federal investment in public education, the American Recovery and Reinvestment Act of 2009 has devoted more than \$100 billion to build the capacity of states, school districts, and institutions of higher learning to educate our children and youth for the new and complex global environment. This investment is based on four basic strategies: implementing new standards and assessments; improving teacher effectiveness; improving national, state, and school district data systems; and turning around

low-performing schools. Numerous grant competitions are underway in response to this funding that require applicants to adhere to specific criteria set by the federal government. Unfortunately, almost none of the criteria for receiving these federal dollars explicitly requires states, school districts, or teacher education programs to advance teachers' understanding of developmental sciences and practices. We believe this means the education reforms being proposed will not be strong enough to have the desired impact on student outcomes.

Issues and Challenges

Implementing New Standards and Assessments: There is nothing in the Race To The Top (RTTT) criteria to prevent states from including child and adolescent development science in new academic content standards and standards for teacher knowledge and practice. At the same time, there is nothing explicit in the request for proposals to the states that mentions the need to include developmental science in new standards and assessment practices or the link between these practices and improved student performance. We believe this is a lost opportunity.

Improving Teacher Effectiveness: RTTT requires states to improve teacher effectiveness by adopting a definition that is linked to student achievement. This is a small move in the right direction but will only be a true advance if states, local education agencies, and schools use multiple measures of teacher effectiveness and include in those measures authentic assessments of teachers' knowledge of the developmental sciences knowledge. These assessments should not just be limited to basic knowledge of child development but should include knowledge of the complex factors involved in child development and the ability to apply developmental science in classroom practice. Current RTTT law and criteria for funding do little to link teacher effectiveness to the developmental sciences knowledge.

Improving Data Systems: To qualify for RTTT funds, states must develop data systems that have the ability to create links between and among teachers and principals, student performance data, and in-state teacher education programs. States need the ability to review and use data from all of these sources to create preparation and credentialing programs that are successful at producing effective teachers and principals who understand and can apply principles from the developmental sciences.

Turning Around Low-Performing Schools: RTTT requires states to develop plans to turn around low-performing schools. Presently, most turn-around models focus on issues of management, data use, leadership, and school organization to achieve results. However, there is ample evidence that if school environments are to be successful in meeting the education challenges of high-poverty, high-need communities, they must be grounded in culturally specific knowledge of child and adolescent development. Failure to require that turn-around proposals be grounded in a developmental approach to school design and management is a recipe for continuing the cycle of low performance and alienation already present in these schools.

Recommendations Summary

Each major stakeholder group has a role to play in implementing change.

Educator preparation programs should ensure that candidates possess contemporary knowledge of child and adolescent development and its effective application in the PreK-12 classroom.

Accrediting bodies should adopt standards for educator preparation programs that incorporate specific evidence of candidates' mastery of the core competencies identified with knowledge of child and adolescent development.

States should ensure that the knowledge base of child/adolescent development is integrated into all routes to teaching.

When relevant, explicit use of “knowledge and application of the contemporary developmental sciences knowledge” should be added to review criteria for **U.S. Department of Education** grant programs.

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